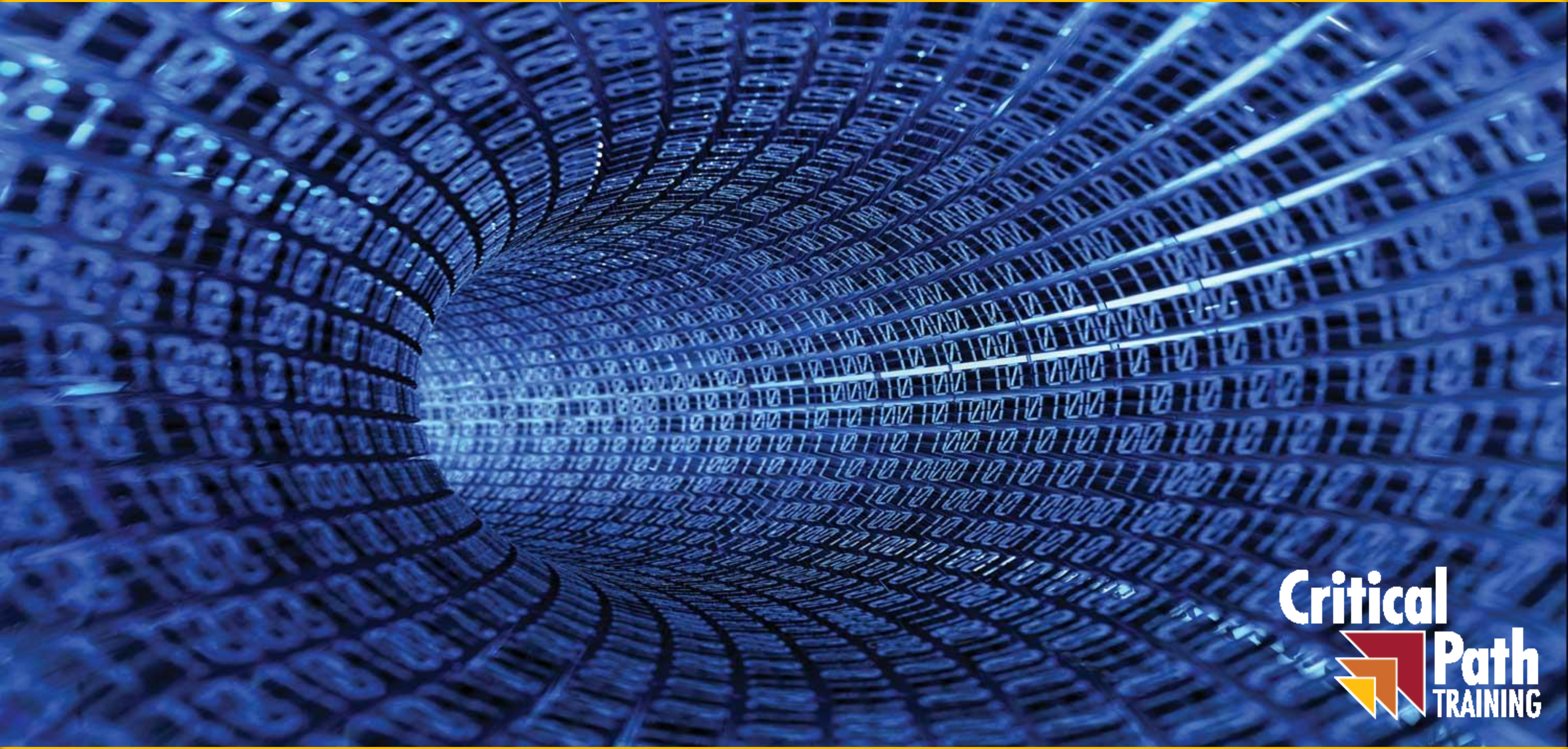
# Streaming Datasets and Real-time Dashboards



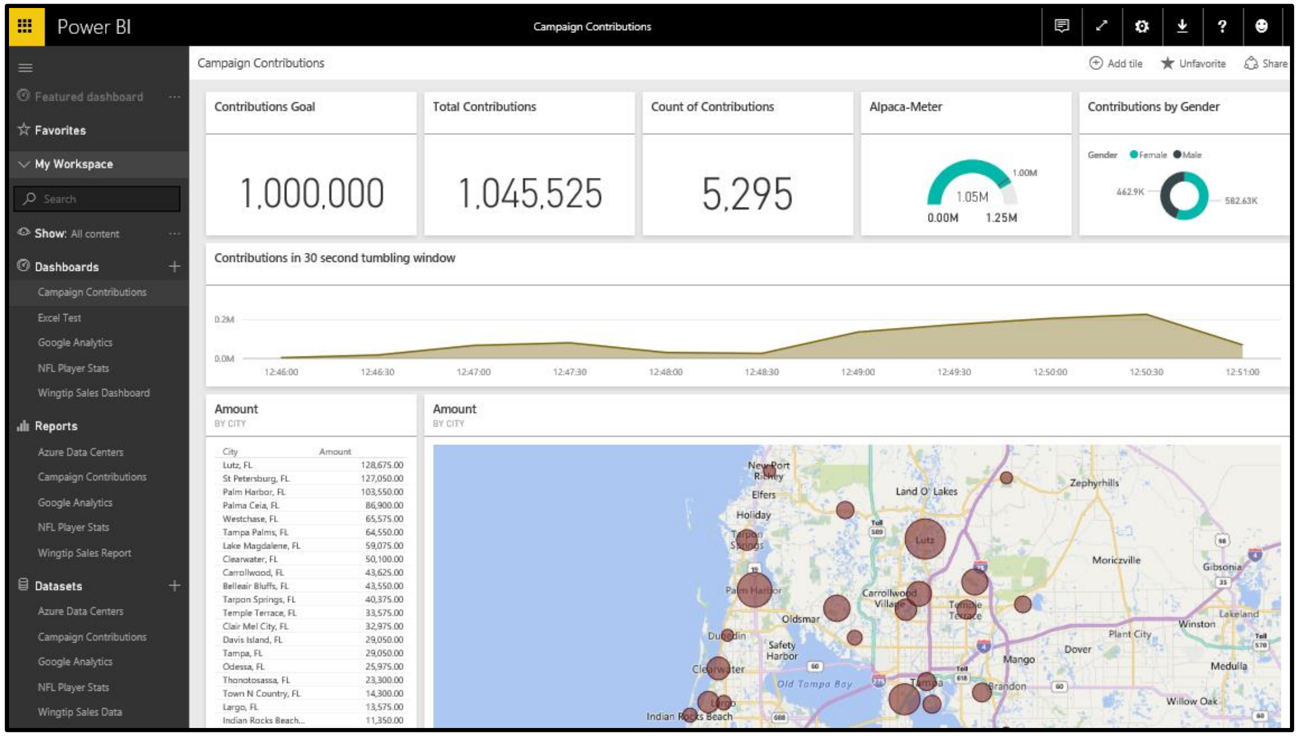
Critical Path TRAINING

## Agenda

- ➢ Power BI Embedding Fundamentals
- App Workspaces and Premium Capacities
- Authentication with Azure Active Directory
- Programming with Power BI Service API
- Working with Embeddable Resources
- Embedding with Power BI JavaScript API

# The Power BI Service

- Provides cloud-based foundation for Power BI platform
  - Accessible with browser through https://app.powerbi.com
  - Accessible through Power BI mobile apps
  - Accessible to developers through Power BI Service API

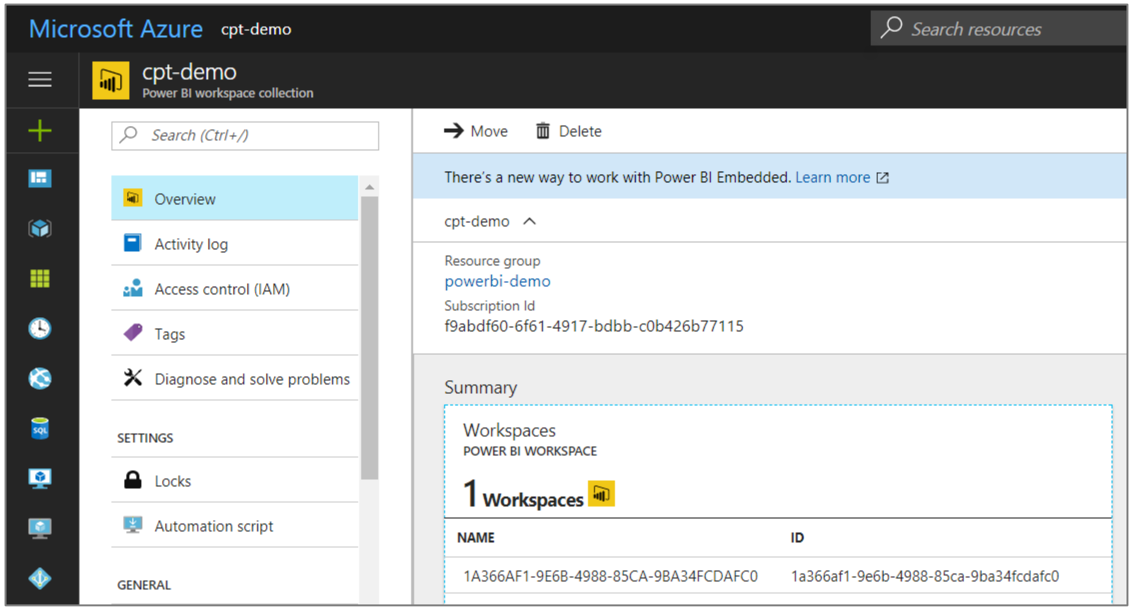


Amount
BY CITY

| City | Amount |
|---|---|
| Lutz, FL | 128,675.00 |
| St Petersburg, FL | 127,050.00 |
| Palm Harbor, FL | 103,550.00 |
| Palma Ceia, FL | 86,900.00 |
| Westchase, FL | 65,575.00 |
| Tampa Palms, FL | 64,550.00 |
| Lake Magdalene, FL | 59,075.00 |
| Clearwater, FL | 50,100.00 |
| Carrollwood, FL | 43,625.00 |
| Belleair Bluffs, FL | 43,550.00 |
| Tarpon Springs, FL | 40,375.00 |
| Temple Terrace, FL | 33,575.00 |
| Clair Mel City, FL | 32,975.00 |
| Davis Island, FL | 29,050.00 |
| Tampa, FL | 29,050.00 |
| Odessa, FL | 25,975.00 |
| Thonotosassa, FL | 23,300.00 |
| Town N Country, FL | 14,300.00 |
| Largo, FL | 13,575.00 |
| Indian Rocks Beach... | 11,350.00 |

## What ~~is~~ was Power BI Embedded V1?

- Power BI Embedded V1 is an Azure Service
  - PBI Embedded service that is provisioned on-demand
  - Service provisioned in terms of workspace collections
  - PBI Embedded service required an Azure subscription
  - Pricing model based on number of report sessions



There's a new way to work with Power BI Embedded. Learn more

cpt-demo

Resource group
powerbi-demo

Subscription Id
f9abdf60-6f61-4917-bdbb-c0b426b77115

Summary

Workspaces
POWER BI WORKSPACE
1 Workspaces

| NAME | ID |
|---|---|
| 1A366AF1-9E6B-4988-85CA-9BA34FCDAFC0 | 1a366af1-9e6b-4988-85ca-9ba34fcdafc0 |

## Reflecting on Power BI Embedded V1?

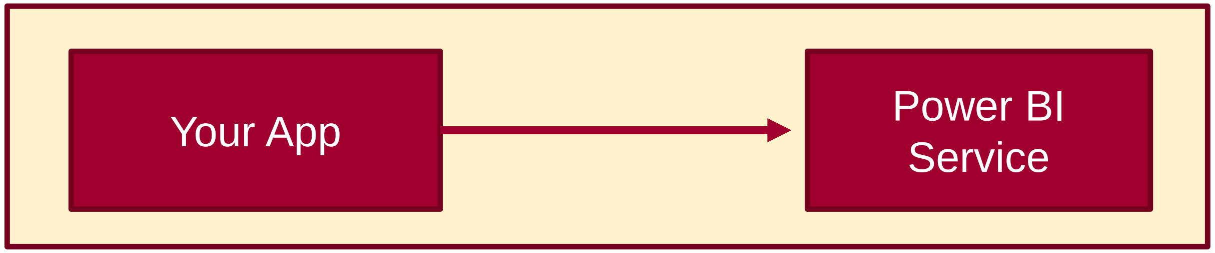
- Good Points about Power BI Embedded V1
  - It eliminates need for Power BI license for each user
  - It decouples user security from app security
  - It opens up PBI platform to commercial applications
- Pain Points with Power BI Embedded V1
  - Requires developers to have Azure subscriptions
  - No out-of-box UX to upload and manage PBIX files
  - It uses separate APIs from Power BI Service API
  - Cannot estimate costs with per-session pricing model
  - It’s deprecated and not available to new customers

