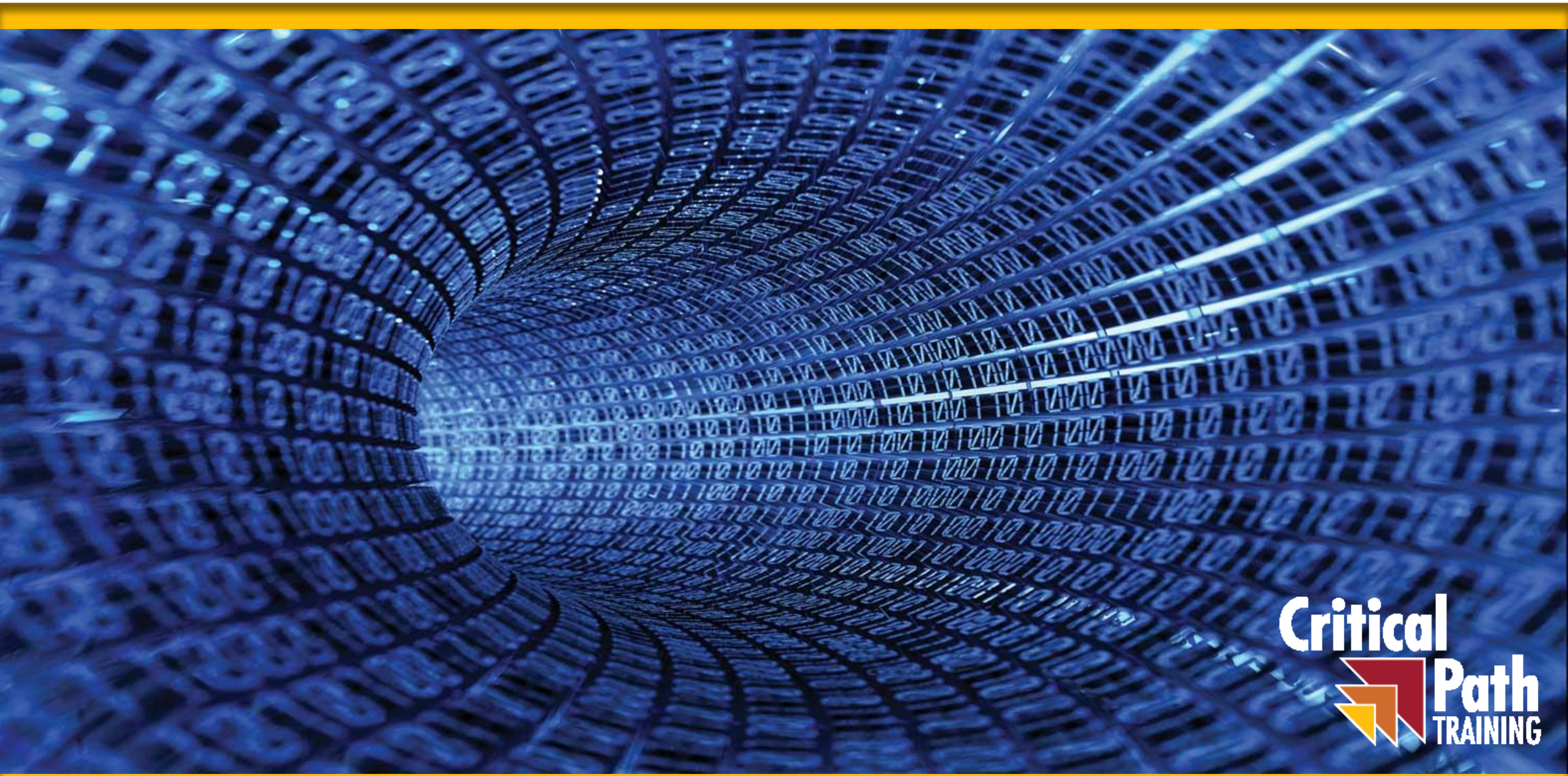
Getting Started with the Power BI Developer Tools



