

# Introduction to the SharePoint Framework



# Agenda

- Creating SPFX Projects using the Yeoman Generator
- Testing & Debugging Projects in SharePoint Workbench
- Creating Application Customizers
- Creating Field Customizers and Command Sets.
- Creating a Web Part with Custom Properties
- Managing Styles using SCSS Files and CSS Modules



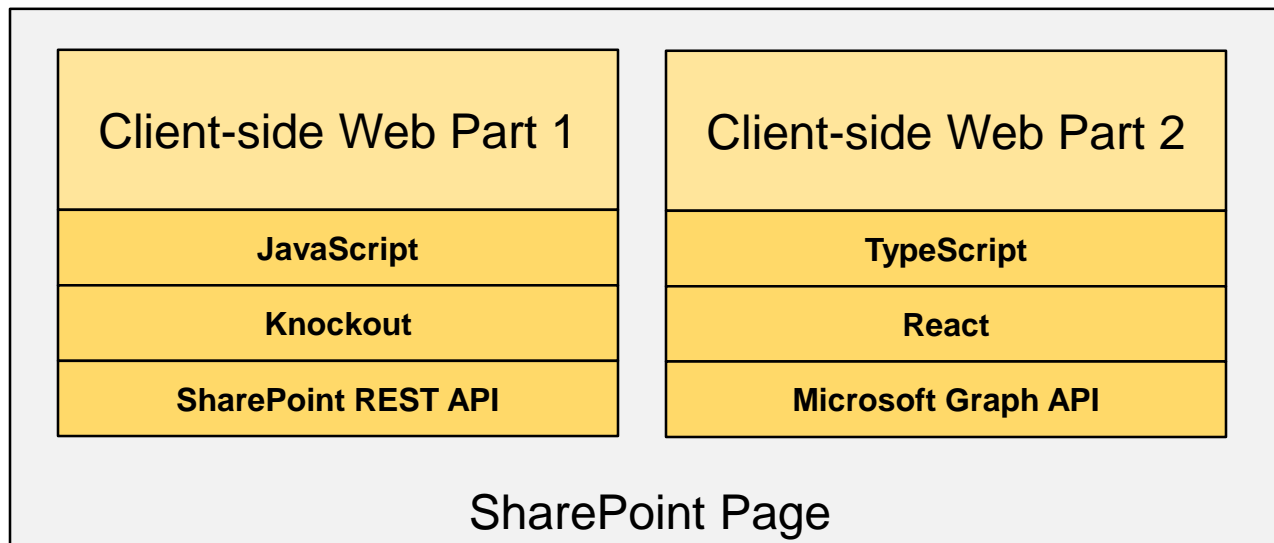
# Evolution of the SharePoint Platform

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



# What is SPFx?

- Development model based on pages and web parts
  - Based on client-side development with JavaScript or TypeScript
  - Code runs with authenticated identity of current user
  - Easy access to SharePoint and Office 365 content and data
  - Developer tools designed to support cross-platform development
  - Great support for targeting mobile devices



# How Does SPFx Work?

- No more iFrames
  - Code runs the context of the current page
- Code runs with identity and permissions of user
  - Uses open browser connections for current user
- Supports lifecycle events
  - render, load, serialize, deserialize, etc.
- Use whatever JavaScript framework you want
  - React, Handlebars, Knockout, Angular1, Angular2, D3



# Cross-platform Toolchain

- Node.js
- Node Package Manager (npm)
- TypeScript
- Yeoman
- Webpack
- Gulp
- git



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  - Deploying SPFx Projects using an Azure CDN



# Install the SPFx Developer Toolchain

- Install Node.JS
  - Version 5.0 recommended - 4.0+ minimum
  - Installs Node Package Manage (npm)
- Install Visual Studio Code
  - Better environment for Development with Node.js
- Install Local self-signed certificate





# Working with npm

- Windows Build Tools (*Visual C++ Build Tools 2015*)  
**npm install -g --production windows-build-tools**
- Install Gulp  
**npm install -g gulp**
- Install Yeoman  
**npm install -g yo**
- Install Yeoman Template for SPFx  
**npm install -g @microsoft/generator-sharepoint**



# Agenda

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- Creating Projects using the SPFx Templates
  - Debugging with the SharePoint Workbench
  - Developing SPFx Web Parts using React.js
  - Deploying SPFx Projects using an Azure CDN