## Power BI Embedded Version 2

- Power BI Embedded V2 has same good points as V1
  - It eliminates need for Power BI license for each user
  - It decouples user security from app security
  - It opens up PBI platform to commercial applications
- Power BI Embedded V2 significantly improves upon V1
  - Embedding features all available through Power BI Service API
  - Standard PBI UX used to upload and manage PBIX files
  - New pricing models allow for predictable costs per month
  - No need to create, manage and monitor any Azure services
- The term “Power BI Embedded” is now ambiguous
  - Better to refer to the “Embedding features in Power BI”

# The Power BI Service API

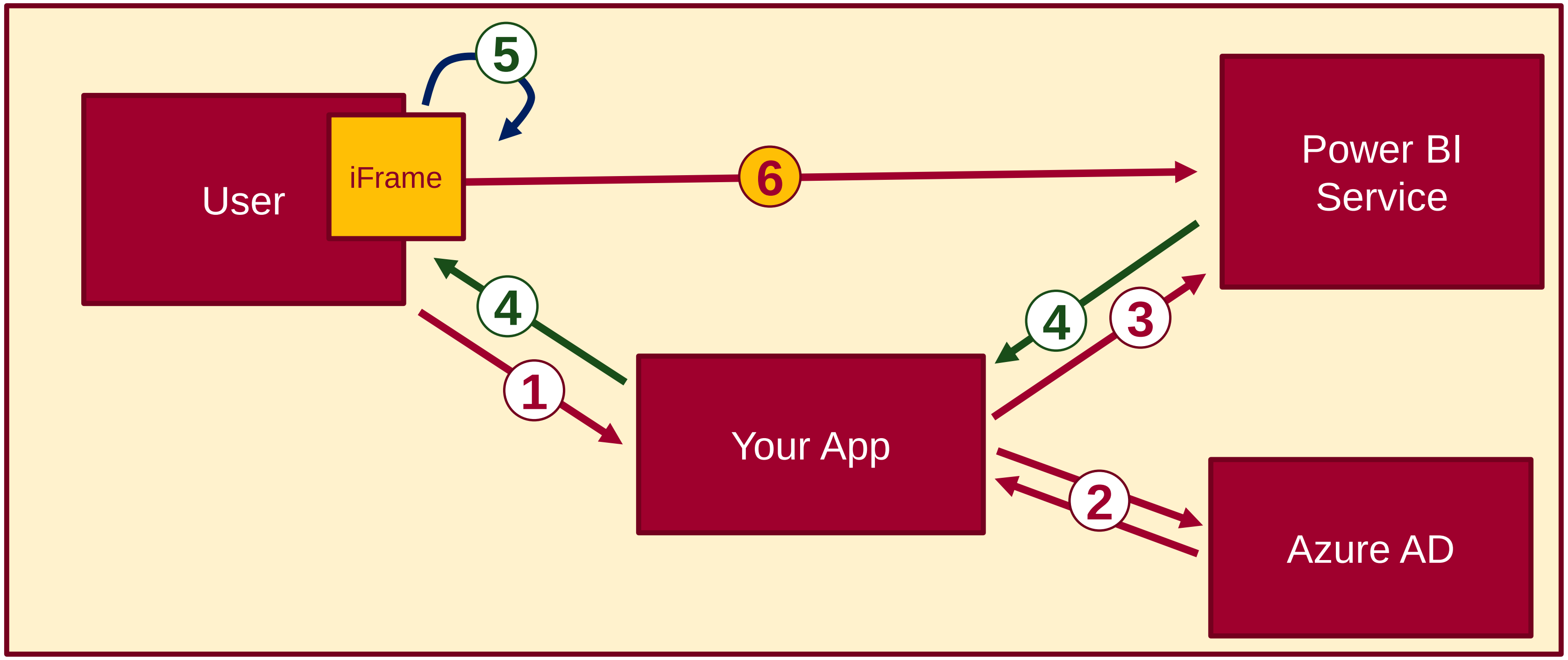
- The Power BI Service API goes by other names
  - The Power BI REST API
  - The Power BI API



- Using the Power BI Service API
  - Accessible by making direct REST calls against service
  - Accessible by using Assembly DLL that abstracts away REST calls
  - Assembly DLL is named **Microsoft.PowerBI.Api.dll**
  - Assembly DLL part of NuGet package (**Microsoft.PowerBI.Api**)
  - Calling service requires authentication with Azure Active Directory

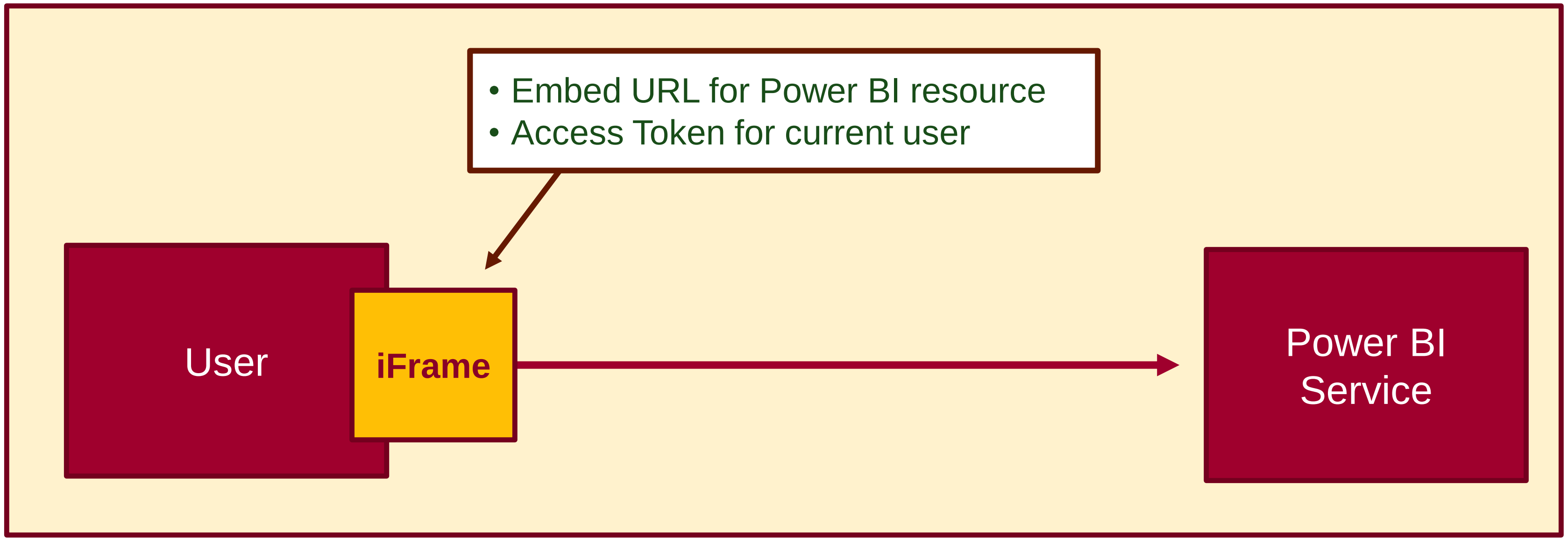
# Power BI Embedding – The Big Picture

1. User launches your app using a browser
2. App authenticates with Azure Active Directory and obtains access token
3. App uses access token to call to Power BI Service API
4. App retrieves data for embedded resource and passes it to browser.
5. Client-side code uses Power BI JavaScript API to create embedded resource
6. Embedded resource session created between browser and Power BI service



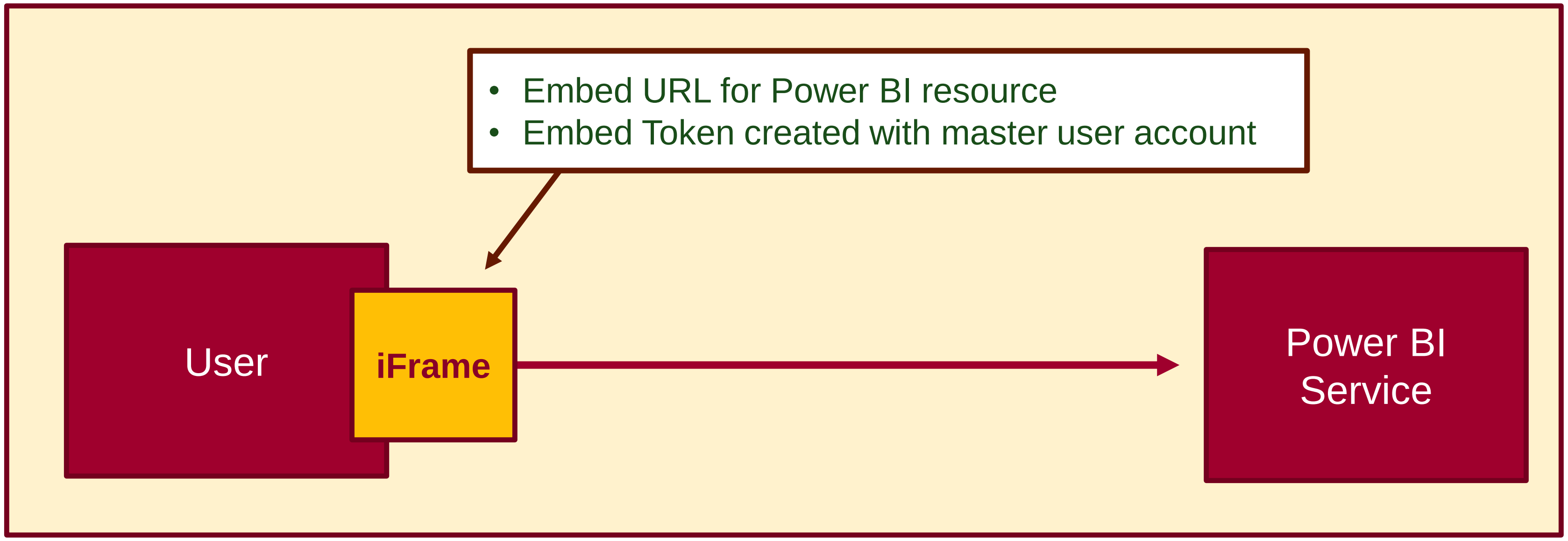
## First Party Embedding

- App authenticates current user with Azure AD
  - Your code accesses Power BI Service as current user
  - Embedding requires Azure AD access token for user
  - User requires Azure AD account and Power BI license
  - Your code has access to whatever user has access to


• Embed URL for Power BI resource
• Access Token for current user
User
iFrame
Power BI Service

## Third Party Embedding

- App authenticates using Master User Account
  - Your code accesses Power BI Service as master user
  - Embedding uses embed token instead of access token
  - Users don’t need AAD accounts and Power BI licenses
  - Your code has access to whatever master has access to



