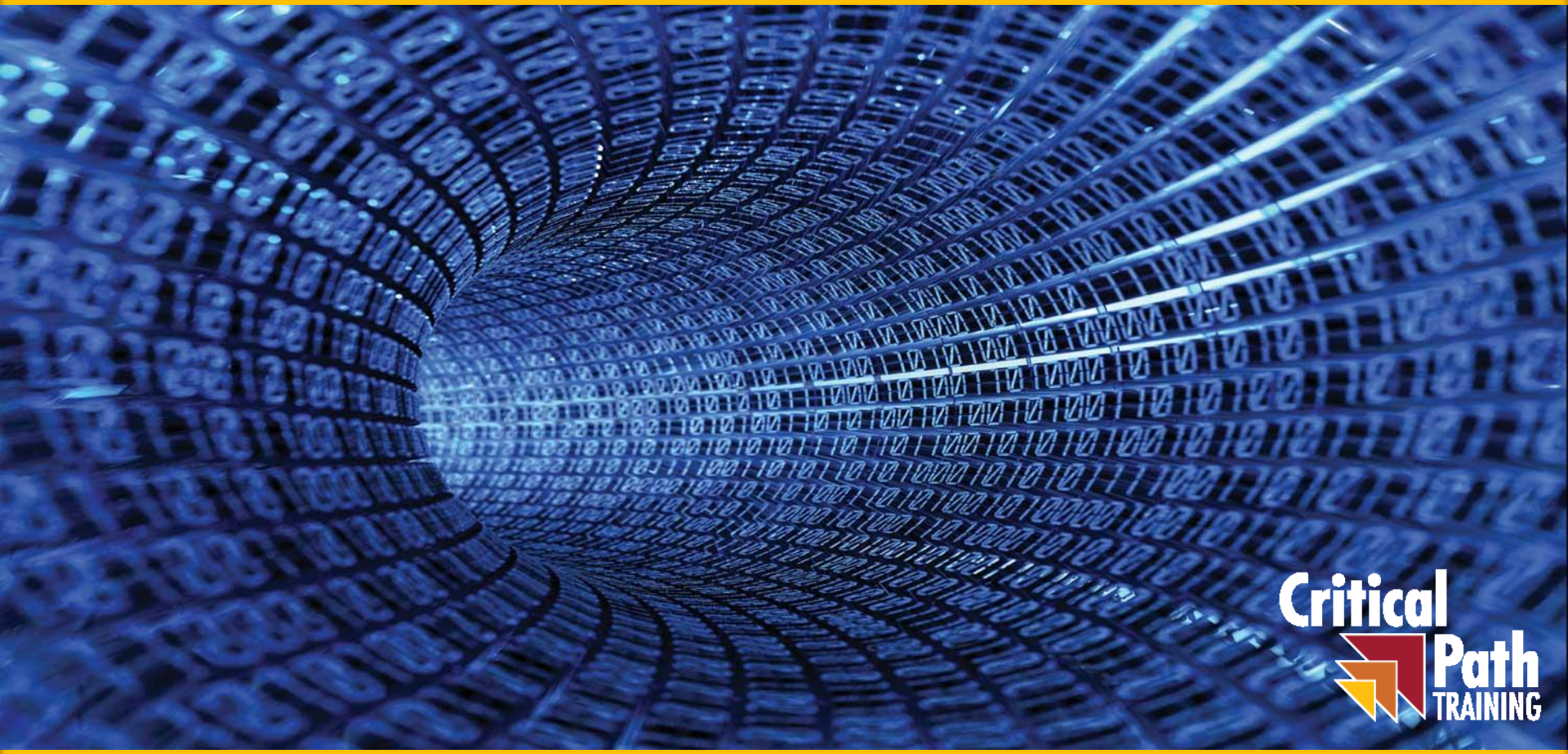
Embedding Reports and Dashboards using SharePoint Framework



Agenda

- Creating SharePoint Framework Projects
- Quick Primer on SharePoint Framework Development
- Granting Tenant-level Permissions to Call to Power BI Service API
- Calling the Power BI Service API using AadHttpClient
- Installing the Power BI JavaScript API Package in an SPFx Project
- Using Typescript to Embed Reports & Dashboards in Web Parts