# Using the SPFx Yeoman Template

- SPFx projects created with Yeoman template
  - `yo @microsoft/sharepoint`
  - Takes 8-10 minutes to complete
  - Create a directory with over 200MB of source files

The image is a collage of terminal screenshots showing the process of creating an SPFx project using Yeoman. The main terminal window shows the following commands and output:

```
C:\Demos>md hello-spfx
C:\Demos>cd hello-spfx
C:\Demos\hello-spfx>yo @microsoft/sharepoint
```

The output of the `yo @microsoft/sharepoint` command is a series of prompts and a welcome message:

```

  _ _ _ _ _
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  ~
  _ _ _ _ _
  |o|
  _ _ _ _ _

Welcome to the
SharePoint Client-side
Solution Generator

Let's create a new SharePoint solution.
? What is your solution name? hello-spfx
? Where do you want to place the files? Use default
? What is your webpart name? my-spfx-webpart
? What is your webpart description? absolute
? What framework would you like to start with? create
create package.json
create config\config.json
create config\deploy-azure-storage.json
create config\package-solution.json
create config\prepare-deploy.json
create config\serve.json
create config\tslint.json
create config\write-manifests.json
```

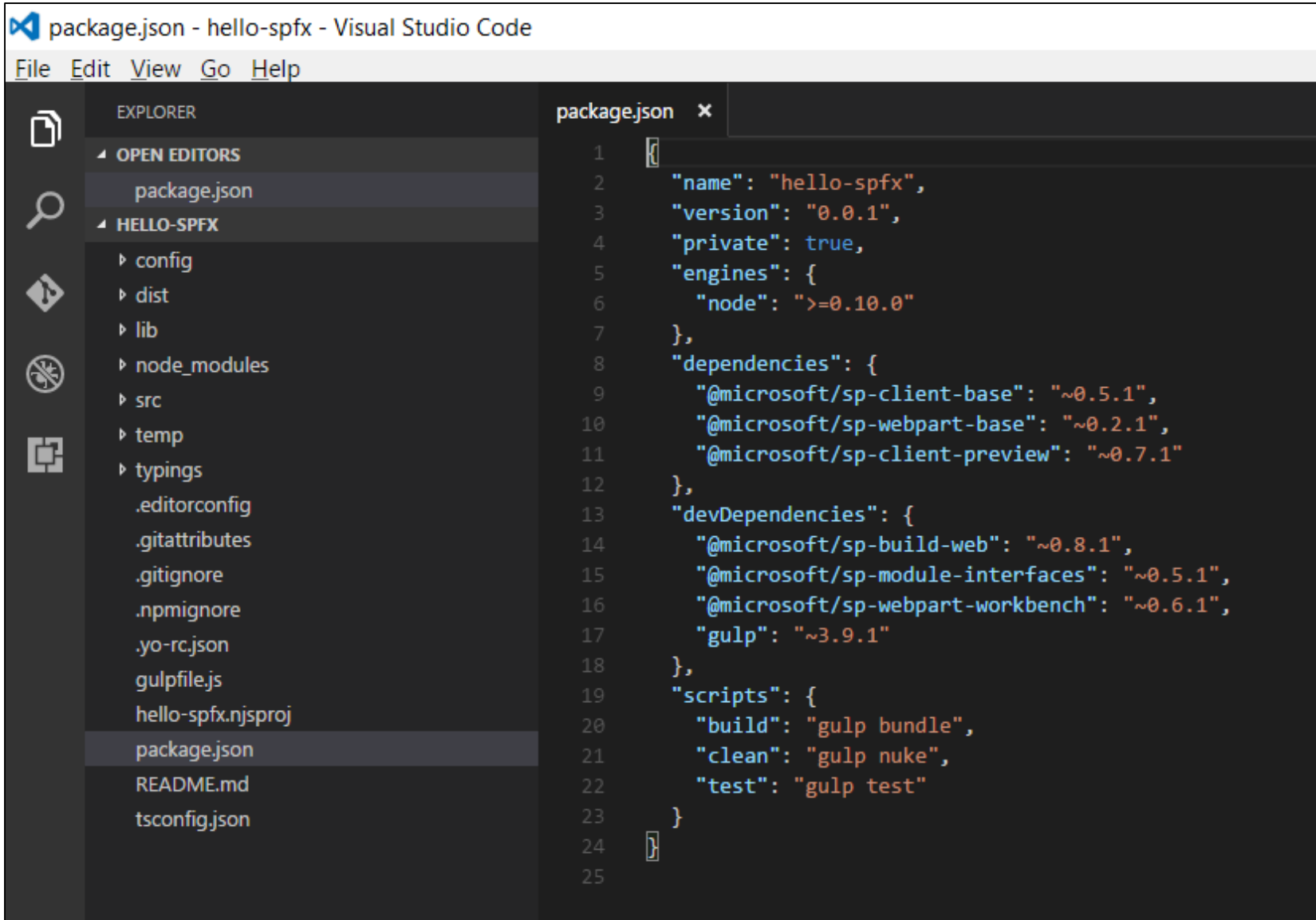
The final screenshot shows the completion of the project creation:

```
C:\Demos\hello-spfx>

#####
##/ (##) (@)
## ##### \
##/ /## (##)
##### ## /
## /## (@)
#####
**=+####!
```