Critical Path TRAINING

Agenda

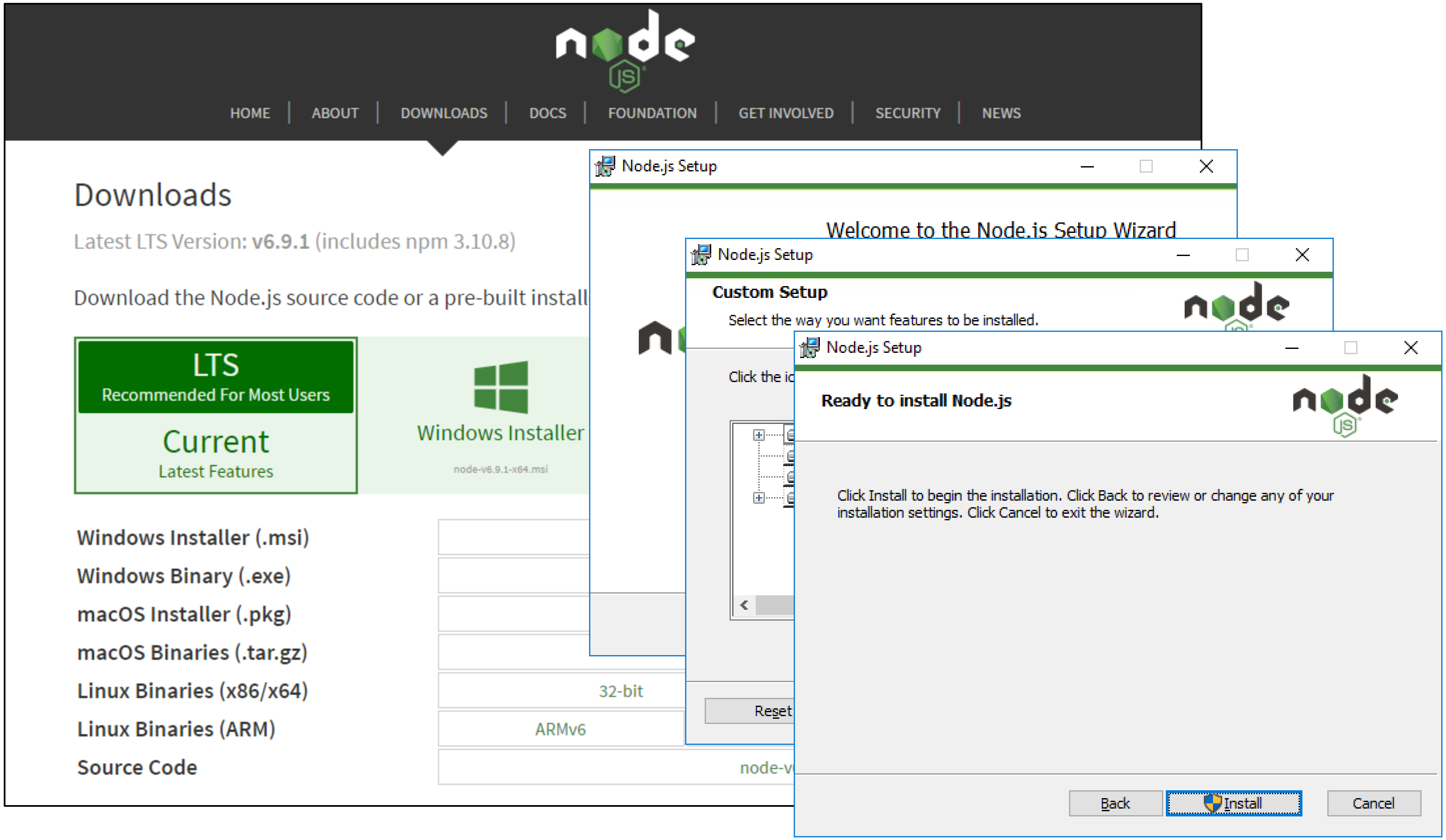
- Custom Visuals in Power BI
- Node.JS and the Cross-platform Toolchain
- Creating Projects with the PBIVIZ CLI
- Custom Visual Project Structure
- Adding Typed Definition Files
- Testing and Debugging a Custom Visual