Evolution of the SharePoint Platform

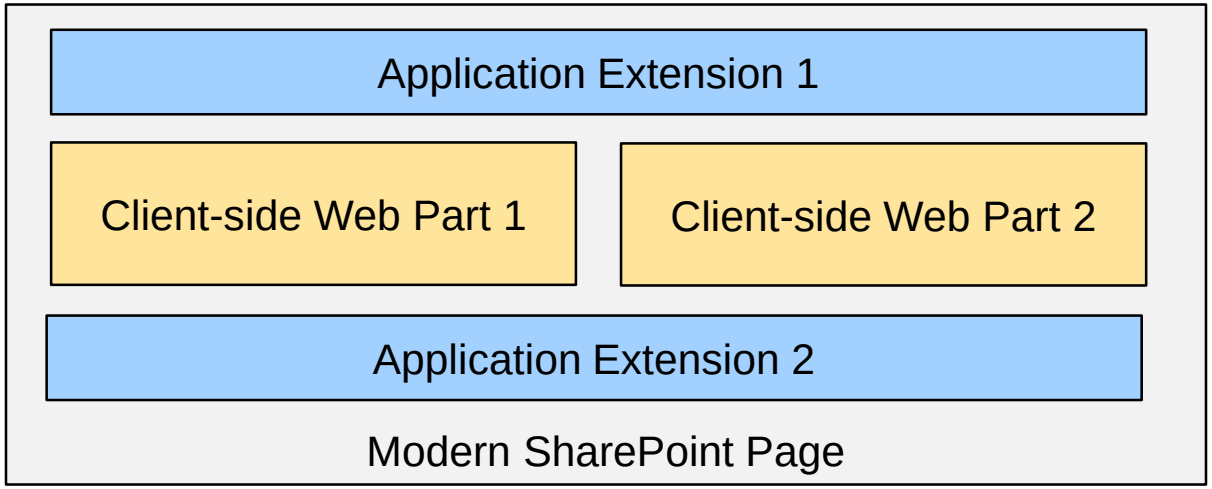
- Farm Solutions
  - Server-side DLLs and XML-based Definitions
- ~~Sandboxed Solutions~~
- SharePoint ~~Apps~~ Add-ins
  - iFrames used to add in extra security dimension
  - Introduced complexity with 2 domains (app web vs host web)
- JavaScript Injection
  - Scripting can be disabled in SharePoint Online
  - No formal deployment model
- SharePoint Framework
  - A natural evolution and formalization of JavaScript Injection model

SPFx versus the SharePoint Add-in Model

- SPFx is quite different from SharePoint Add-in model
  - SPFx components hosted directly on page, not in iFrame
  - SPFx components rendered using DOM of hosting page
  - No more confusion over "host web" versus "app web"
- SPFx developer experience is completely different
  - SPFx uses modern tools (npm, Yeoman, gulp and webpack)
  - Requires move from Visual Studio to Node.js & Visual Studio Code
- Considerations for migrating to SharePoint Framework
  - SPFx is replacement for SharePoint-hosted add-in model
  - SPFx has nothing similar to provided-hosted add-in model

SharePoint Framework Component Types

- SPFx allows you to create several styles of webparts
  - Standard Webparts
  - React Webparts
- SPFx also provides several other Application Extensions
  - Application Customizer
  - Field Customizers
  - Command Sets



