

Deep Dive into the Power BI JavaScript API



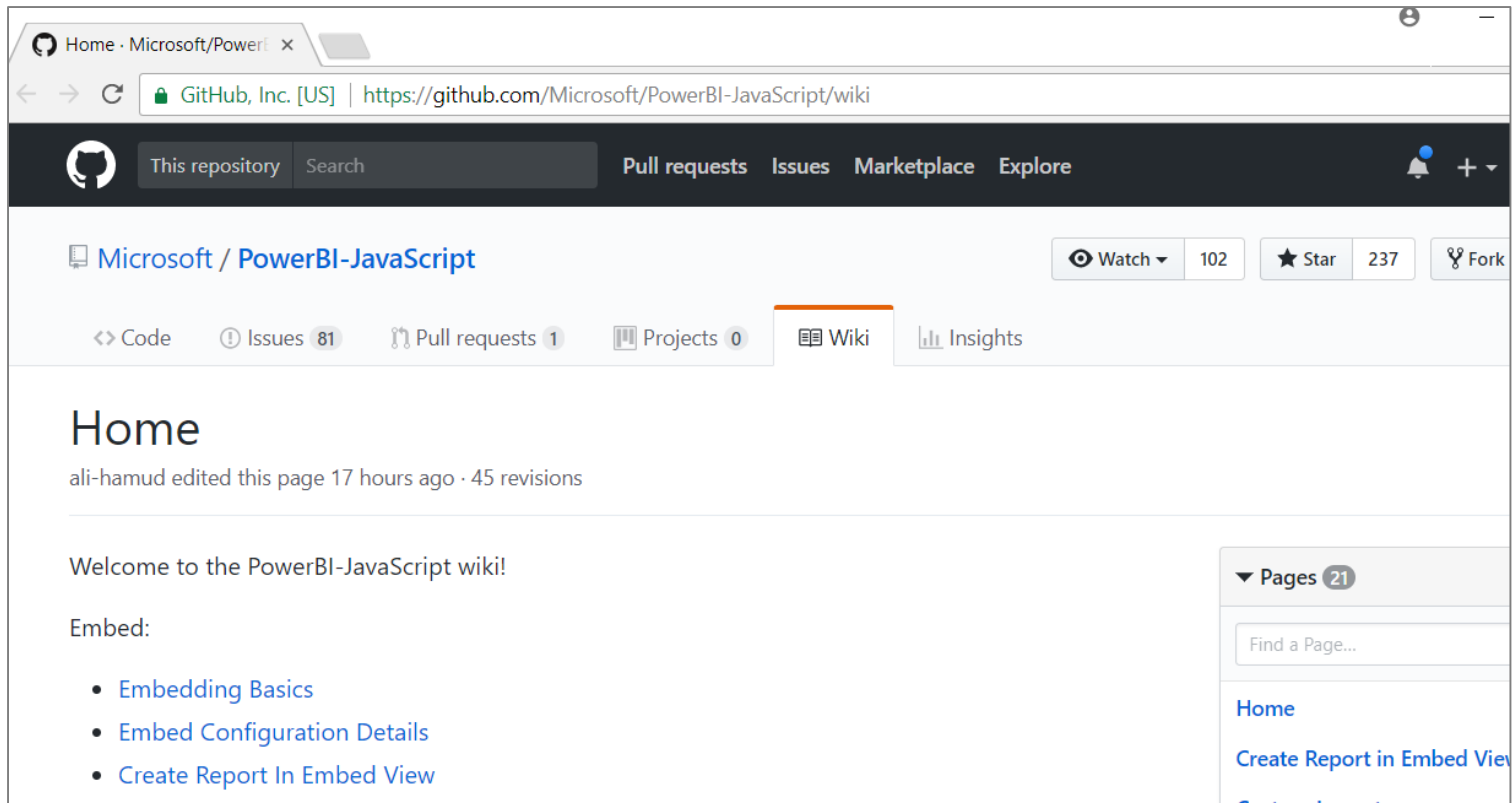
Agenda

- Embedding Dashboards, Dashboard Tiles and the Q&A Experience
- Embedding a New Report with Save-As Redirect Logic
- Setting Report Filters and Applying Bookmarks
- Embedding Reports using Phased Loading
- Embedding Report Visuals using a Custom Layout
- Extending an Embedded Report with Custom Menu Commands