Install the Power BI Developer Toolchain

- Install Node.JS
  - Installs Node Package Manage (npm)
- Install Visual Studio Code
  - Lightweight Alternative to Visual Studio for Node.js Development
- Install Power BI visuals CLI tool (pbiviz)
  - Install using Node Package Manager (npm)
- Install Local self-signed certificate
  - Install using Power BI visuals CLI tool (pbiviz)

Installing node.js

- https://nodejs.org/en/download/



Downloads

Latest LTS Version: **v6.9.1** (includes npm 3.10.8)

Download the Node.js source code or a pre-built install

Windows Installer (.msi)
Windows Binary (.exe)
macOS Installer (.pkg)
macOS Binaries (.tar.gz)
Linux Binaries (x86/x64)
Linux Binaries (ARM)
Source Code

Node.js Setup

Welcome to the Node.js Setup Wizard

Node.js Setup

Custom Setup

Select the way you want features to be installed.

Click the ic

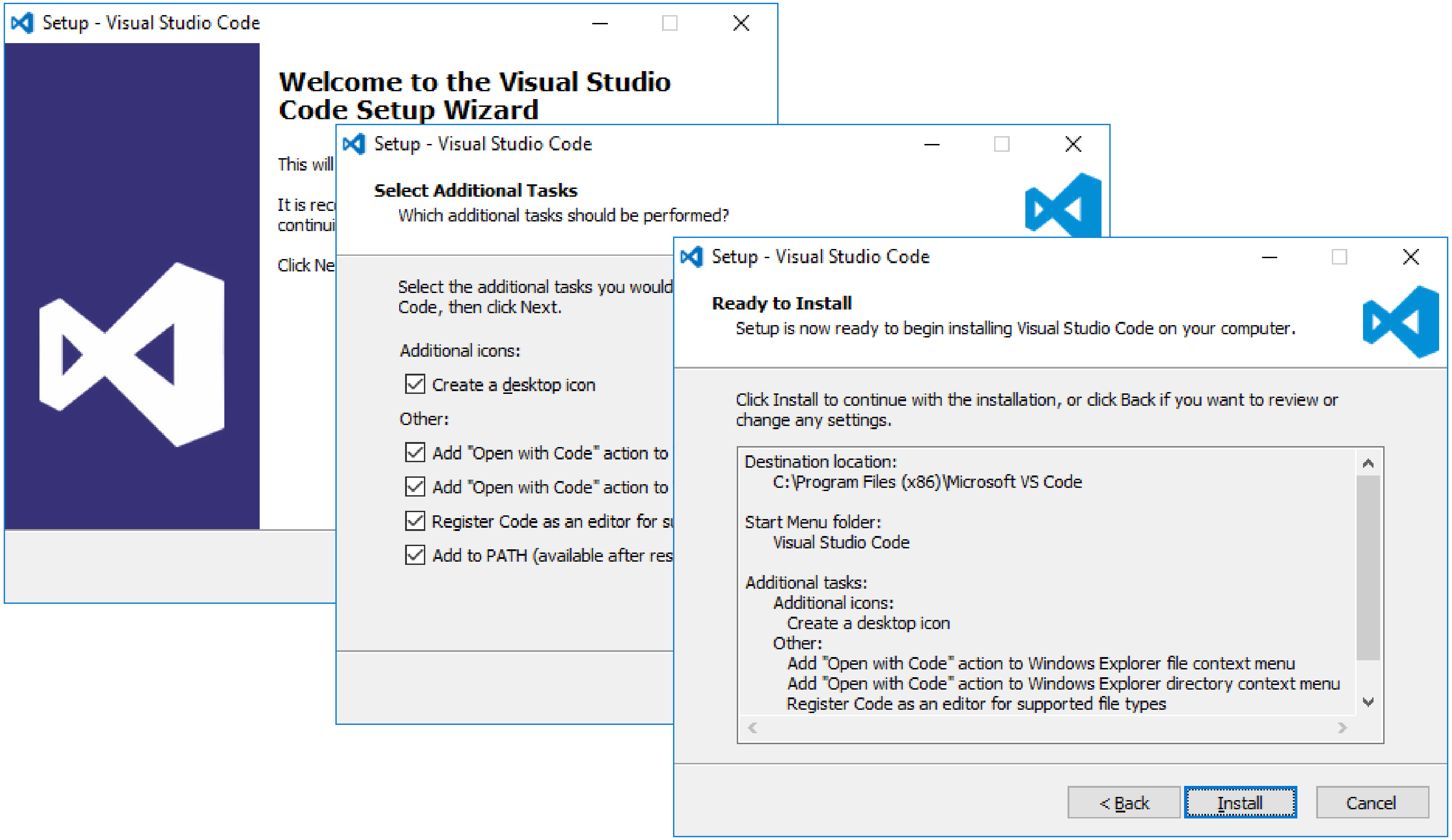
Node.js Setup

Ready to install Node.js

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

Install Visual Studio Code

- http://code.visualstudio.com/