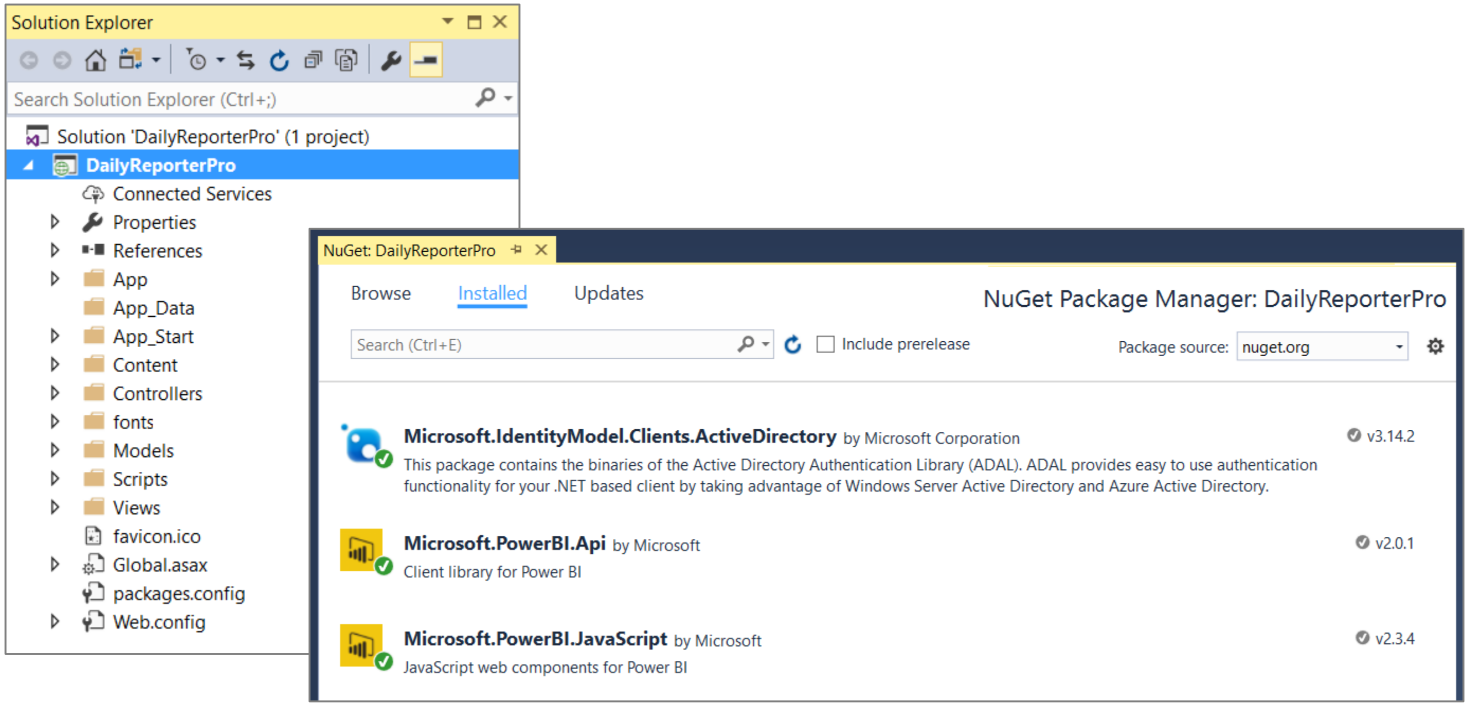
• Embed URL for Power BI resource
• Embed Token created with master user account
User
iFrame
Power BI Service

## First Party vs Third Party Embedding

- What scenarios use first party embedding?
  - Organizations where users have Power BI licenses
  - Users can already access Power BI with browser
  - Development should go beyond out-of-box experience
- What scenarios use third party embedding?
  - Scenarios where users don’t have Power BI licenses
  - Applications which have custom identity providers
  - Applications which use identity provider other than AAD

## NuGet Packages Required in MVC Project

- NuGet Packages used in DailyReporterPro sample app
  - Azure Active Directory Library (ADAL) for .NET
  - Power BI Service API
  - Power BI JavaScript API



**Microsoft.IdentityModel.Clients.ActiveDirectory** by Microsoft Corporation — v3.14.2
This package contains the binaries of the Active Directory Authentication Library (ADAL). ADAL provides easy to use authentication functionality for your .NET based client by taking advantage of Windows Server Active Directory and Azure Active Directory.

**Microsoft.PowerBI.Api** by Microsoft — v2.0.1
Client library for Power BI

**Microsoft.PowerBI.JavaScript** by Microsoft — v2.3.4
JavaScript web components for Power BI

DEMO

## The Daily Reporter Pro Sample App

## Agenda

- ✓ Power BI Embedding Fundamentals
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# Power BI Premium

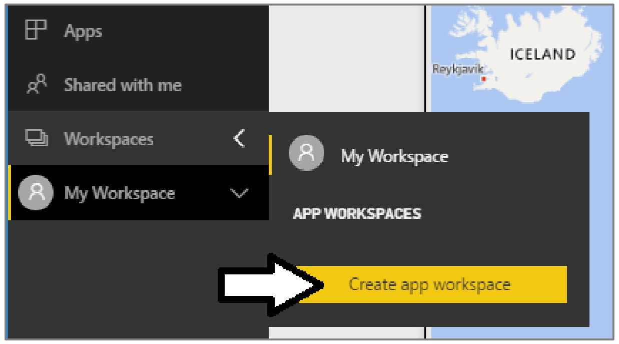
- Microsoft initially offered two Power BI licensing options
  - Power BI Free license
  - Power BI Pro license ($10/month)
  - All Power BI resources and processing runs in shared capacity

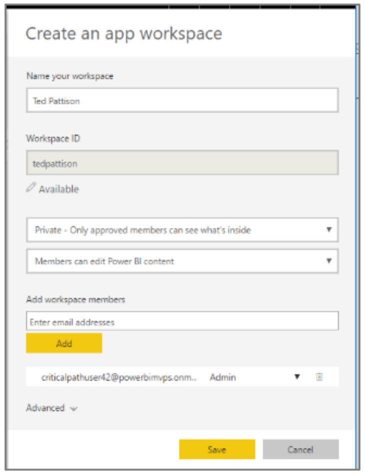
- In May 2017, Microsoft introduced Power BI Premium licensing
  - Power BI Premium customers can create premium capacities
  - Premium capacities useful to organization with many read-only users
  - Premium capacities used by ISVs to reach non-licensed users

- Power BI Premium details and pricing are in flux
  - More info at https://powerbi.microsoft.com/en-us/pricing/

# Understanding App Workspaces

- App workspaces used to deploy custom solutions
  - App workspaces required for team-based development
  - App workspace can be secured using private membership
  - App workspace used to publish apps for licensed users
- App workspaces required for 3rd party embedding
  - App workspace must be added to premium capacity
  - Master user account must be configured as app workspace admin




Create an app workspace

Name your workspace: Ted Pattison

Workspace ID: tedpattison

Available

Private - Only approved members can see what's inside

Members can edit Power BI content

Add workspace members: Enter email addresses

Add

criticalpathuser42@powerbimvps.onm... Admin

Advanced

Save Cancel

## Premium Capacities

- Power BI workspaces run in two possible environments
  - Shared Capacities
  - Premium Capacities *(formerly known as dedicated capacities)*

- Premium capacity acts as dedicated resource
  - Premium capacity only used by single organization
  - PBIX file uploads not limited to 1GB
  - Data refresh frequency can exceed 8 times per day
  - Each premium capacity defines its own set of admins
  - *Premium capacity required to share with users without pro license*

# Premium Capacity Nodes

- Power BI Premium Purchased using Nodes
  - Node type defines v-core and RAM capabilities
  - P nodes used for embedded or service deployments
  - EM nodes used only for embedded deployments

| Capacity Node | Total cores | Backend Cores | Frontend Cores | Direct Query Limits | Page renders/hour |
|---|---|---|---|---|---|
| EM1 | 1 v-cores | .5 cores, 3GB RAM | .5 cores | | 1-300 |
| EM2 | 2 v-cores | 1 core, 5GB RAM | 1 core | | 301-600 |
| EM3 | 4 v-cores | 2 cores, 10GB RAM | 2 cores | | 601-1,200 |
| P1 | 8 v-cores | 4 cores, 25GB RAM | 4 cores | 30 per second | 1,201-2,400 |
| P2 | 16 v-cores | 8 cores, 50GB RAM | 8 cores | 60 per second | 2,401-4,800 |
| P3 | 32 v-cores | 16 cores, 100GB RAM | 16 cores | 120 per second | 4,801-9600 |

## Agenda

- ✓ Power BI Embedding Fundamentals
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DEMO

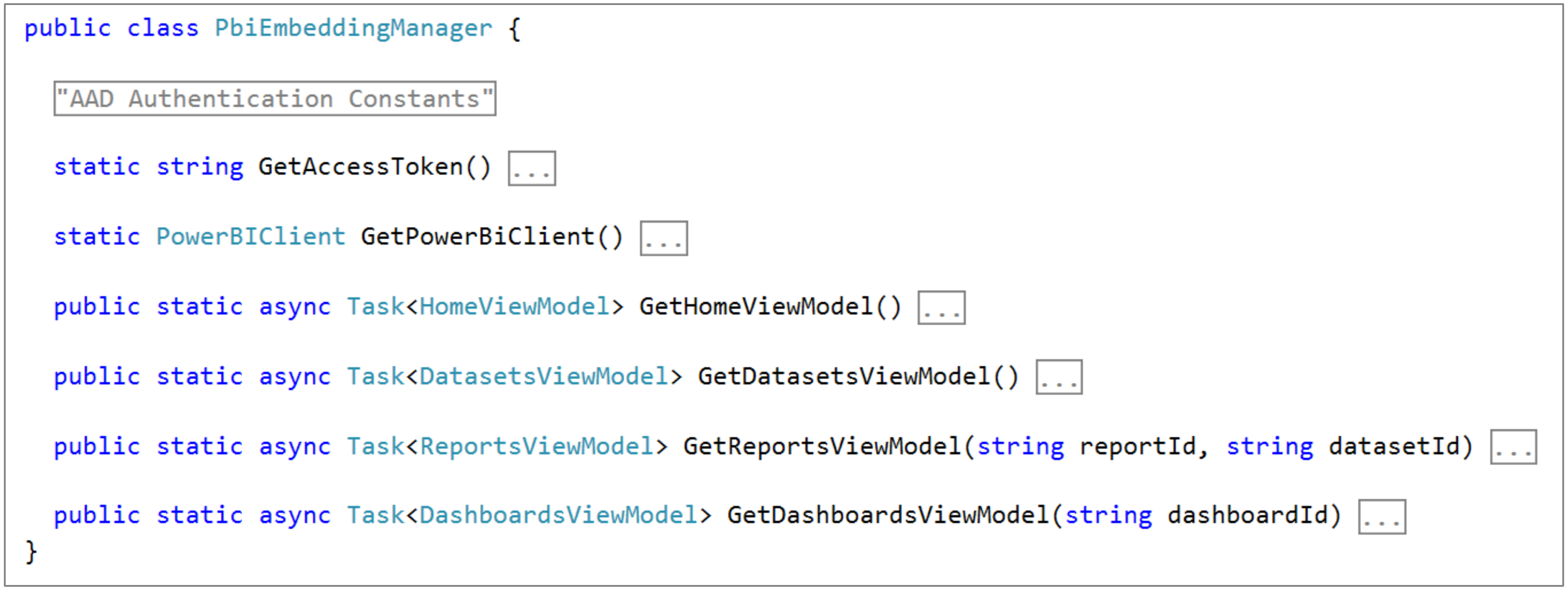
## Registering an App with Azure AD

## 1st Party Embedding vs 3rd Party Embedding

| | 1st Part Embedding | 3rd Party Embedding |
|---|---|---|
| Authentication flow | Authentication Code Flow or Implicit Flow | Direct User Credentials |
| Identity used to call Power BI | Current User | Master User Account |
| Access to personal workspace | Yes | No |
| Access to app workspaces | Yes | Yes |
| Ability to reach non-licensed users | No | Yes |

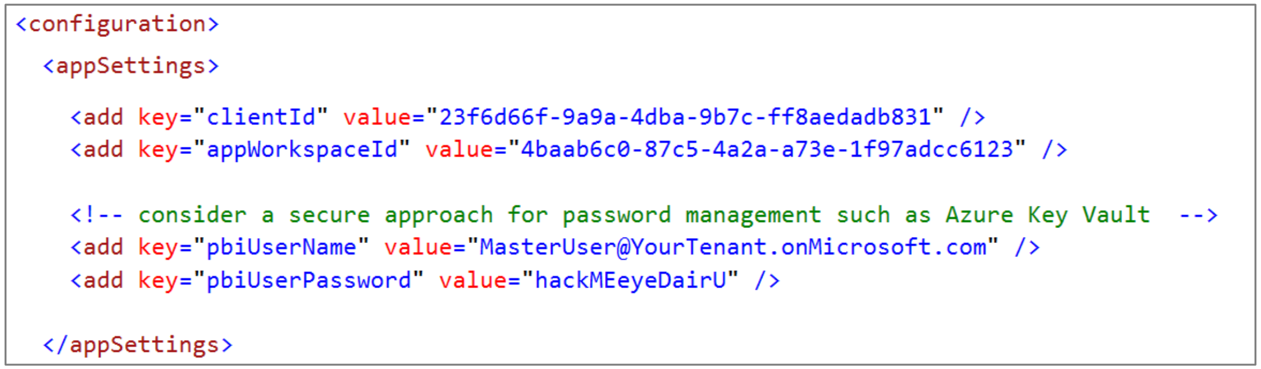
# PbiEmbeddingManger Class

- PbiEmbeddingManger Class responsibilities
  - Get access tokens from Azure AD
  - Retrieve embedding data from Power BI service
  - Pass embedding data to browser using MVC view models