Installing Packages for SPFx Development

- Install Gulp

```
npm install -g gulp
```

- Install Yeoman

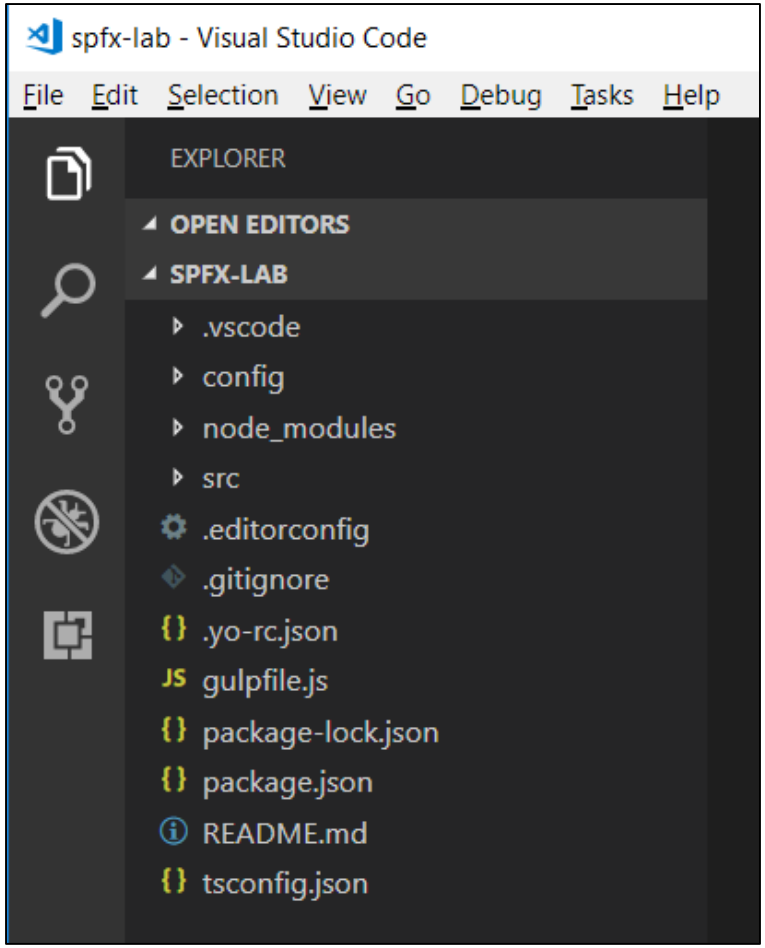
```
npm install -g yo
```

- Install Yeoman Template for SPFx

```
npm install -g @microsoft/generator-sharepoint
```

SharePoint Framework Project Structure

- Project created as Node.js project



The "Hello World" SPFx Webpart

- Webpart class must extend BaseClientSideWebPart
  - Override render() for minimal “hello world” functionality
  - Base class provides API though **context** and **pageContext**
  - Base class provides **domElement** to access hosting page DOM

TS WalmartGreeterWebPart.ts

```
import { BaseClientSideWebPart } from '@microsoft/sp-webpart-base';

export default class WalmartGreeterWebPart extends BaseClientSideWebPart<any> {

  public render(): void {

    let currentUser = this.context.pageContext.user.displayName;

    this.domElement.innerHTML = `
      <div>
        <h2>Hello ${currentUser}</h2>
      </div>`;
  }

}
```

Web Part Context

```
public render(): void {

  var container = jquery(this.domElement);
  container.append( jquery("<h2>").text("Web Part Context Demo") );

  var table: JQuery = this.CreateTable();
  this.AddTableRow(table, "site.id:", this.context.pageContext.site.id.toString());
  this.AddTableRow(table, "web.id:", this.context.pageContext.web.id.toString());
  this.AddTableRow(table, "web.title:", this.context.pageContext.web.title);
  this.AddTableRow(table, "web.absoluteUrl:", this.context.pageContext.web.absoluteUrl);
  this.AddTableRow(table, "web.serverRelativeUrl:", this.context.pageContext.web.serverRelativeUrl);
  this.AddTableRow(table, "web.templateName:", this.context.pageContext.web.templateName);
  this.AddTableRow(table, "web.currentCultureName:", this.context.pageContext.cultureInfo.currentCultureName);
  this.AddTableRow(table, "web.language:", this.context.pageContext.web.language.toString());
  this.AddTableRow(table, "user.displayName:", this.context.pageContext.user.displayName);
  this.AddTableRow(table, "user.loginName:", this.context.pageContext.user.loginName);
  this.AddTableRow(table, "user.emal:", this.context.pageContext.user.email);
  this.AddTableRow(table, "this.diplayMode:", this.displayMode.toString());
  this.AddTableRow(table, "context.webPartTag:", this.context.webPartTag);
  container.append(table);
```

Property	Value
site.id:	a5aa0f03-16b6-4057-8704-daaea2f84494
web.id:	b68b2b24-63c2-42af-a10b-fabb37c034f3
web.title:	Labs for CBD365 Team Site
web.absoluteUrl:	https://labsforcbd365.sharepoint.com
web.serverRelativeUrl:	/
web.templateName:	1
web.currentCultureName:	en-US
web.language:	1033
user.displayName:	Ted Pattison
user.loginName:	student@labsforcbd365.onmicrosoft.com
user.emal:	
this.diplayMode:	2
context.webPartTag:	WebPart.InspectorWebPart.eaf44355-2d45-4e1c-b8de-e8b3bce60279

Working with SASS and .SCSS Files

- SPFx uses Syntactically Awesome Style Sheets (SASS)
  - Styles maintained in .scss files instead of .css files
  - SASS is superset of CSS with variables, selector nesting & mixins
  - SASS compilation occurs when you build project using **gulp build**
  - Webpack compiles .scss files into .css files
- SASS compilation generates unique style names
  - **helloWebPart** renamed to **helloWebPart_0989818e**

Hello.module.scss

```
$font-stack:    Helvetica, sans-serif;
$background-color: lightyellow;
$foont-size: 3.0em;
$padding: 18px;

.helloWebPart{
  font: $font-stack;
  font-size: $foont-size;
  background-color: $background-color;
  border: 1px solid black;
  border-radius: $padding;
  padding: $padding;
  text-align: center;
}
```