Power BI JavaScript API (powerbi.js)

- Power BI JavaScript API used to embed resources in browser
 - GitHub repo at <https://github.com/Microsoft/PowerBI-JavaScript/wiki>
 - GitHub repository contains code, docs, wiki and issues list



Hello World with Power BI Embedding

- **powerbi.js** library provides **powerbi** as top-level service object
 - You call **powerbi.embed** and pass **configuration** object with access token
 - **models** object available to supply configuration settings
 - **configuration** object sets **tokenType** to either **TokenType.Embed** or **TokenType.Aad**

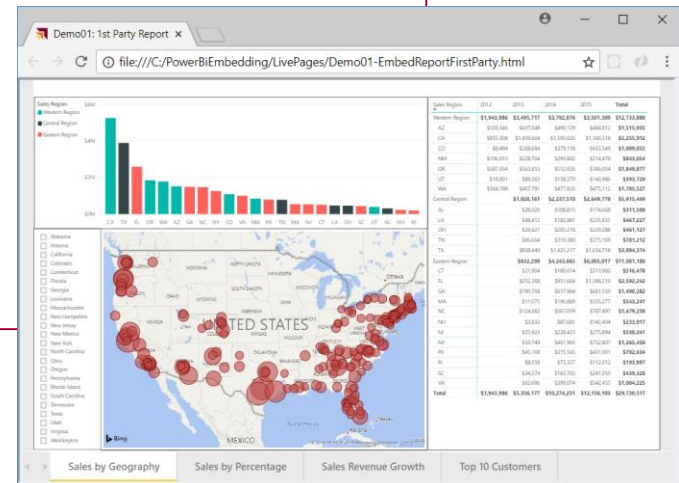
```
// data required for embedding Power BI report
var embedReportId = "ba274ba0-93be-4e53-af65-fdc8a559c557";
var embedUrl = "https://app.powerbi.com/reportEmbed?reportId=ba274ba0-93be-4e53-af65-fdc8a559c557&groupId=7f4...";
var accessToken = "eyJ0eXAiOiJKVlQiLCJhbGciOiJSUzI1NiIsIngldCI6ImRpb0d5d3dsahZkRmJYwjcXMLEdwUGF5OUFsVSIsImtpZD..."

// 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 // First party embedding
};

// 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);
```



Embedded Report Configuration Options

- **permissions** determines what permissions are given to user on resource
- **viewMode** determines when report opens in read-only view or edit view
- **pageView** determines how reports scales to fit embed container element

```
var models = window['powerbi-client'].models;  
  
var config: embed.IEmbedConfiguration = {  
  type: 'report',  
  id: reportId,  
  embedUrl: embedUrl,  
  accessToken: accessToken,  
  tokenType: models.TokenType.Embed,  
  permissions: models.Permissions.All,  
  viewMode: models.ViewMode.Edit,  
  pageView: "fitToWidth",  
  settings: {  
    filterPaneEnabled: false,  
    navContentPaneEnabled: false  
  }  
};
```

Read: Allows view report only.
ReadWrite: Allows view, Edit and Save report.
Copy: Allows Save a copy of a report using Save As.
Create: Allows creating a new report.
All: Allows everything.