Welcome to the Visual Studio Code Setup Wizard

This will

It is rec
continui

Click Ne

Select Additional Tasks

Which additional tasks should be performed?

Select the additional tasks you would
Code, then click Next.

Additional icons:

☑ Create a desktop icon

Other:

☑ Add "Open with Code" action to

☑ Add "Open with Code" action to

☑ Register Code as an editor for su

☑ Add to PATH (available after res

Ready to Install

Setup is now ready to begin installing Visual Studio Code on your computer.

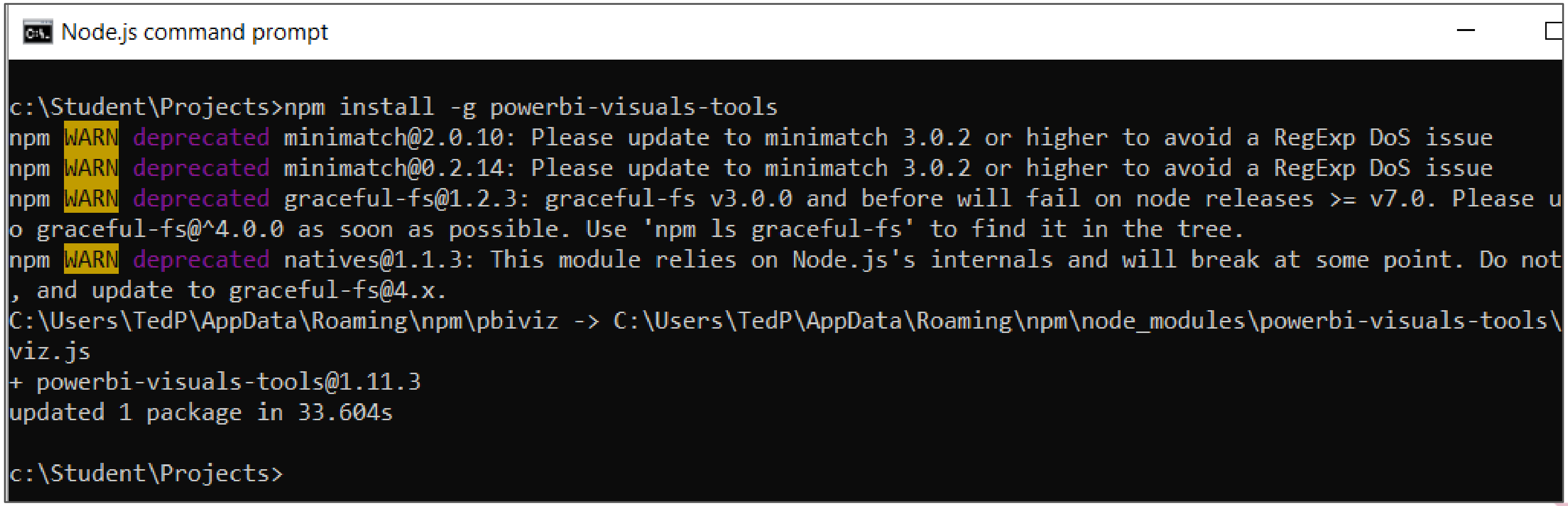
Click Install to continue with the installation, or click Back if you want to review or change any settings.

```
Destination location:
    C:\Program Files (x86)\Microsoft VS Code

Start Menu folder:
    Visual Studio Code

Additional tasks:
    Additional icons:
      Create a desktop icon
    Other:
      Add "Open with Code" action to Windows Explorer file context menu
      Add "Open with Code" action to Windows Explorer directory context menu
      Register Code as an editor for supported file types
```