SASS

Hello.module.css

```
.helloWebPart_0989818e{
    font:Helvetica,sans-serif;
    font-size:3em;
    background-color:#ffffe0;
    border:1px solid #000;
    border-radius:18px;
    padding:18px;
    text-align:center}
```

Web Part Properties

- Define interface with properties

IGreeterWebpartWebPartProps.ts

```
1  export interface IGreeterWebpartWebPartProps {
2    greeting: string;
3    largefont: boolean;
4    color: string;
5  }
```

- Add interface to web part class definition

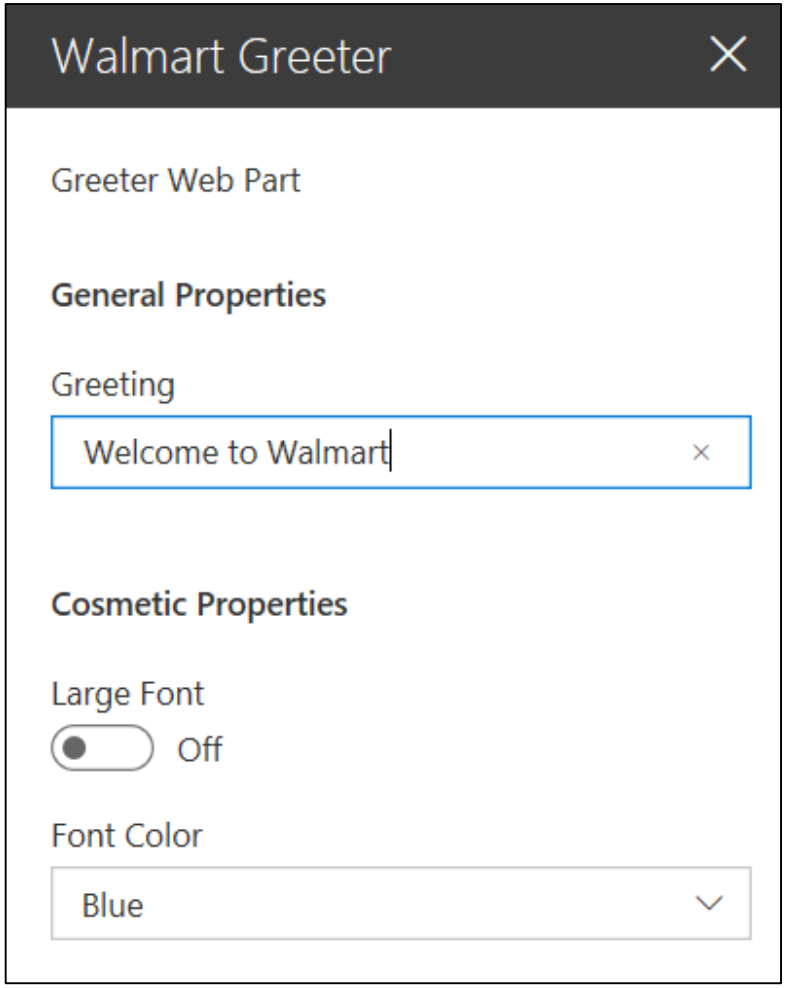
```
class GreeterWebpartWebPart extends BaseClientSideWebPart<IGreeterWebpartWebPartProps> {
```

- Override panelPropertySettings()

```
protected get propertyPaneSettings(): IPropertyPaneSettings {
  return {
    pages: [
      {
        header: { description: "Greeter Web Part" },
        groups: [
          {
            groupName: "General Properties",
            groupFields: [
              PropertyPaneTextField('greeting', { label: 'Greeting' }),
            ]
```