View - Opens report in View mode.
Edit - Opens report in Edit mode.

fitToWidth: Fit to width of host HTML element.
oneColumn: Opens in single column.
actualSize: Actual size as designed in report



PowerBiEmbeddedScratchpad Sample

<https://github.com/CriticalPathTraining/PowerBiEmbeddedScratchpad>

The screenshot shows the GitHub repository page for **CriticalPathTraining / PowerBiEmbeddedScratchpad**. The repository is described as "A sample application for developer's learning about Power BI Embedding". It has 4 commits, 1 branch, 0 releases, 1 contributor, and is licensed under MIT. The repository is currently on the **master** branch. A table of recent updates is shown below the repository information.

| Update | Author | Time |
|----------------------------|---------|----------------------------------|
| TedPattison Updates | | Latest commit 3d2e699 7 days ago |
| DemoPagesWithEmbedding | Updates | 8 days ago |
| PBIX | Updates | 7 days ago |
| PowerBiEmbeddedScratchpad | Updates | 8 days ago |



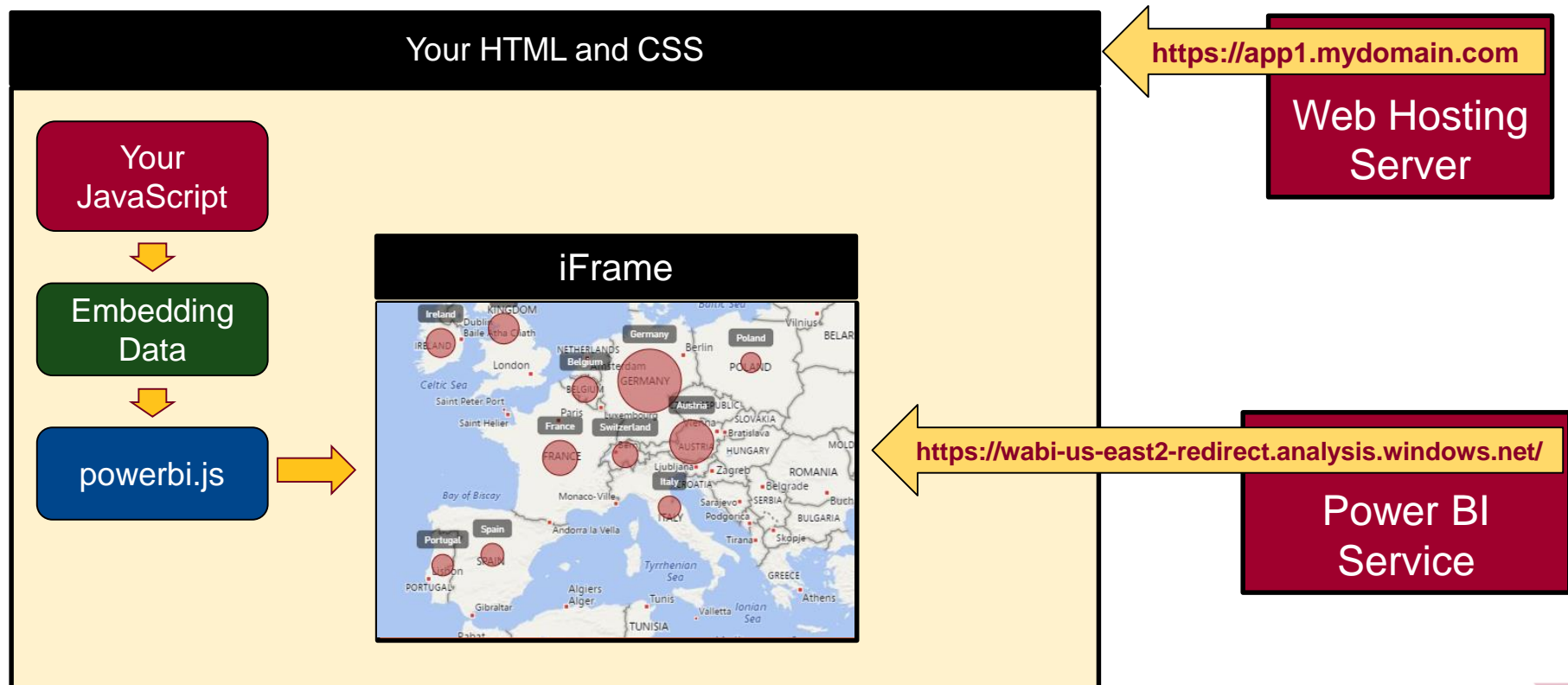


DEMO

The Power BI Embedded Scratchpad App

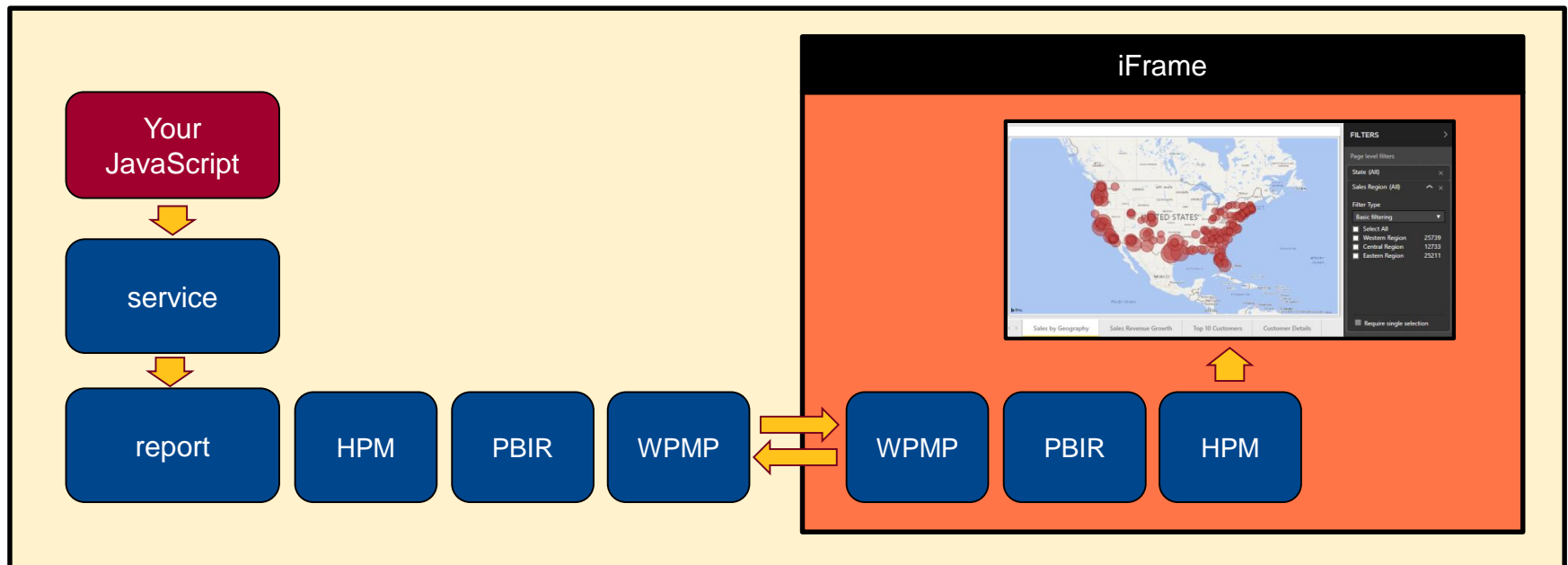
Report Embedding Architecture

- Embedding involves creating an iFrame on the page
 - PBIJS transparently creates iFrame and sets source to Power BI Service
 - ***The iFrame and hosting page originate from different DNS domains***