Power BI Visual CLI Tool (PBIVIZ)

- What is the Power BI Custom Visual Tool?
  - Command-line utility for cross-platform dev
  - Use it with Visual Studio or Visual Studio Code
  - Requires that you first install node.js
  - Install by running command from node.js command prompt

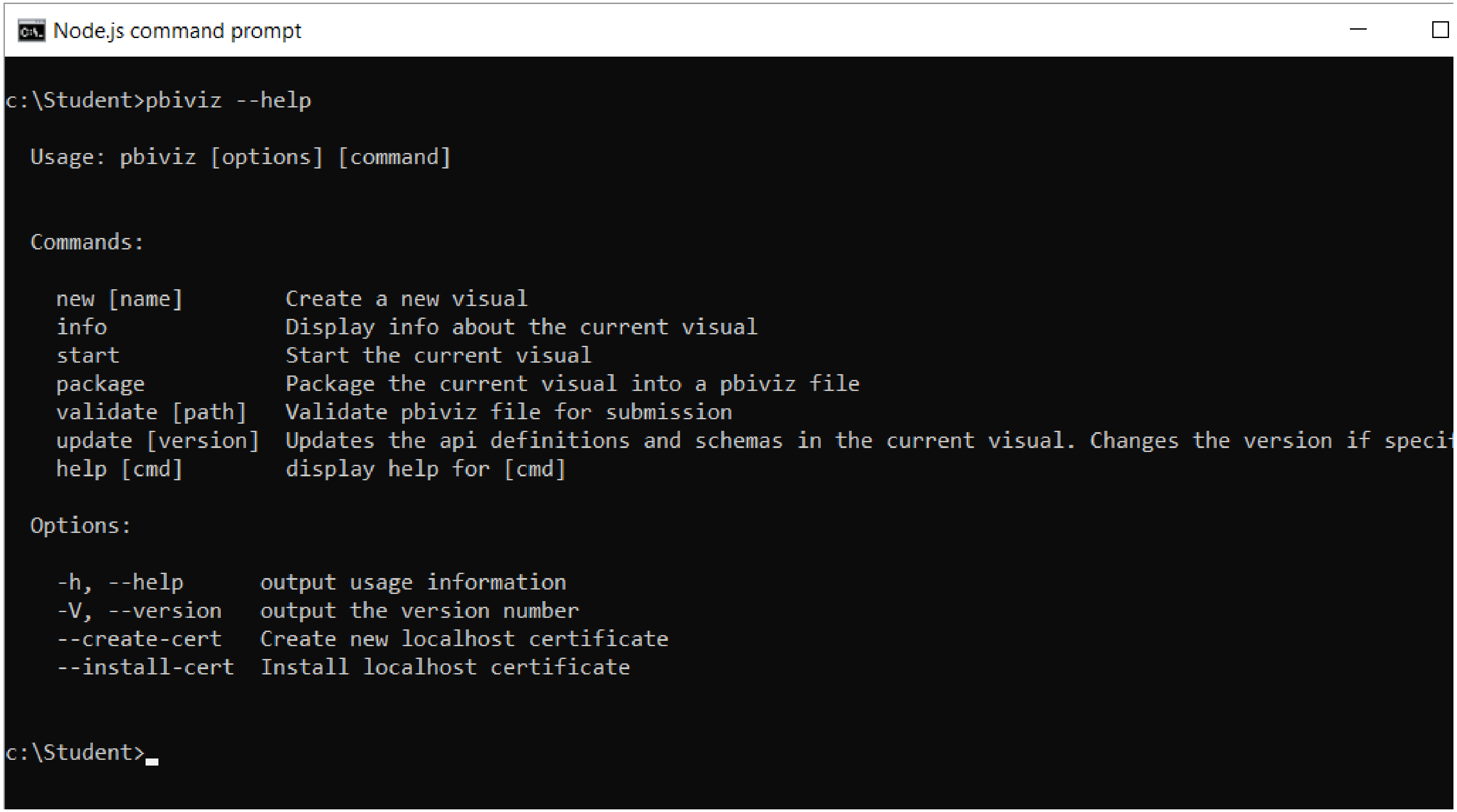
```
npm install -g powerbi-visuals-tools
```