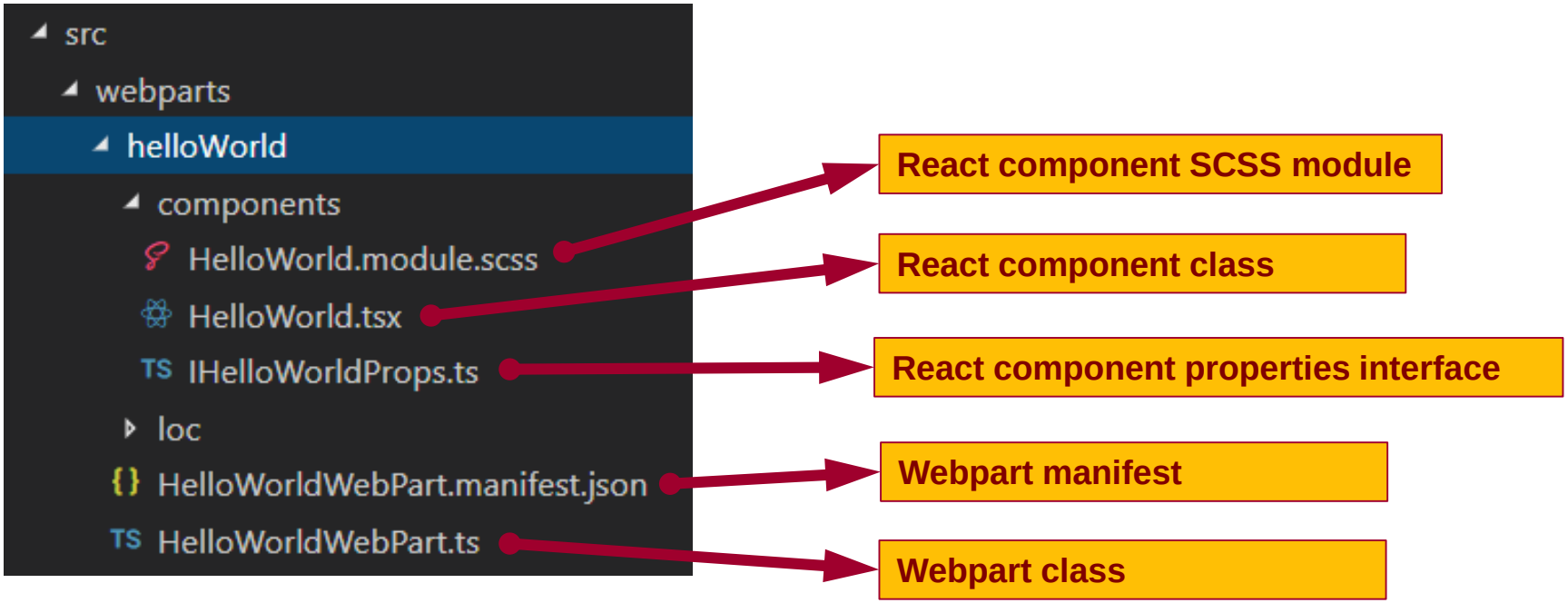
Property Panel Settings

```
protected get propertyPaneSettings(): IPropertyPaneSettings {
  return {
    pages: [
      {
        header: { description: "Greeter Web Part" },
        groups: [
          {
            groupName: "General Properties",
            groupFields: [
              PropertyPaneTextField('greeting', { label: 'Greeting' }),
            ]
          },
          {
            groupName: "Cosmetic Properties",
            groupFields: [
              PropertyPaneToggle('largefont', {
                label: 'Large Font',
                onText: 'On',
                offText: 'Off'
              }),
              PropertyPaneDropdown('color', {
                label: 'Font Color',
                options: [
                  { key: 'green', text: 'Green' },
                  { key: 'blue', text: 'Blue' },
                  { key: 'red', text: 'Red' },
                  { key: 'purple', text: 'Purple' }
                ]
              })
            ]
```



Creating a React Webpart

- You can select React as framework for your webpart
  - You can create a React webpart when creating new project
  - You can add React webpart to existing project
  - React webpart made up of several different source files



React Webpart Architecture

```
export default class HelloWorldWebPart extends BaseClientSideWebPart<IHelloWorldWebPartProps> {

  public render(): void {
    const element: React.ReactElement<IHelloWorldProps > = React.createElement(
      HelloWorld, { description: this.properties.description }
    );
    ReactDom.render(element, this.domElement);
  }
```

```
export interface IHelloWorldProps {
  description: string;
}
```

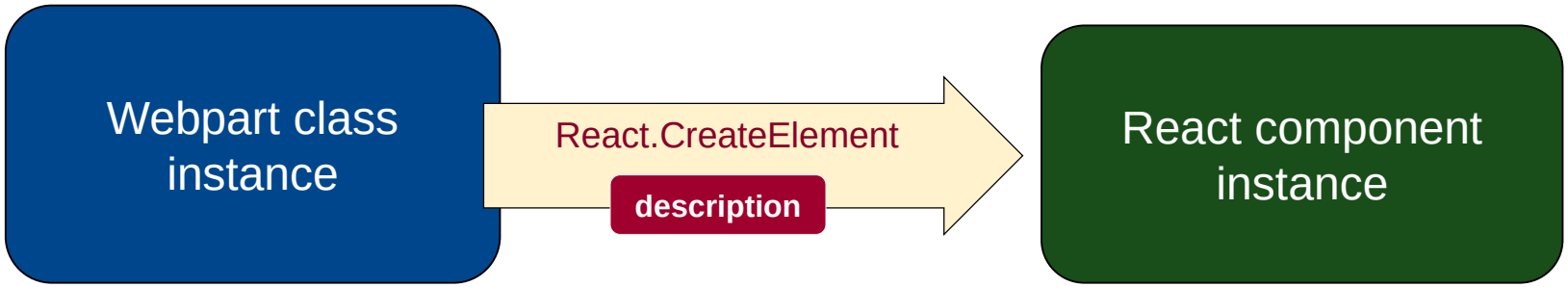
```
import * as React from 'react';

import { IHelloWorldProps } from './IHelloWorldProps';

export default class HelloWorld extends React.Component<IHelloWorldProps, {}> {

  public render(): React.ReactElement<IHelloWorldProps> {
    return <div>{this.props.description}</div>;
  }

}
```