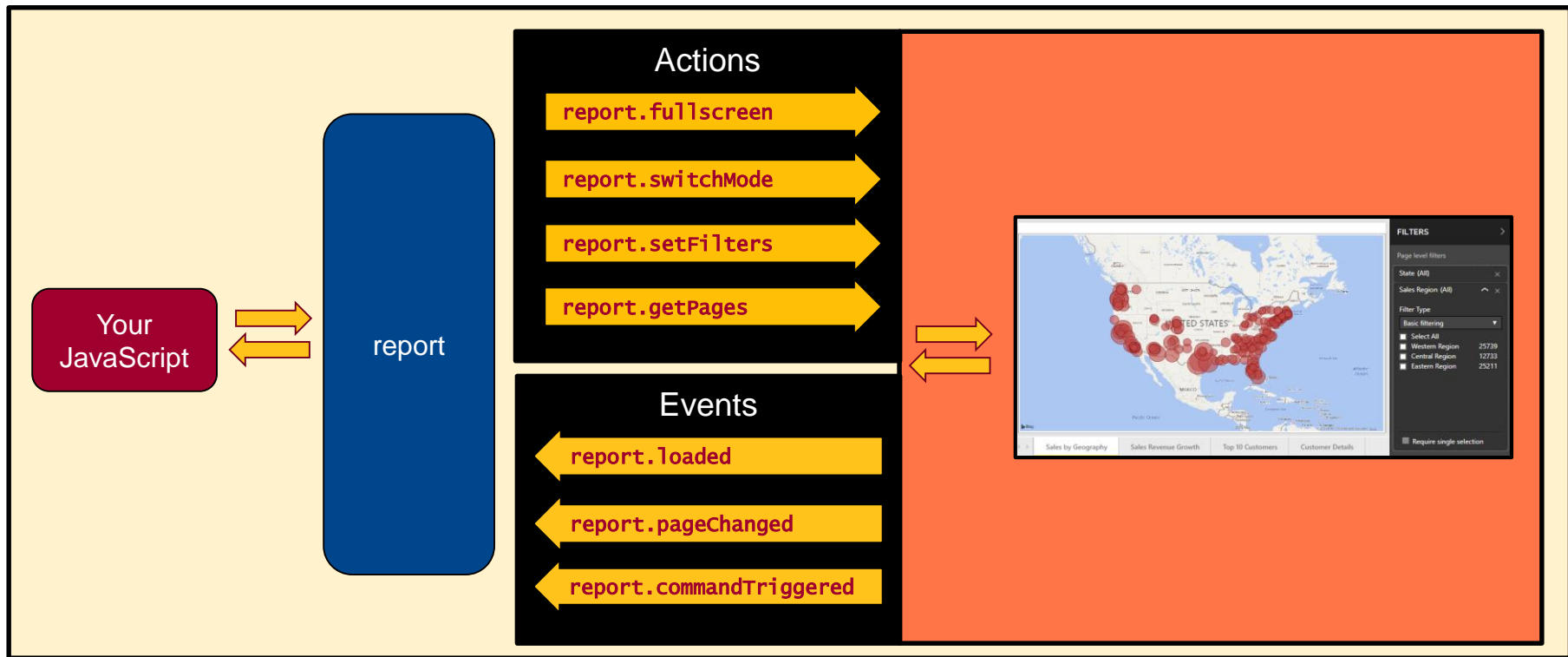
Post Message Communications Flow

- 4 extra libraries used to communicate with report in iFrame
 - window-post-message-proxy (WPMP)
 - http-post-message (HPM)
 - powerbi-router (PBIR)
 - powerbi-models (PBIM)



A Promise-based Programming Model

- Design of PBIJS simulates HTTP protocol
 - Creates more intuitive programming model for developers
 - Programming based on asynchronous requests and promises
 - Embedded objects programmed using actions and events



Handling Report Events

```
var report = powerbi.embed(embedContainer, config);

var pages;

report.on('loaded', function () {
    // call getPages with callback
    report.getPages().then(
        function (reportPages) {
            pages = reportPages;
            // call method to load pages into nav menu
            loadReportPages(pages);
        });
});

var loadReportPages = function (pages) {
    for (var index = 0; index < pages.length; index++) {
        // determine which pages are visible and not hidden
        if (pages[index].visibility == 0) { // 0 means visible and 1 means hidden
            var reportPageDisplayName = pages[index].displayName;
            pageNavigation.append($("<li>")
                .append($("<a href='javascript:;'>")
                    .text(pages[index].displayName))
                .click(function (domEvent) {
                    var targetPageName = domEvent.target.textContent;
                    // get target page from pages collection
                    var targetPage = pages.find(function (page) { return page.displayName === targetPageName; }));
                    // navigate report to target page
                    targetPage.setActive();
                }));
        }
    }
}
```

```
▼ Report ⓘ
  ▼ allowedEvents: Array(12)
    0: "loaded"
    1: "saved"
    2: "rendered"
    3: "saveAsTriggered"
    4: "error"
    5: "dataSelected"
    6: "filtersApplied"
    7: "pageChanged"
    8: "commandTriggered"
    9: "swipeStart"
    10: "swipeEnd"
    11: "bookmarkApplied"
```