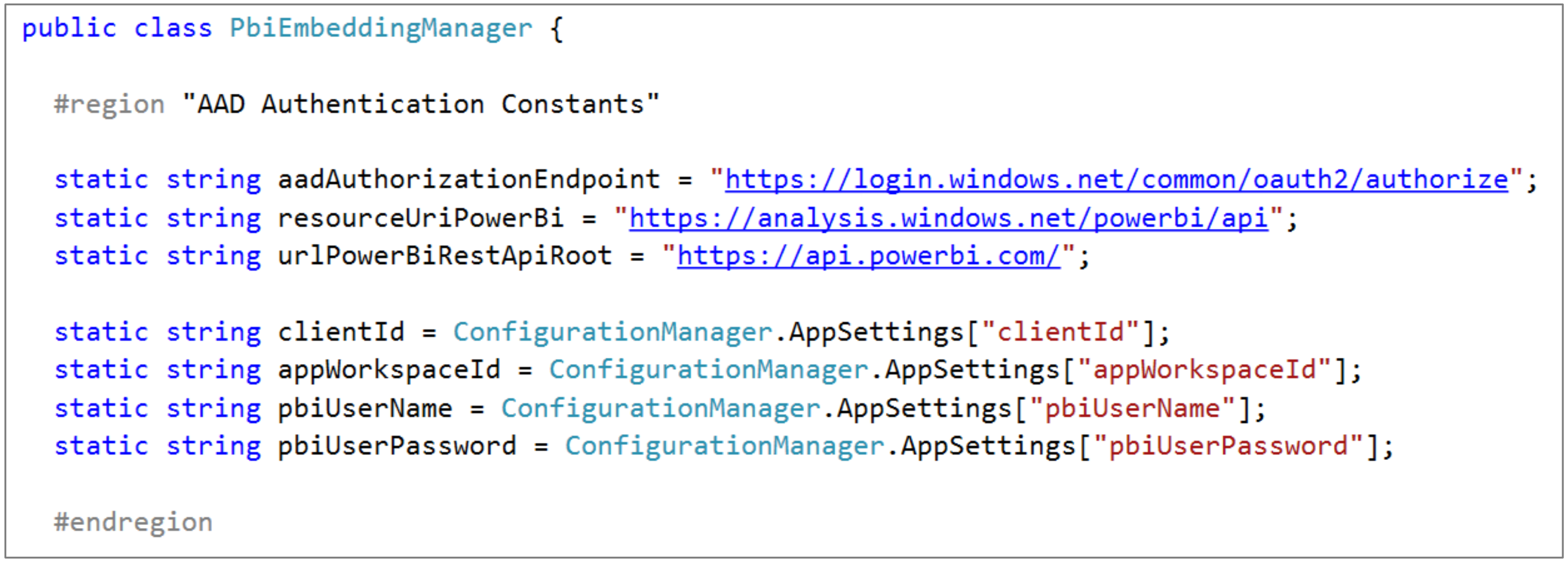


```
public class PbiEmbeddingManager {

  "AAD Authentication Constants"

  static string GetAccessToken() ...

  static PowerBIClient GetPowerBiClient() ...

  public static async Task<HomeViewModel> GetHomeViewModel() ...

  public static async Task<DatasetsViewModel> GetDatasetsViewModel() ...

  public static async Task<ReportsViewModel> GetReportsViewModel(string reportId, string datasetId) ...

  public static async Task<DashboardsViewModel> GetDashboardsViewModel(string dashboardId) ...
}
```

# Data Required for AAD Authentication



```xml
<configuration>
  <appSettings>

    <add key="clientId" value="23f6d66f-9a9a-4dba-9b7c-ff8aedadb831" />
    <add key="appWorkspaceId" value="4baab6c0-87c5-4a2a-a73e-1f97adcc6123" />

    <!-- consider a secure approach for password management such as Azure Key Vault  -->
    <add key="pbiUserName" value="MasterUser@YourTenant.onMicrosoft.com" />
    <add key="pbiUserPassword" value="hackMEeyeDairU" />

  </appSettings>
```



```csharp
public class PbiEmbeddingManager {

  #region "AAD Authentication Constants"

  static string aadAuthorizationEndpoint = "https://login.windows.net/common/oauth2/authorize";
  static string resourceUriPowerBi = "https://analysis.windows.net/powerbi/api";
  static string urlPowerBiRestApiRoot = "https://api.powerbi.com/";

  static string clientId = ConfigurationManager.AppSettings["clientId"];
  static string appWorkspaceId = ConfigurationManager.AppSettings["appWorkspaceId"];
  static string pbiUserName = ConfigurationManager.AppSettings["pbiUserName"];
  static string pbiUserPassword = ConfigurationManager.AppSettings["pbiUserPassword"];

  #endregion
```

# Getting an Access Token for the Master User

```
static string GetAccessToken() {
  AuthenticationContext authContext = new AuthenticationContext(aadAuthorizationEndpoint);
  var userCredentials = new UserPasswordCredential(pbiUserName, pbiUserPassword);

  // this call will fail if permission consent has not be granted to master user account
  string aadAccessToken =
    authContext.AcquireTokenAsync(resourceUriPowerBi, clientId, userCredentials).Result.AccessToken;

  // return Azure AD access token for master user account
  return aadAccessToken;
}
```

## Agenda

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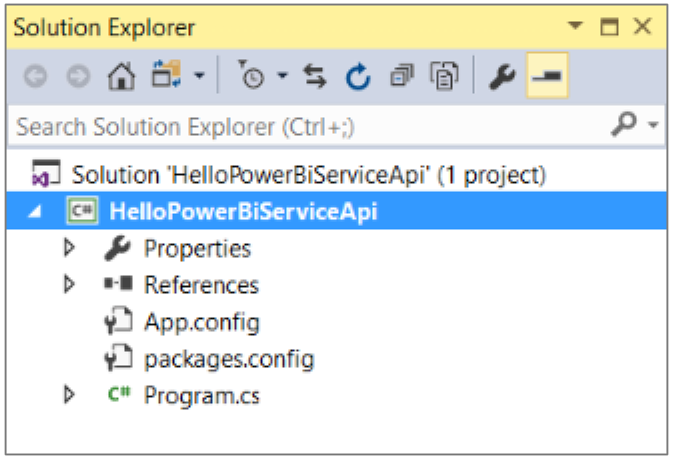
# HelloPowerBiServiceApi Demo

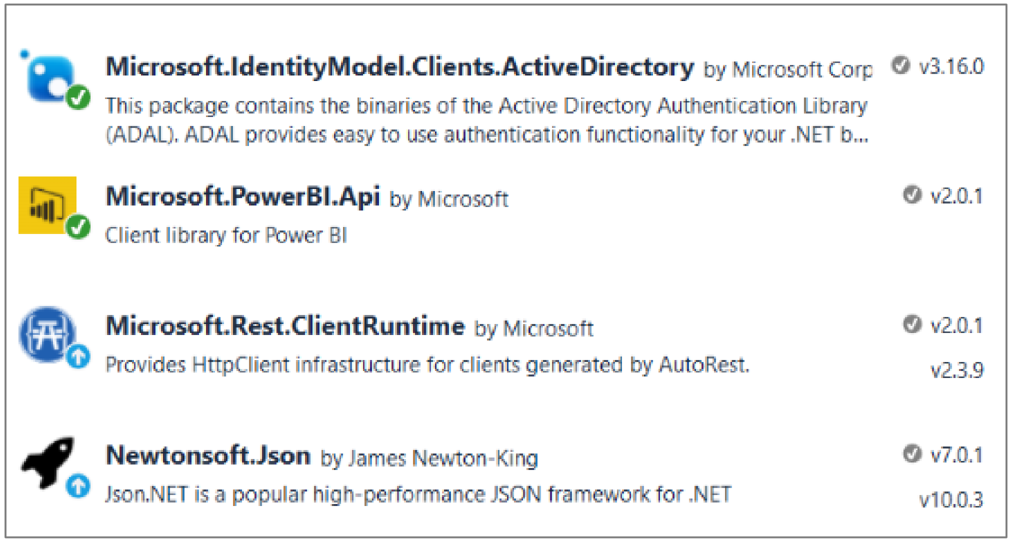
- Let’s get started with a simple C# console app
  - NuGet packages added for ADAL and Power BI Service API



Solution Explorer

Search Solution Explorer (Ctrl+;)

Solution 'HelloPowerBiServiceApi' (1 project)
- HelloPowerBiServiceApi
  - Properties
  - References
  - App.config
  - packages.config
  - Program.cs



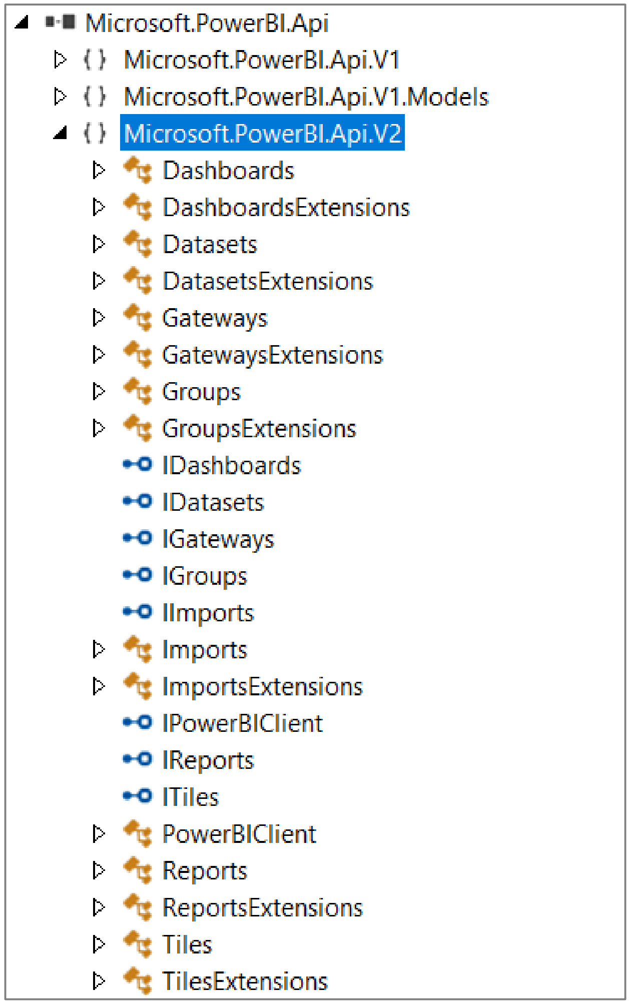
**Microsoft.IdentityModel.Clients.ActiveDirectory** by Microsoft Corp — v3.16.0
This package contains the binaries of the Active Directory Authentication Library (ADAL). ADAL provides easy to use authentication functionality for your .NET b...

**Microsoft.PowerBI.Api** by Microsoft — v2.0.1
Client library for Power BI

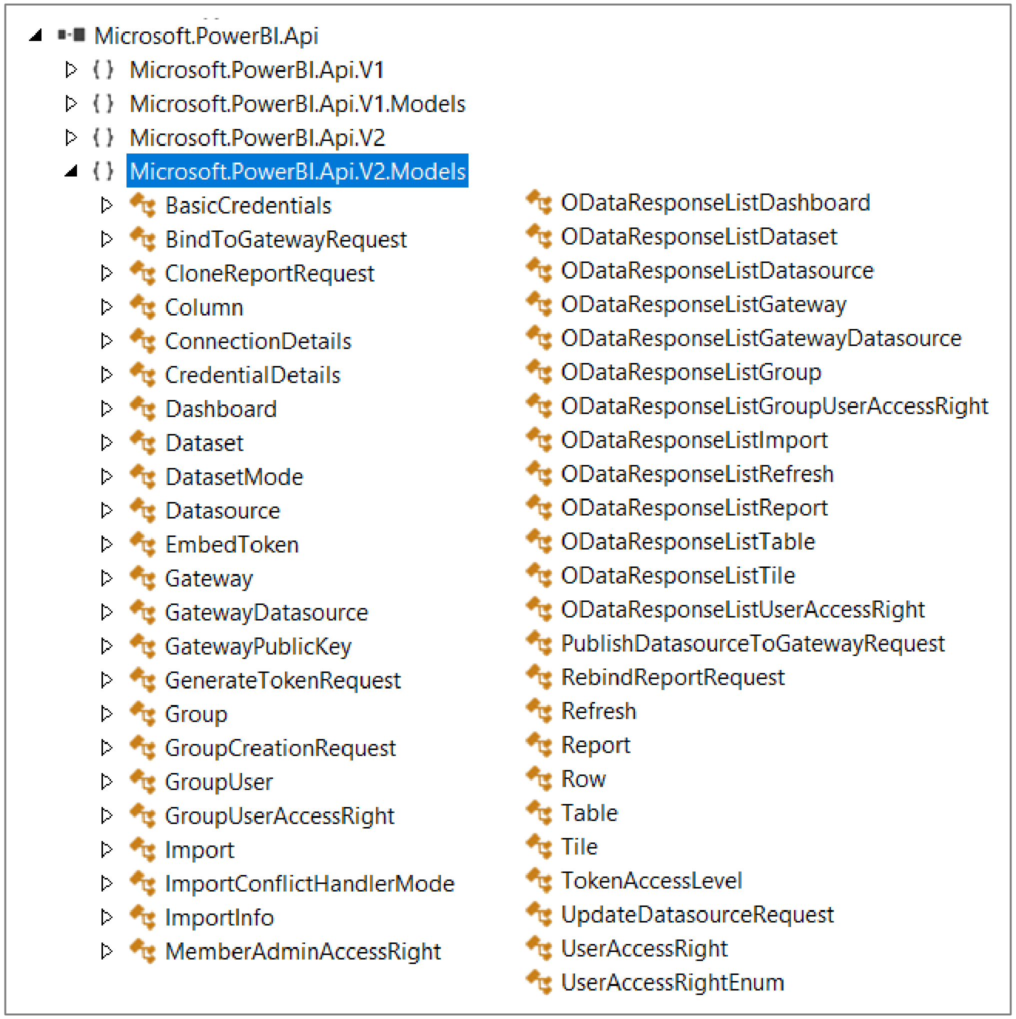
**Microsoft.Rest.ClientRuntime** by Microsoft — v2.0.1, v2.3.9
Provides HttpClient infrastructure for clients generated by AutoRest.