React Webpart Styling

HelloWorld.module.scss

```scss
.helloWorld {
  background-color: lightsalmon;
  border: 4px solid purple;
  border-radius: 12px;

  .title {
    padding: 8px;
    font-size: 48px;
  }

}
```

HelloWorld.tsx

```tsx
import * as React from 'react';

import { IHelloWorldProps } from './IHelloWorldProps';

import styles from './HelloWorld.module.scss';

export default class HelloWorld extends React.Component<IHelloWorldProps, {}> {

  public render(): React.ReactElement<IHelloWorldProps> {
    return (
      <div className={styles.helloWorld}>
        <div className={styles.title}>
          {this.props.description}
        </div>
      </div>
    );
  }

}
```

Passing SPHttpClient to the React Component

```
import { SPHttpClient } from '@microsoft/sp-http';

export interface ILeadTrackerProps {
  targetListDefault: string;
  siteUrl: string;
  spHttpClient: SPHttpClient | undefined;
}
```

```
public render(): void {

  const element: React.ReactElement<ILeadTrackerProps> = React.createElement(
    LeadTracker, {
      targetListDefault: this.properties.targetList,
      siteUrl: this.context.pageContext.web.absoluteUrl,
      spHttpClient: <SPHttpClient>this.context.spHttpClient
    }
  );

  this.leadTracker = <LeadTracker>ReactDom.render(element, this.domElement);
}
```

Create a New SPFX Web Part Project

npm

```
c:\Vegas\PBIESPFX\powerbi-api-demo>yo @microsoft/sharepoint

     _-----_
    |       |    .--------------------------.
    |--(o)--|    |      Welcome to the      |
   `---------´   |  SharePoint Client-side  |
    ( _´U`_ )    |    Solution Generator    |
    /___A___\    '--------------------------'
     |  ~  |
   __'.___.'__
 ´   `  |° ´ Y `

Let's create a new SharePoint solution.
? What is your solution name? powerbi-api-demo
? Which baseline packages do you want to target for your component(s)? SharePoint Online only (latest)
? Where do you want to place the files? Use the current folder
? Do you want to allow the tenant admin the choice of being able to deploy the solution to all sites immediately without
 running any feature deployment or adding apps in sites? Yes
? Which type of client-side component to create? WebPart
? What is your Web part name? reportlist
? What is your Web part description? A sample web part which calls the Power BI Service API
? Which framework would you like to use? (Use arrow keys)
> No JavaScript framework
  React
  Knockout
```

Configuring Web API Permissions

• package-solution.json - powerbi-api-demo - Visual Studio Code

File Edit Selection View Go Debug Tasks Help

EXPLORER

OPEN EDITORS 1 UNSAVED

• package-solution.json config

POWERBI-API-DEMO

- .vscode
- config
  - config.json
  - copy-assets.json
  - deploy-azure-storage.json
  - package-solution.json
  - serve.json
  - tslint.json
  - write-manifests.json
- dist
- lib
- node_modules
- src

package-solution.json

```
1  {
2    "$schema": "https://dev.office.com/json-schemas/spfx-build/package-solutio
3    "solution": {
4      "name": "powerbi-api-demo",
5      "id": "3f4aaaad-387a-405d-8026-e49d653d7a7a",
6      "version": "1.0.0.0",
7      "includeClientSideAssets": true,
8      "skipFeatureDeployment": true,
9      "webApiPermissionRequests": [
10       { "resource": "Power BI Service", "scope": "Group.Read.All" },
11       { "resource": "Power BI Service", "scope": "Dataset.Read.All" },
12       { "resource": "Power BI Service", "scope": "Report.Read.All" },
13       { "resource": "Power BI Service", "scope": "Dashboard.Read.All" }
14     ]
15   },
16   "paths": {
17     "zippedPackage": "solution/powerbi-api-demo.sppkg"
18   }
19 }
```