Congratulations!  
Solution `hello-spfx` is created.  
Run `gulp serve` to play with it!

# Package.json



The screenshot displays the Visual Studio Code interface with the 'package.json' file open in the editor. The Explorer sidebar on the left shows the project structure, including folders like 'config', 'dist', 'lib', 'node\_modules', 'src', 'temp', and 'typings', as well as files like '.editorconfig', '.gitattributes', '.gitignore', '.npmignore', '.yo-rc.json', 'gulpfile.js', 'hello-spfx.njsproj', 'package.json', 'README.md', and 'tsconfig.json'. The 'package.json' file is selected and its content is shown in the editor window.

```
1  {  
2    "name": "hello-spfx",  
3    "version": "0.0.1",  
4    "private": true,  
5    "engines": {  
6      "node": ">=0.10.0"  
7    },  
8    "dependencies": {  
9      "@microsoft/sp-client-base": "~0.5.1",  
10     "@microsoft/sp-webpart-base": "~0.2.1",  
11     "@microsoft/sp-client-preview": "~0.7.1"  
12   },  
13   "devDependencies": {  
14     "@microsoft/sp-build-web": "~0.8.1",  
15     "@microsoft/sp-module-interfaces": "~0.5.1",  
16     "@microsoft/sp-webpart-workbench": "~0.6.1",  
17     "gulp": "~3.9.1"  
18   },  
19   "scripts": {  
20     "build": "gulp bundle",  
21     "clean": "gulp nuke",  
22     "test": "gulp test"  
23   }  
24 }  
25
```



# Gulp as a Task Runner

- Gulp serves as a Task Runner
  - Compiles TypeScript files to JavaScript
  - Compiles SASS files to CSS
  - Bundles and minifies JavaScript and CSS files
- Create a self-signed certificate  
**gulp trust-dev-cert**
- Start up the project for testing & debugging  
**gulp serve**



# Developing a SPFx Web Part?

- Create class that extends BaseClientSideWebPart
  - Override render() for minimal “hello world” functionality
  - Base class provides access to page context

HelloWebPart.ts ✕

```
1  import { BaseClientSideWebPart } from '@microsoft/sp-webpart-base';
2
3  import styles from './Hello.module.scss';
4
5  export interface IMyWebPartProps {}
6
7  export default class HelloWebPart extends BaseClientSideWebPart<IMyWebPartProps> {
8
9      public render(): void {
10         var styleName: string = styles.helloWebPart;
11         this.domElement.innerHTML = `<div class="${styleName}">Hello SPFx</div>`;
12     }
13
14 }
15
```



# Working with SASS and .SCSS Files

- Sass: Syntactically Awesome Style Sheets
  - Compiles .scss files into .css files
  - Allows build process to use variables and nesting

```
Hello.module.scss x
1  $font-stack:    Helvetica, sans-serif;
2  $background-color: #ffffe0;
3  $font-size: 3.0em;
4  $padding: 18px;
5
6  .helloWebPart{
7    font: $font-stack;
8    font-size: $font-size;
9    background-color: $background-color;
10   border: 1px solid black;
11   border-radius: $padding;
12   padding: $padding;
13   text-align: center;
14 }
```