**Newtonsoft.Json** by James Newton-King — v7.0.1, v10.0.3
Json.NET is a popular high-performance JSON framework for .NET

# The Power BI Service API



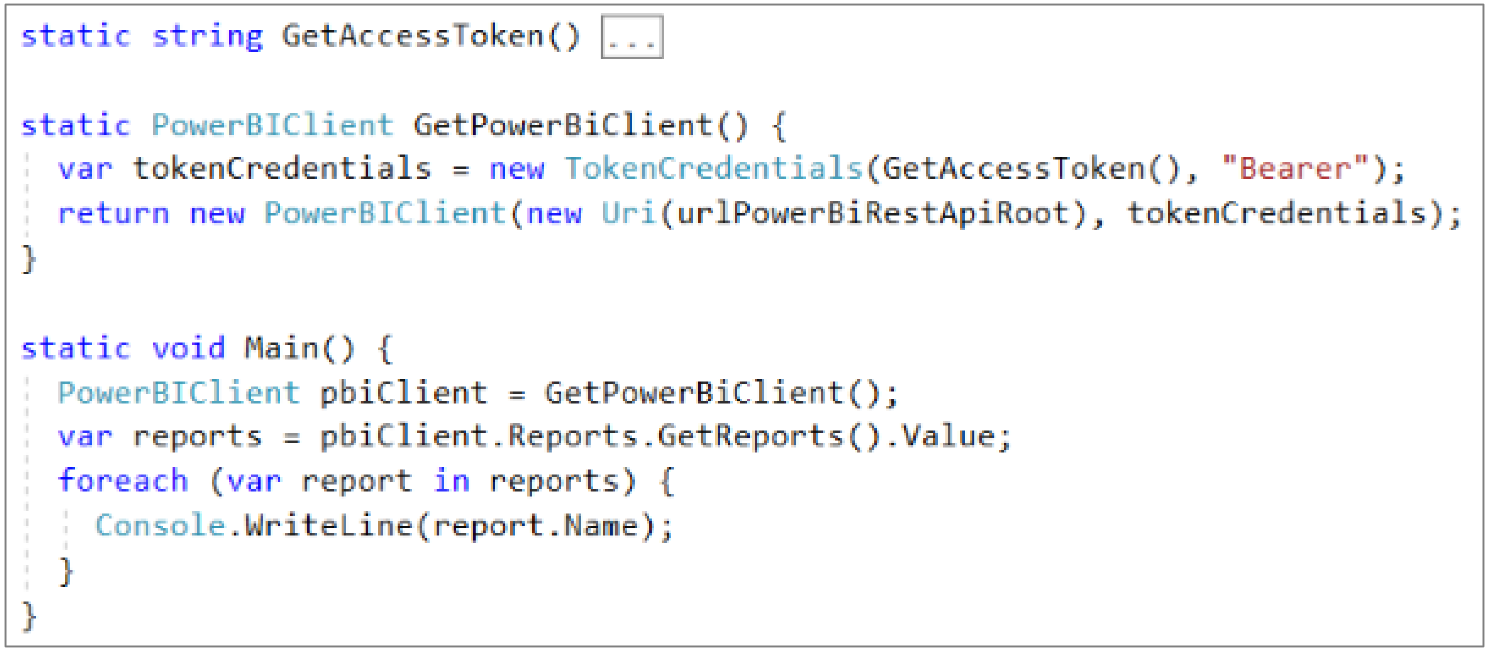
```
◢ Microsoft.PowerBI.Api
    ▷ { } Microsoft.PowerBI.Api.V1
    ▷ { } Microsoft.PowerBI.Api.V1.Models
    ◢ { } Microsoft.PowerBI.Api.V2
        ▷ Dashboards
        ▷ DashboardsExtensions
        ▷ Datasets
        ▷ DatasetsExtensions
        ▷ Gateways
        ▷ GatewaysExtensions
        ▷ Groups
        ▷ GroupsExtensions
          IDashboards
          IDatasets
          IGateways
          IGroups
          IImports
        ▷ Imports
        ▷ ImportsExtensions
          IPowerBIClient
          IReports
          ITiles
        ▷ PowerBIClient
        ▷ Reports
        ▷ ReportsExtensions
        ▷ Tiles
        ▷ TilesExtensions
```



```
◢ Microsoft.PowerBI.Api
    ▷ { } Microsoft.PowerBI.Api.V1
    ▷ { } Microsoft.PowerBI.Api.V1.Models
    ▷ { } Microsoft.PowerBI.Api.V2
    ◢ { } Microsoft.PowerBI.Api.V2.Models
        ▷ BasicCredentials                    ODataResponseListDashboard
        ▷ BindToGatewayRequest                ODataResponseListDataset
        ▷ CloneReportRequest                  ODataResponseListDatasource
        ▷ Column                              ODataResponseListGateway
        ▷ ConnectionDetails                   ODataResponseListGatewayDatasource
        ▷ CredentialDetails                   ODataResponseListGroup
        ▷ Dashboard                           ODataResponseListGroupUserAccessRight
        ▷ Dataset                             ODataResponseListImport
        ▷ DatasetMode                         ODataResponseListRefresh
        ▷ Datasource                          ODataResponseListReport
        ▷ EmbedToken                          ODataResponseListTable
        ▷ Gateway                             ODataResponseListTile
        ▷ GatewayDatasource                   ODataResponseListUserAccessRight
        ▷ GatewayPublicKey                    PublishDatasourceToGatewayRequest
        ▷ GenerateTokenRequest                RebindReportRequest
        ▷ Group                               Refresh
        ▷ GroupCreationRequest                Report
        ▷ GroupUser                           Row
        ▷ GroupUserAccessRight                Table
        ▷ Import                              Tile
        ▷ ImportConflictHandlerMode           TokenAccessLevel
        ▷ ImportInfo                          UpdateDatasourceRequest
        ▷ MemberAdminAccessRight              UserAccessRight
                                              UserAccessRightEnum
```

## Initializing a Instance of PowerBIClient

- PowerBIClient object serves as top-level object
  - Used to execute calls against Power BI Service
  - Initialized with function to retrieve AAD access token

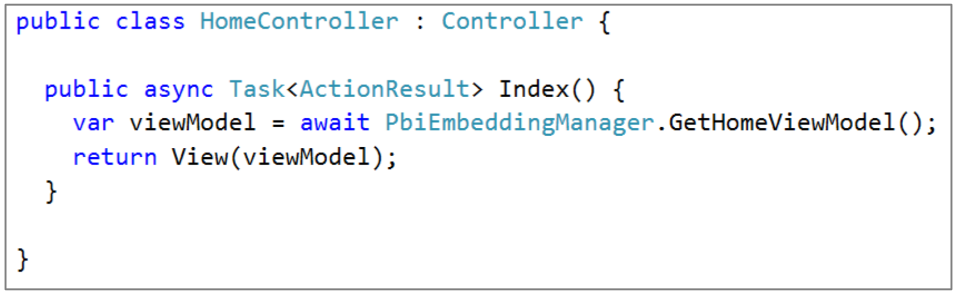


```
static string GetAccessToken() ...

static PowerBIClient GetPowerBiClient() {
  var tokenCredentials = new TokenCredentials(GetAccessToken(), "Bearer");
  return new PowerBIClient(new Uri(urlPowerBiRestApiRoot), tokenCredentials);
}

static void Main() {
  PowerBIClient pbiClient = GetPowerBiClient();
  var reports = pbiClient.Reports.GetReports().Value;
  foreach (var report in reports) {
    Console.WriteLine(report.Name);
  }
}
```

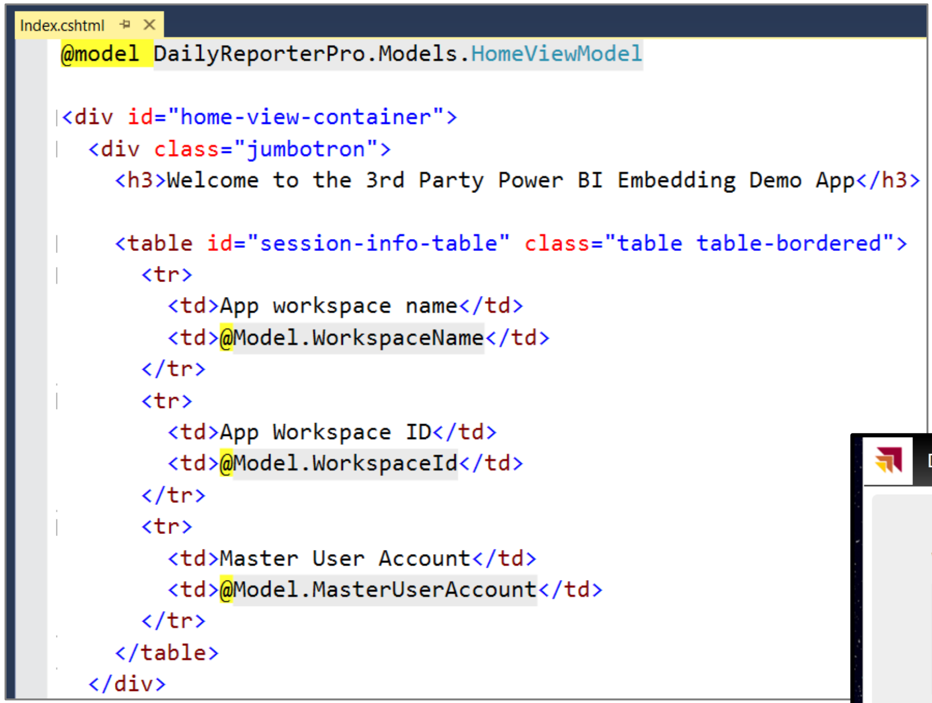
DEMO

## Programming the Power BI Service API

# MVC Controllers and Views

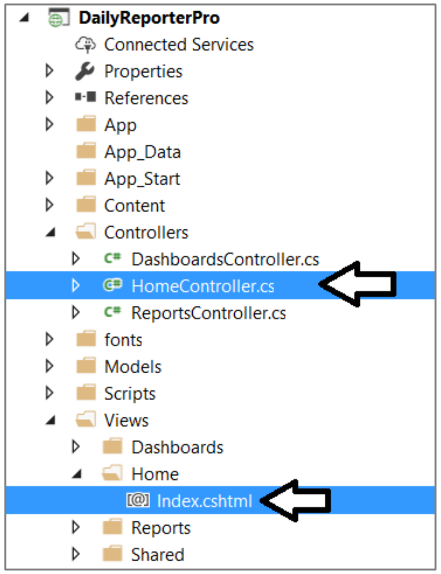


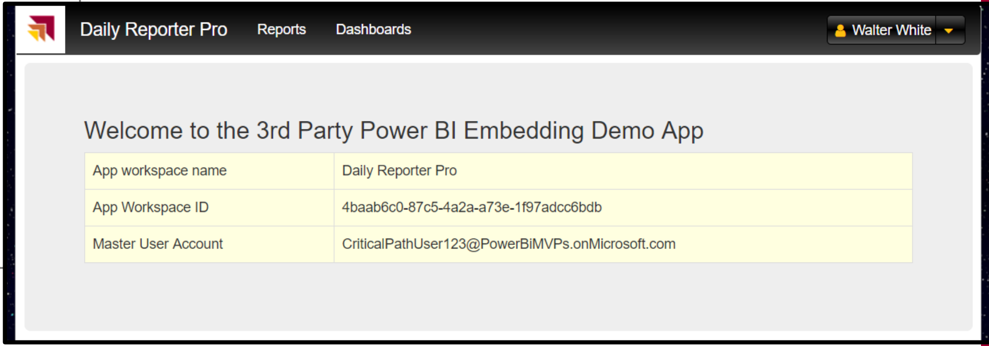
```
public class HomeController : Controller {

  public async Task<ActionResult> Index() {
    var viewModel = await PbiEmbeddingManager.GetHomeViewModel();
    return View(viewModel);
  }

}
```