Packaging Your SPFX Solution

powerbi-api-demo - Visual Studio Code

File Edit Selection View Go Debug Tasks Help

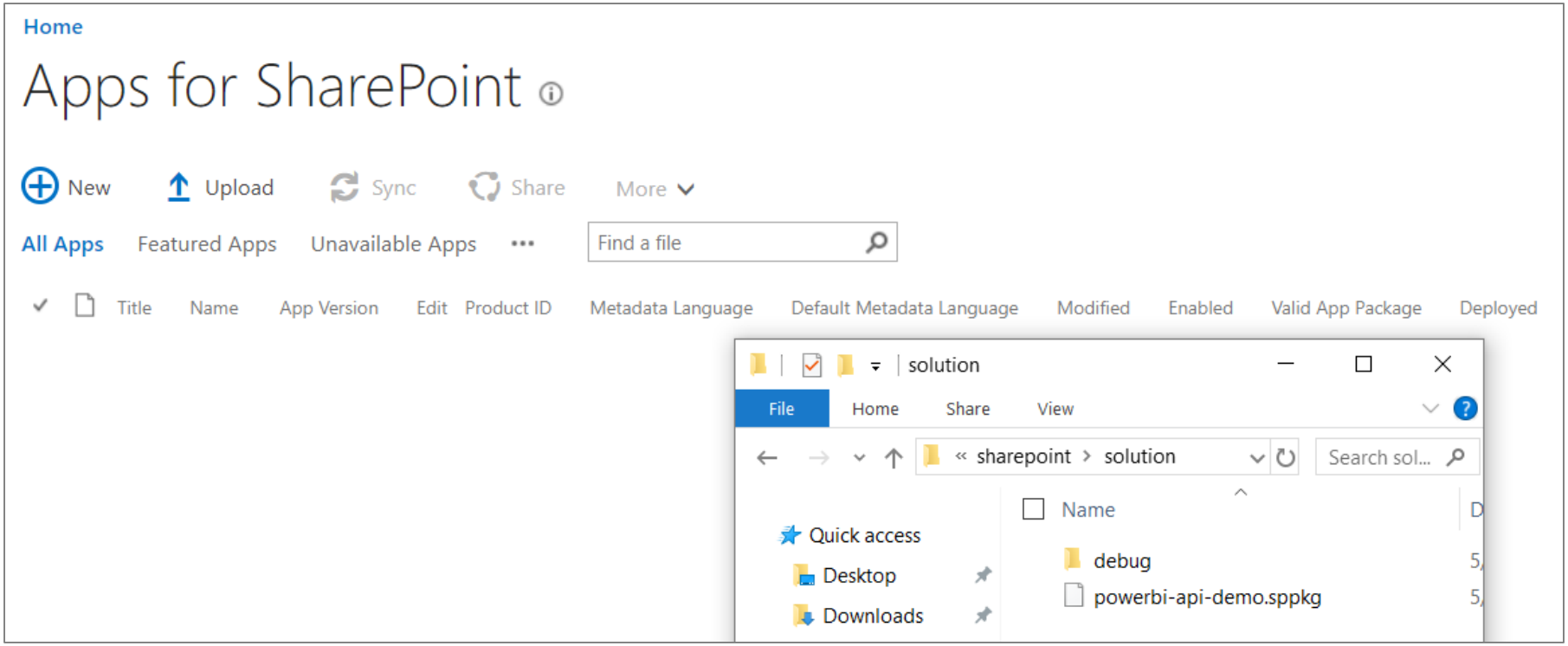
EXPLORER

- OPEN EDITORS
- POWERBI-API-DEMO
  - .vscode
  - config
  - dist
  - lib
  - node_modules
  - sharepoint
    - solution
      - debug
      - powerbi-api-demo.sppkg
  - src