SASS

```
Hello.module.css •
1  .helloWebPart_0989818e{
2    font:Helvetica,sans-serif;
3    font-size:3em;
4    background-color:#ffffe0;
5    border:1px solid black;
6    border-radius:18px;
7    padding:18px;
8    text-align:center}
```

```
public render(): void {
  var styleName: string = styles.helloWebPart;
  this.domElement.innerHTML = `<div class="${styleName}">Hello SPFx</div>`;
}
```







**DEMO**

**Hello World with SPFx**



# Adding a JavaScript Library (D3.js)

- Adding package for D3.js library

**npm install d3 --save**

- Add typings file to Intellisense and type checking

**npm install @types/d3 --save-dev**





**DEMO**

**Using D3 with SPFx**

# 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.email:", this.context.pageContext.user.email);
    this.AddTableRow(table, "this.diplyMode:", this.displayMode.toString());
    this.AddTableRow(table, "context.webPartTag:", this.context.webPartTag);
    container.append(table);
}
```

Property	Value
site.id:	a5aa0f03-16b6-4057-8704-daaa2f84494
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.email:	
this.diplyMode:	2
context.webPartTag:	WebPart.InspectorWebPart.eaf44355-2d45-4e1c-b8de-e8b3bce60279



# 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' }
                                ]
                            })
                        ]
                    }
                ]
            }
        ]
    }
}
```

Walmart Greeter

Greeter Web Part

General Properties

Greeting

Welcome to Walmart

Cosmetic Properties

Large Font

☒ On ☐ Off

Font Color

Blue





**DEMO**

## Web Part Properties



# Calling the SharePoint REST API

```
private getListData(): Promise<ISPLists> {  
  
    var restUrl: string = this.context.pageContext.web.absoluteUrl +  
        `/_api/web/lists?$select=ID,Title,DefaultViewUrl&$filter=Hidden eq false`;  
  
    return this.context.httpClient.get(restUrl)  
        .then((response: Response) => {  
            return response.json();  
        });  
}
```

```
private renderList(items: ISPList[]): void {  
    var baseUrl = this.context.pageContext.web.absoluteUrl + "/";  
    let html: string = ``;  
    items.forEach((item: ISPList) => {  
        var DefaultViewUrl = baseUrl + item.DefaultViewUrl;  
        html += `  
<ul class="${styles.list}">  
    <li class="${styles.listItem}">  
        <a href='${DefaultViewUrl}'>${item.Title}</a>  
        <span class="ms-font-1"></span>  
    </li>  
</ul>`;   
    });  
  
    const listContainer: Element = this.domElement.querySelector('#spListContainer');  
    listContainer.innerHTML = html;  
}
```





**DEMO**

# Calling the SharePoint REST API



# React and JSX

```
export default class Futurepart extends React.Component<any, any> {

  constructor(props: any){
    super(props);
    this.state = { message: "Press the button when you can" };
  }

  public render(): JSX.Element {
    return (
      <div className={styles.futurepart}>
        <div className={styles.container}>

          <h3>Hello React and JSX/TSX</h3>

          <div>
            <input type="Button" onClick={e => this.onClickHandler(e) } value="Click me"
          </div>

          <div className={styles.message} >{this.state.message}</div>

        </div>
      </div>
    );
  }
}
```



**DEMO**

# Creating Web Parts with React.js

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# Building a Deployment Package

```
Node.js command prompt

c:\Demos\charts>gulp package-solution_
```

Local Disk (C:) > Demos > charts > sharepoint > solution

Name	Date modified	Type
debug	12/8/2016 12:24 PM	File folder
charts.spapp	12/8/2016 12:24 PM	SPAPP File

Home

## Apps for SharePoint ①

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✓	📄	Title	Name	App Version	Edit	Product ID	Metadata Language	Default Metadata Language
Product ID : {95073FC4-5FB6-40DA-8DF9-C064604A2228} (1)								
	📄	charts-client-side-solution	charts	...	1.0.0.0	{95073FC4-5FB6-40DA-8DF9-C064604A2228}	English - 1033	Yes



# Deploying to Azure

- Gulp commands to deploy to CDN
  1. **gulp --ship**
  2. **gulp deploy-azure-storage**
  3. **gulp bundle --ship**
  4. **gulp package-solution --ship**





# Summary

- ✓ Overview the SharePoint Framework (SPFx)
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- ✓ Deploying SPFx Projects using an Azure CDN



## Assets included in deployment packages