Index.cshtml

```
@model DailyReporterPro.Models.HomeViewModel

<div id="home-view-container">
  <div class="jumbotron">
    <h3>Welcome to the 3rd Party Power BI Embedding Demo App</h3>

    <table id="session-info-table" class="table table-bordered">
      <tr>
        <td>App workspace name</td>
        <td>@Model.WorkspaceName</td>
      </tr>
      <tr>
        <td>App Workspace ID</td>
        <td>@Model.WorkspaceId</td>
      </tr>
      <tr>
        <td>Master User Account</td>
        <td>@Model.MasterUserAccount</td>
      </tr>
    </table>
  </div>
```





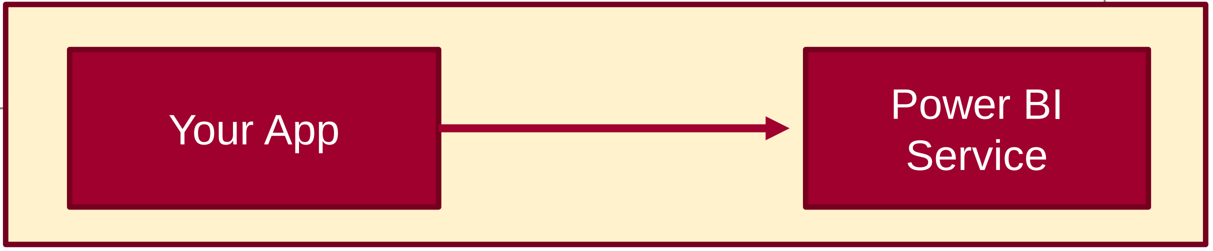
Welcome to the 3rd Party Power BI Embedding Demo App

| | |
|---|---|
| App workspace name | Daily Reporter Pro |
| App Workspace ID | 4baab6c0-87c5-4a2a-a73e-1f97adcc6bdb |
| Master User Account | CriticalPathUser123@PowerBiMVPs.onMicrosoft.com |

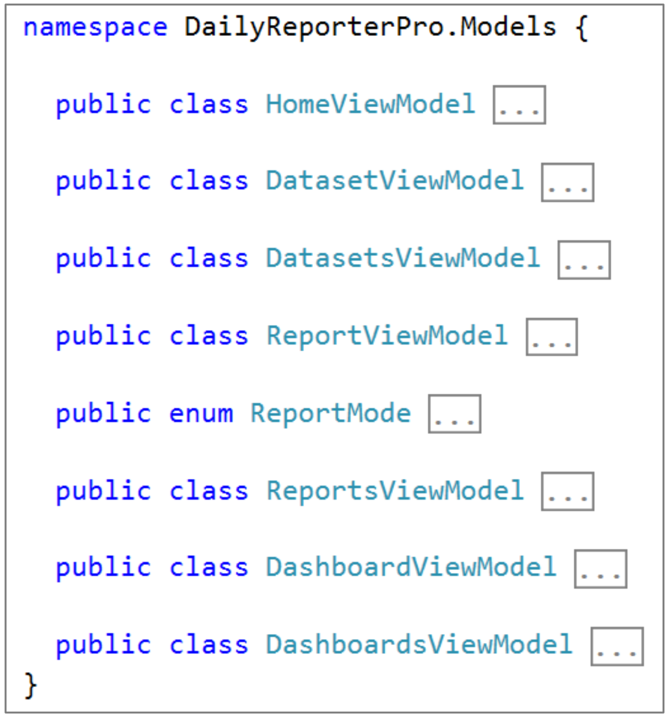
# Back to the DailyReporterPro Application

```
public class HomeViewModel {
  public string WorkspaceName;
  public string WorkspaceId;
  public string MasterUserAccount;
}
```

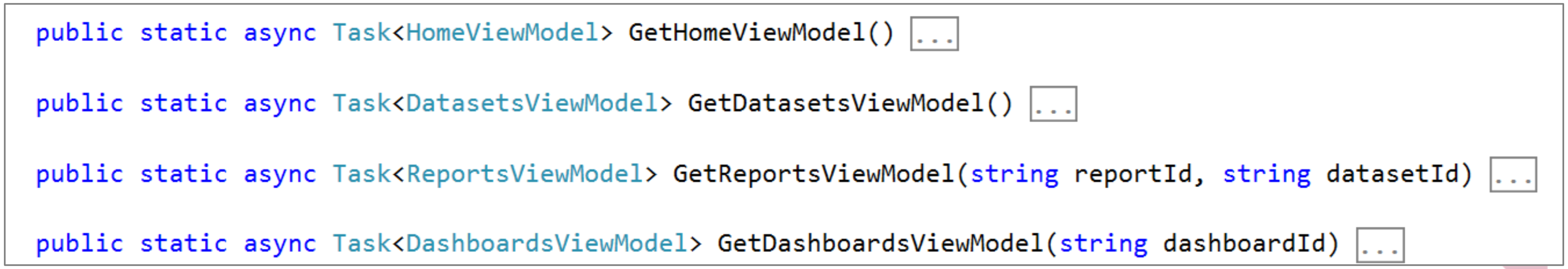
```
public static async Task<HomeViewModel> GetHomeViewModel() {
  var client = GetPowerBiClient();
  var workspaces = (await client.Groups.GetGroupsAsync()).Value;
  var workspace = workspaces.Where(ws => ws.Id == appWorkspaceId).FirstOrDefault();
  var viewModel = new HomeViewModel {
    WorkspaceName = workspace.Name,
    WorkspaceId = workspace.Id,
    MasterUserAccount = pbiUserName
  };
  return viewModel;
}
```



# MVC View Models



```
namespace DailyReporterPro.Models {

  public class HomeViewModel ...

  public class DatasetViewModel ...

  public class DatasetsViewModel ...

  public class ReportViewModel ...

  public enum ReportMode ...

  public class ReportsViewModel ...

  public class DashboardViewModel ...

  public class DashboardsViewModel ...
}
```



```
public static async Task<HomeViewModel> GetHomeViewModel() ...

public static async Task<DatasetsViewModel> GetDatasetsViewModel() ...

public static async Task<ReportsViewModel> GetReportsViewModel(string reportId, string datasetId) ...

public static async Task<DashboardsViewModel> GetDashboardsViewModel(string dashboardId) ...
```

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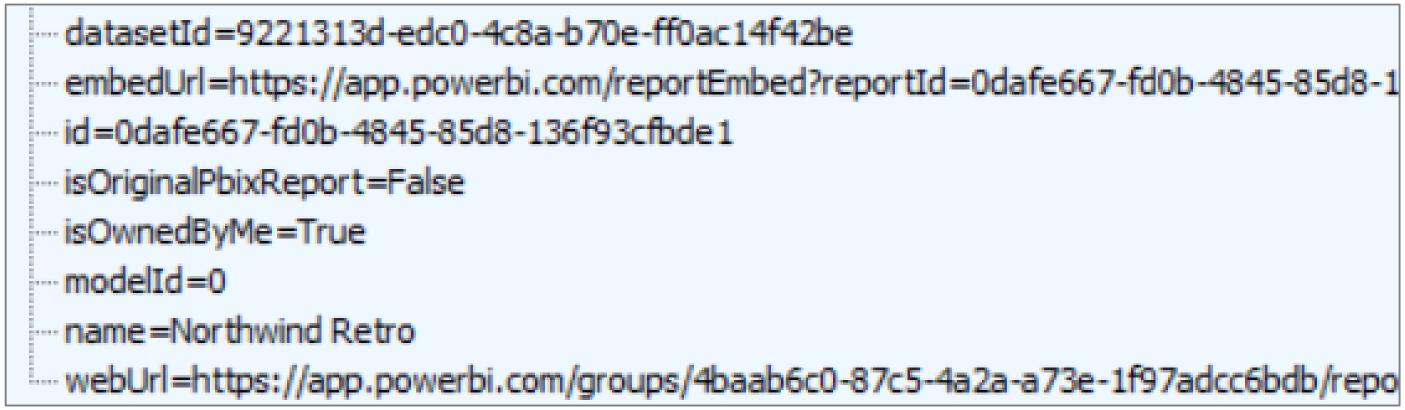
- ✓ Power BI Embedding Fundamentals
- ✓ App Workspaces and Premium Capacities
- ✓ Authentication with Azure Active Directory
- ✓ Programming with Power BI Service API
- ➢ Working with Embeddable Resources
- • Embedding with Power BI JavaScript API

## Embeddable Resources

1. Reports
   - Provides user with full interactive experience
   - Allows editing existing reports & creating new reports
2. Dashboards
   - Provides user with limited interactive experience
   - Provides support for real-time dashboards
3. Dashboard Tiles
   - Provides flexibility to embed selected tiles
   - No support for tiles which receive real-time updates

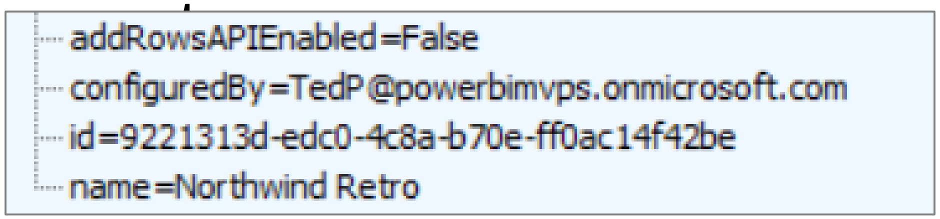
## Report and Dataset Info

- Embed data required for an existing report



```
datasetId=9221313d-edc0-4c8a-b70e-ff0ac14f42be
embedUrl=https://app.powerbi.com/reportEmbed?reportId=0dafe667-fd0b-4845-85d8-1
id=0dafe667-fd0b-4845-85d8-136f93cfbde1
isOriginalPbixReport=False
isOwnedByMe=True
modelId=0
name=Northwind Retro
webUrl=https://app.powerbi.com/groups/4baab6c0-87c5-4a2a-a73e-1f97adcc6bdb/repo
```

- Embed data for dataset required to create new



```
addRowsAPIEnabled=False
configuredBy=TedP@powerbimvps.onmicrosoft.com
id=9221313d-edc0-4c8a-b70e-ff0ac14f42be
name=Northwind Retro
```

# Embed Tokens

- You can embed reports using master user AAD token, but…
  - You might want embed resource using more restricted tokens
  - You might want stay within the bounds of Power BI licensing terms

- Power BI service supports generating embed tokens
  - Embed token provides restrictions on whether user can view or edit
  - Each embed token created for one specific resource
  - Embed token can only be generated inside Power BI Premium capacity
  - *Support for generating tokens using RLS available any day now*

```
Report report = reports.Where(r => r.Id == reportId).First();
var generateTokenRequestParameters = new GenerateTokenRequest(accessLevel: "edit");
var token = client.Reports.GenerateTokenInGroupAsync(appWorkspaceId,
                                                     report.Id,
                                                     generateTokenRequestParameters).Result;
```