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
PS C:\Vegas\PBIESPFX\powerbi-api-demo> gulp package-solution --ship
Build target: SHIP
[12:37:55] Using gulpfile C:\Vegas\PBIESPFX\powerbi-api-demo\gulpfile.js
[12:37:55] Starting gulp
[12:37:55] Starting 'package-solution'...
[12:37:55] Starting subtask 'configure-sp-build-rig'...
[12:37:55] Finished subtask 'configure-sp-build-rig' after 6.58 ms
[12:37:55] Starting subtask 'package-solution'...
[12:37:55] [package-solution] Found manifest: C:\Vegas\PBIESPFX\powerbi-api-
[12:37:55] [package-solution] Found client-side build resource: reportlist-w
[12:37:55] Verifying configuration...
```

Deploy the Web Part to the App Gallery



Configuring Trust

Do you trust powerbi-api-demo?

The client-side solution you are about to deploy contains full trust client side code. The components in the solution can, and usually do, run in full trust, and no resource usage restrictions are placed on them.

This client side solution will get content from the following domains:

SharePoint Online

☑ Make this solution available to all sites in the organization

Please go to the Service Principal Permissions Management Page to approve pending permissions.

powerbi-api-demo

Deploy Cancel

Granting Web API Permissions

API management

Control the third-party APIs that can be called by apps and custom script.

API name	Permission	Access
Pending approval (0)		
Approved (4)		
Power BI Service	Group.Read.All	Approved
Power BI Service	Group.Read.All Dataset.Read.All	Approved
Power BI Service	Group.Read.All Dataset.Read.All Report.	Approved
Power BI Service	Group.Read.All Dataset.Read.All Report.	Approved

admin center

Feedback

Calling Power BI API with AadHttpClient

```
import { AadHttpClient, HttpClientResponse } from '@microsoft/sp-http';

export default class ReportlistWebPart extends BaseClientSideWebPart<any> {

  private powerbiApiResourceId = "https://analysis.windows.net/powerbi/api";
  private pbiClient: AadHttpClient;

  protected onInit(): Promise<void> {
    this.pbiClient = new AadHttpClient(this.context.serviceScope, this.powerbiApiResourceId);
    return Promise.resolve();
  }

  public render(): void {
    var urlReports: string = "https://api.powerbi.com/v1.0/myorg/reports/";
    this.pbiClient.get(urlReports, AadHttpClient.configurations.v1)
      .then((res: HttpClientResponse): Promise<any> => {
        return res.json();
      })
      .then((reports: any): void => {
        this.domElement.innerHTML =
        `<h2>Power BI Reports</h2>
        <ul>
            ${ reports.value.map(r => `<li><a href='${r.webUrl}' target='_blank' >${r.name}</a></li>`).join("") }
        </ul>`;
    });
  }
}
```

Installing the Power BI JavaScript API

- npm install powerbi-client –save-dev

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

PS C:\Vegas\PBIESPFX\embed-report-demo> npm install powerbi-client --save
npm WARN optional SKIPPING OPTIONAL DEPENDENCY: fsevents@1.2.4 (node_modules\fsevents
npm WARN notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@1.2.4
)

+ powerbi-client@2.5.1
added 9 packages in 22.762s
```

- postcss-value-parser
- postcss-zindex
- powerbi-client
- powerbi-models
- powerbi-router
- prelude-ls

tsconfig.json

```
{
  "compilerOptions": {
    "target": "es5",
    "forceConsistentCasingInFileNames": true,
    "module": "commonjs",
    "jsx": "react",
    "declaration": true,
    "sourceMap": true,
    "experimentalDecorators": true,
    "skipLibCheck": true,
    "typeRoots": [
      "./node_modules/@types",
      "./node_modules/@microsoft",
      "./node_modules/powerbi-client",
      "./node_modules/powerbi-models"
    ],
    "types": [
      "es6-promise",
      "webpack-env"
    ],
    "lib": [
      "es5",
      "dom",
      "es2015.collection"
    ]
  }
}
```

```
public render(): void {
  let hostDiv: JQuery = $(this.domElement);
  let height: string = this.properties.reportHeight + "px";
  hostDiv.empty().css({"margin": "0", "padding": "0", "height": height });

  var reqHeaders: HeadersInit = new Headers();
  reqHeaders.append("Accept", "*");
  this.pbiClient.get(this.reportUrl, AadHttpClient.configurations.v1, { headers: reqHeaders })
    .then((res: HttpClientResponse): Promise<any> => {
      return res.json();
    })
    .then((report: any): void => {
      console.log("begin embed...");
      var embedReportId: string = report.id;
      var embedUrl: string = report.embedUrl;
      var accessToken: string = window.sessionStorage["adal.access.token.keyhttps://analysis.windows.net/powerbi/api"];
      // Get models object to access enums for embed configuration
      var models = pbimodels;

      var config: any = {
        type: 'report',
        id: embedReportId,
        embedUrl: embedUrl,
        accessToken: accessToken,
        tokenType: models.TokenType.Aad,
        permissions: models.Permissions.All,
        viewMode: models.ViewMode.View,
        settings: {
          filterPaneEnabled: false,
          navContentPaneEnabled: this.properties.showPageTabs,
        }
      };
      window.powerbi.reset(this.domElement);
      window.powerbi.embed(this.domElement, config);
    });
}
```

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