Embedding a New Report

```
// Get data required for embedding
var embedWorkspaceId= "7f4576c7-039a-472f-b998-546a572d5da2";
var embedDatasetId = "b4a48602-71da-42b2-8cf5-44d35b2ac70b";
var embedUrl = "https://app.powerbi.com/reportEmbed?groupId=7f4576c7-039a-472f-b998-546a5
var accessToken = "H4sIAAAAAAAEAB2Wxw60CA6E3-W_shIZmpXmQE5NztzIOwdG--7bM3dbsj67qvz3HzN5-i

// Get models object to access enums for embed configuration
var models = window['powerbi-client'].models;

var config = {
  datasetId: embedDatasetId,
  embedUrl: embedUrl,
  accessToken: accessToken,
  tokenType: models.TokenType.Embed,
};

// Get a reference to the embedded report HTML element
var embedContainer = document.getElementById('embedContainer');

// Embed the report and display it within the div container.
var report = powerbi.createReport(embedContainer, config);
```



New Report with SaveAs Redirect

```
// Embed the report and display it within the div container.
var newReport = powerbi.createReport(embedContainer, config);

// this event fires whenever user runs save or SaveAs command on a new report
newReport.on("saved", function (event) {

    // get ID and name of new report
    var newReportId = event.detail.reportObjectId;
    var newReportName = event.detail.reportName;

    // set new title for browser window
    document.title = newReportName;

    // reset report container element
    powerbi.reset(embedContainer);

    config = {
        type: 'report',
        id: newReportId,
        embedUrl: "https://app.powerbi.com/reportEmbed?reportId=" + newReportId + "&groupId=" + embedWorkspaceId,
        accessToken: accessToken,
        tokenType: models.TokenType.Aad,
        permissions: models.Permissions.All,
        viewMode: models.ViewMode.Edit,
    };

    // Embed the report and display it within the div container.
    var savedReport = powerbi.embed(embedContainer, config);
```



Embedding the Q&A Experience

```
// Get data required for embedding
var datasetId = "b4a48602-71da-42b2-8cf5-44d35b2ac70b";
var embedUrl = "https://app.powerbi.com/qnaEmbed?groupId=7f4576c7-039a-472f-b998-546a57";
var accessToken = "H4sIAAAAAAAEAC2Wx6rFDI6E3-XfeuA4h4Fe00ecvXPO0buZd58L3XuBpK8K1f79j5W-";

// Get models object to access enums for embed configuration
var models = window['powerbi-client'].models;

var config = {
  type: 'qna',
  tokenType: models.TokenType.Embed,
  accessToken: accessToken,
  embedUrl: embedUrl,
  datasetIds: [ datasetId ],
  viewMode: models.QnaMode.Interactive,
  question: "What is sales revenue by quarter and sales region as stacked area chart"
};

var embedContainer = document.getElementById('embedContainer');

var embeddedObject = powerbi.embed(embedContainer, config);
```



Configuration Options

```
// Get models object to access enums for embed configuration
var models = window['powerbi-client'].models;

var config = {
  type: 'report',
  id: embedReportId,
  embedUrl: embedUrl,
  accessToken: accessToken,
  tokenType: models.TokenType.Embed,
  permissions: models.Permissions.All,
  viewMode: models.ViewMode.View,
  settings: {
    filterPaneEnabled: false,
    navContentPaneEnabled: true,
    localeSettings: { language: "en", formatLocale: "es" },
    background: models.BackgroundType.Transparent
  }
};

// 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);
```



Summary

- ✓ Embedding Dashboards, Dashboard Tiles and the Q&A Experience
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