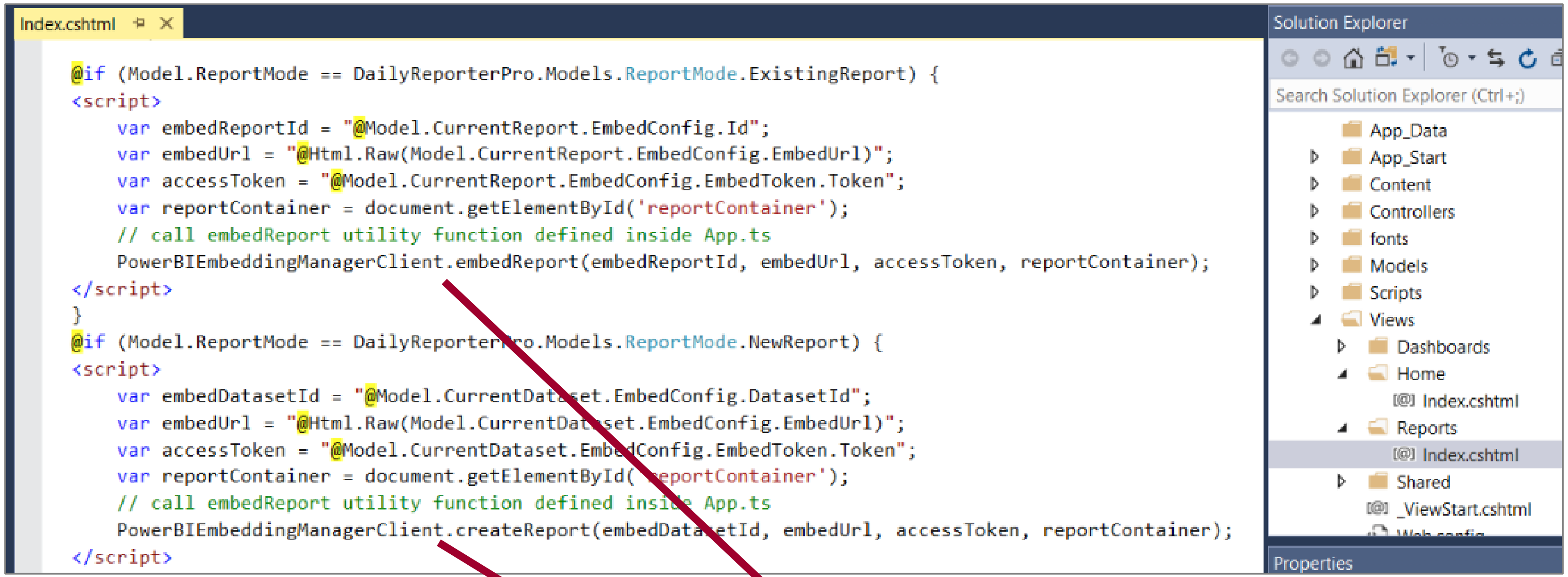
## View Model with Embed Data for Report

```
// create embed info for existing report
var embedConfig = new EmbedConfiguration() {
  EmbedToken = token,
  EmbedUrl = report.EmbedUrl,
  Id = report.Id
};
// add report data to view model
viewModel.CurrentReport = new ReportViewModel {
  Report = report,
  EmbedConfig = embedConfig
};
```

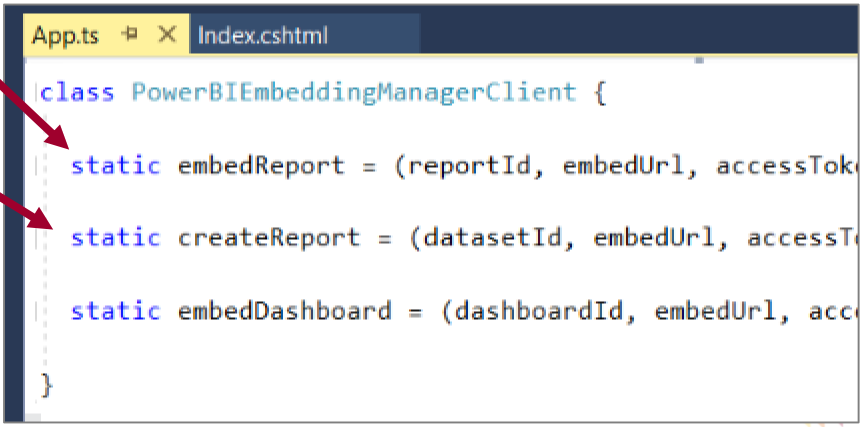
# Agenda

- ✓ Power BI Embedding Fundamentals
- ✓ App Workspaces and Premium Capacities
- ✓ Authentication with Azure Active Directory
- ✓ Programming with Power BI Service API
- ✓ Working with Embeddable Resources
- ➢ Embedding with Power BI JavaScript API

# Embedding Data in MVC View



```
@if (Model.ReportMode == DailyReporterPro.Models.ReportMode.ExistingReport) {
<script>
    var embedReportId = "@Model.CurrentReport.EmbedConfig.Id";
    var embedUrl = "@Html.Raw(Model.CurrentReport.EmbedConfig.EmbedUrl)";
    var accessToken = "@Model.CurrentReport.EmbedConfig.EmbedToken.Token";
    var reportContainer = document.getElementById('reportContainer');
    // call embedReport utility function defined inside App.ts
    PowerBIEmbeddingManagerClient.embedReport(embedReportId, embedUrl, accessToken, reportContainer);
</script>
}
@if (Model.ReportMode == DailyReporterPro.Models.ReportMode.NewReport) {
<script>
    var embedDatasetId = "@Model.CurrentDataset.EmbedConfig.DatasetId";
    var embedUrl = "@Html.Raw(Model.CurrentDataset.EmbedConfig.EmbedUrl)";
    var accessToken = "@Model.CurrentDataset.EmbedConfig.EmbedToken.Token";
    var reportContainer = document.getElementById('reportContainer');
    // call embedReport utility function defined inside App.ts
    PowerBIEmbeddingManagerClient.createReport(embedDatasetId, embedUrl, accessToken, reportContainer);
</script>
```



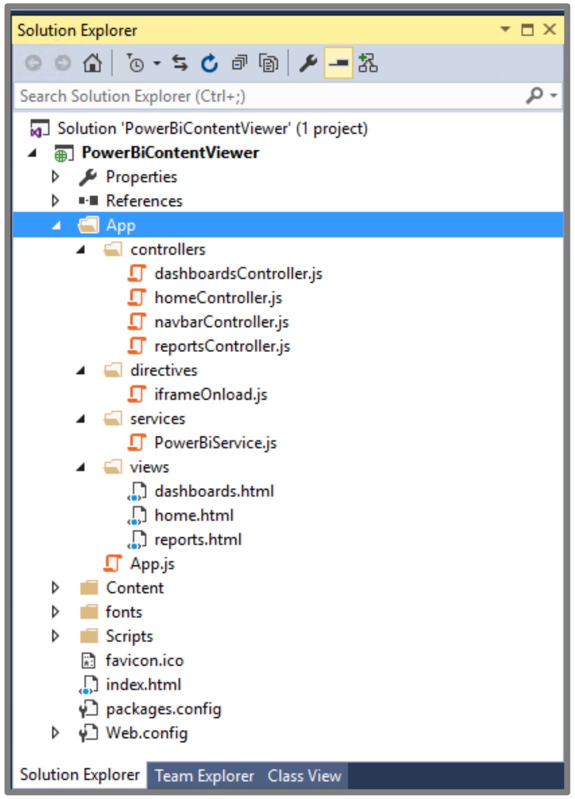
```
class PowerBIEmbeddingManagerClient {

  static embedReport = (reportId, embedUrl, accessTok

  static createReport = (datasetId, embedUrl, accessT

  static embedDashboard = (dashboardId, embedUrl, acc

}
```

DEMO

## Programming the Power BI JavaScript API

# The PowerBiContentViewer Demo

- Demonstrates SPA application
  - Built using client-side code (HTML, CSS and JavaScript)
  - SPA built using Angular-JS
  - Authentication using ADAL-JS



```
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'PowerBiContentViewer' (1 project)
  PowerBiContentViewer
    Properties
    References
    App
      controllers
        dashboardsController.js
        homeController.js
        navbarController.js
        reportsController.js
      directives
        iframeOnload.js
      services
        PowerBiService.js
      views
        dashboards.html
        home.html
        reports.html
      App.js
    Content
    fonts
    Scripts
    favicon.ico
    index.html
    packages.config
    Web.config
```

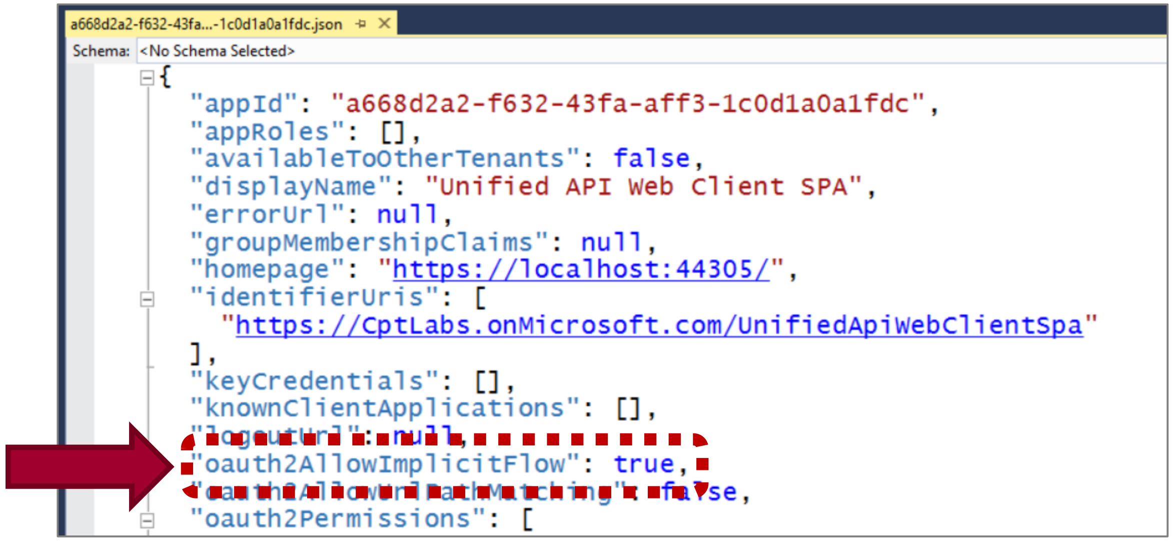
## Understanding Implicit Grant Flow

- Implicit Grant Flow
  - Used when client cannot keep secrets (public client)
  - Used with SPAs built using JavaScript and AngularJS
  - Less secure than Authentication Code Grant

- How does it work?
  - Client authorizes user with AD authorization endpoint
  - AD returns access token directly to SPA in browser
  - Authentication flow does not involve authorization code

# Configuring Implicit Flow in Azure AD

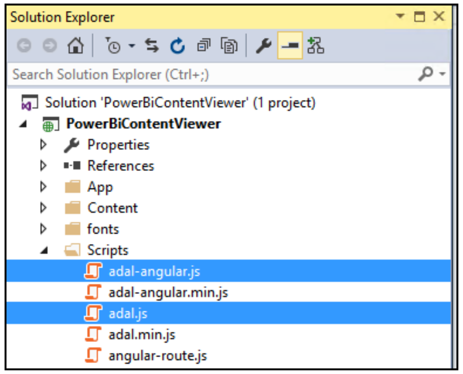
- Requires configuring AD application in Azure AD
  - Download manifest from Azure AD
  - Update **oauth2AllowImplicitFlow** setting equal to **true**
  - Upload manifest to Azure AD to save changes


a668d2a2-f632-43fa...-1c0d1a0a1fdc.json
Schema: <No Schema Selected>

```
{
  "appId": "a668d2a2-f632-43fa-aff3-1c0d1a0a1fdc",
  "appRoles": [],
  "availableToOtherTenants": false,
  "displayName": "Unified API Web Client SPA",
  "errorUrl": null,
  "groupMembershipClaims": null,
  "homepage": "https://localhost:44305/",
  "identifierUris": [
    "https://CptLabs.onMicrosoft.com/UnifiedApiWebClientSpa"
  ],
  "keyCredentials": [],
  "knownClientApplications": [],
  "logoutUrl": null,
  "oauth2AllowImplicitFlow": true,
  "oauth2AllowUrlPathMatching": false,
  "oauth2Permissions": [
```

# Downloading the ADAL-JS Library

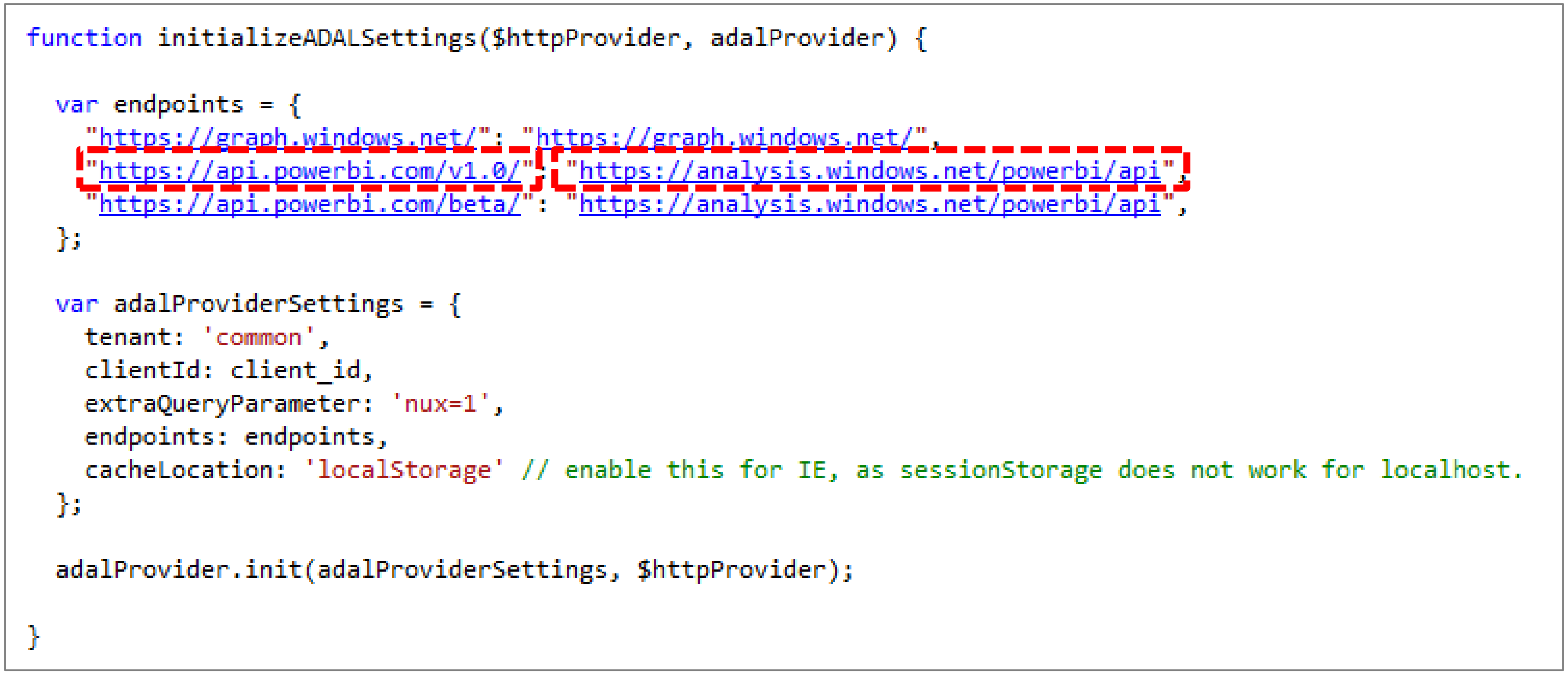
- Developing with ADAL-JS involves to two library files
  - **adal.js** – core ADAL-JS library
  - **adal-angular.js** –integration of ADAL-JS with AngularJS



Solution 'PowerBiContentViewer' (1 project)
- **PowerBiContentViewer**
  - Properties
  - References
  - App
  - Content
  - fonts
  - Scripts
    - adal-angular.js
    - adal-angular.min.js
    - adal.js
    - adal.min.js
    - angular-route.js

- Library files downloadable from GitHub Repository
  - https://github.com/AzureAD/azure-activedirectory-library-for-js

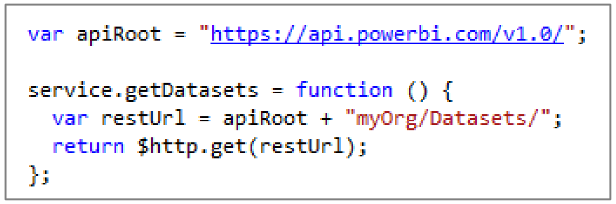
# Initializing ADAL-JS Settings



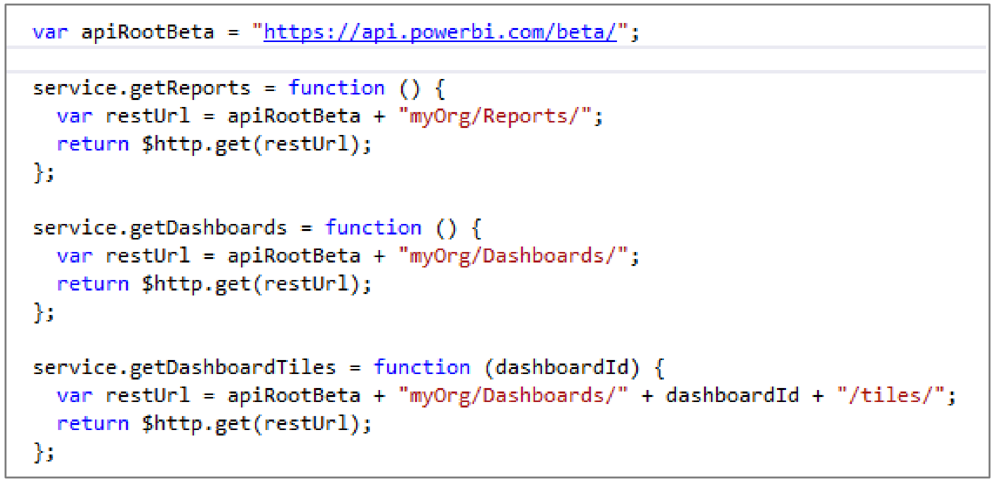
```
function initializeADALSettings($httpProvider, adalProvider) {

  var endpoints = {
    "https://graph.windows.net/": "https://graph.windows.net/",
    "https://api.powerbi.com/v1.0/": "https://analysis.windows.net/powerbi/api",
    "https://api.powerbi.com/beta/": "https://analysis.windows.net/powerbi/api",
  };

  var adalProviderSettings = {
    tenant: 'common',
    clientId: client_id,
    extraQueryParameter: 'nux=1',
    endpoints: endpoints,
    cacheLocation: 'localStorage' // enable this for IE, as sessionStorage does not work for localhost.
  };

  adalProvider.init(adalProviderSettings, $httpProvider);

}
```

# Making Secure Calls to Custom Web Services

- adal-angular.js adds interceptors to $http service
  - adal detects when calls are made to secure endpoints
  - adal acquires & caches access tokens behind scenes
  - adal attaches access token to Authorization header

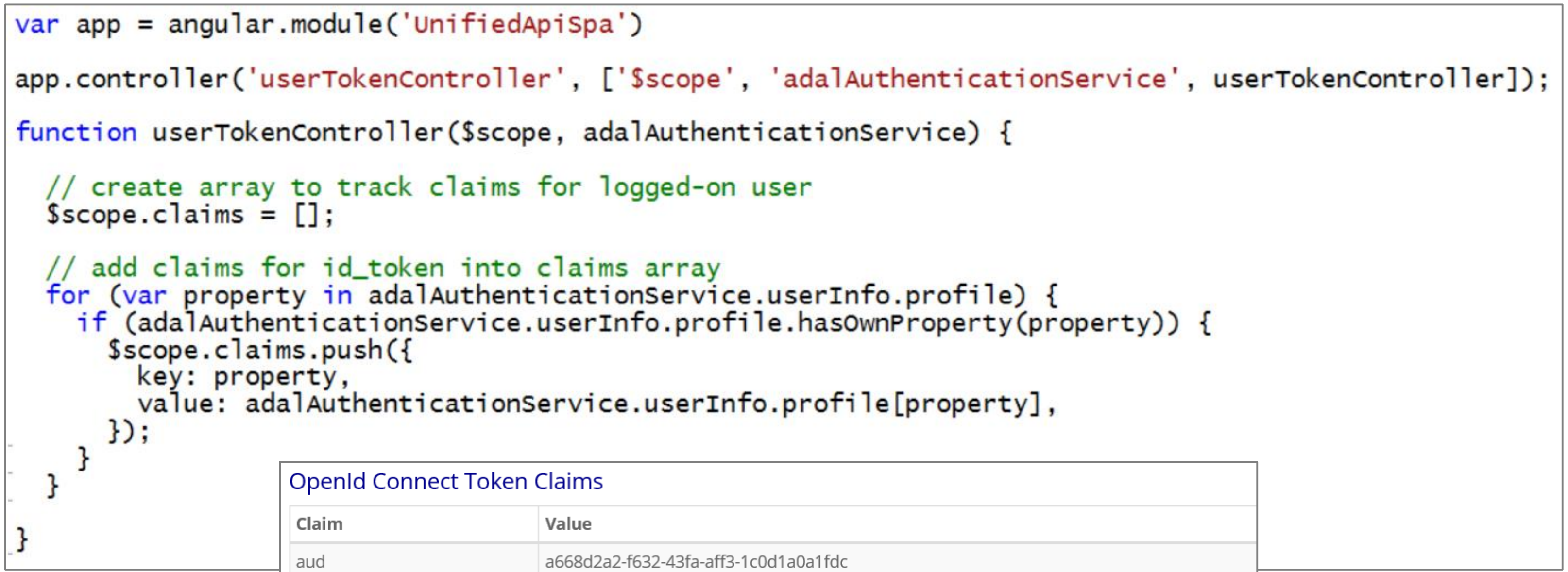


```
var apiRoot = "https://api.powerbi.com/v1.0/";

service.getDatasets = function () {
  var restUrl = apiRoot + "myOrg/Datasets/";
  return $http.get(restUrl);
};
```

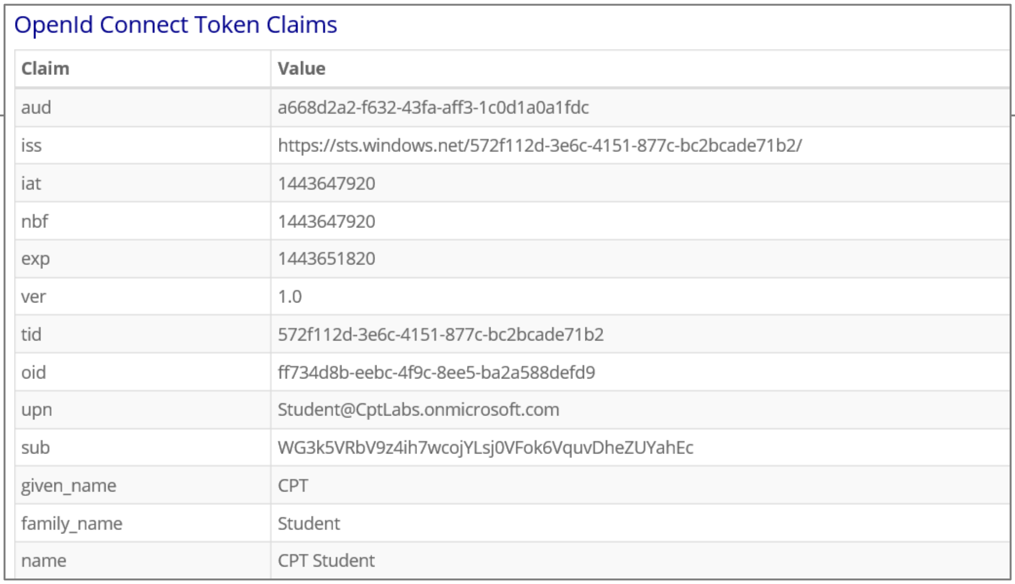


```
var apiRootBeta = "https://api.powerbi.com/beta/";

service.getReports = function () {
  var restUrl = apiRootBeta + "myOrg/Reports/";
  return $http.get(restUrl);
};

service.getDashboards = function () {
  var restUrl = apiRootBeta + "myOrg/Dashboards/";
  return $http.get(restUrl);
};

service.getDashboardTiles = function (dashboardId) {
  var restUrl = apiRootBeta + "myOrg/Dashboards/" + dashboardId + "/tiles/";
  return $http.get(restUrl);
};
```

# Inspecting Authenticated User Claims



```
var app = angular.module('UnifiedApiSpa')

app.controller('userTokenController', ['$scope', 'adalAuthenticationService', userTokenController]);

function userTokenController($scope, adalAuthenticationService) {

  // create array to track claims for logged-on user
  $scope.claims = [];

  // add claims for id_token into claims array
  for (var property in adalAuthenticationService.userInfo.profile) {
    if (adalAuthenticationService.userInfo.profile.hasOwnProperty(property)) {
      $scope.claims.push({
        key: property,
        value: adalAuthenticationService.userInfo.profile[property],
      });
    }
  }

}
```



OpenId Connect Token Claims

| Claim | Value |
|---|---|
| aud | a668d2a2-f632-43fa-aff3-1c0d1a0a1fdc |
| iss | https://sts.windows.net/572f112d-3e6c-4151-877c-bc2bcade71b2/ |
| iat | 1443647920 |
| nbf | 1443647920 |
| exp | 1443651820 |
| ver | 1.0 |
| tid | 572f112d-3e6c-4151-877c-bc2bcade71b2 |
| oid | ff734d8b-eebc-4f9c-8ee5-ba2a588defd9 |
| upn | Student@CptLabs.onmicrosoft.com |
| sub | WG3k5VRbV9z4ih7wcojYLsj0VFok6VquvDheZUYahEc |
| given_name | CPT |
| family_name | Student |
| name | CPT Student |

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