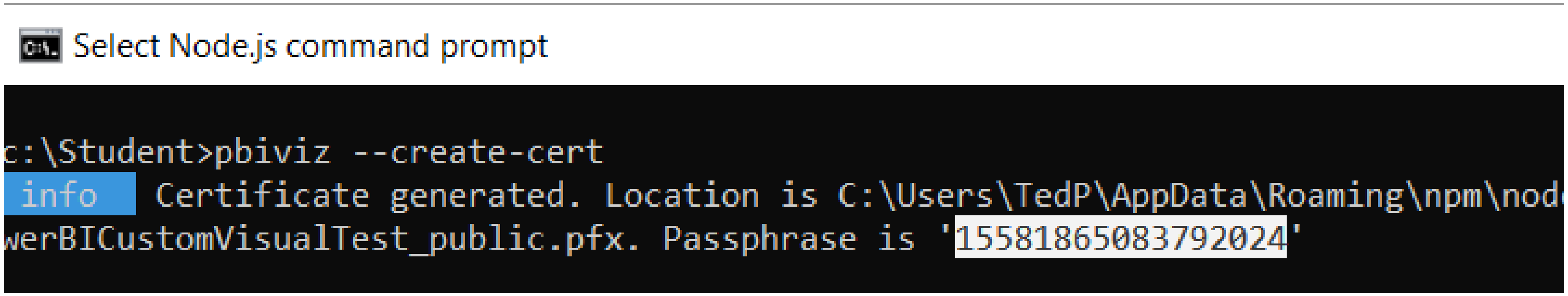
```
c:\Student\Projects>npm install -g powerbi-visuals-tools
npm WARN deprecated minimatch@2.0.10: Please update to minimatch 3.0.2 or higher to avoid a RegExp DoS issue
npm WARN deprecated minimatch@0.2.14: Please update to minimatch 3.0.2 or higher to avoid a RegExp DoS issue
npm WARN deprecated graceful-fs@1.2.3: graceful-fs v3.0.0 and before will fail on node releases >= v7.0. Please u
o graceful-fs@^4.0.0 as soon as possible. Use 'npm ls graceful-fs' to find it in the tree.
npm WARN deprecated natives@1.1.3: This module relies on Node.js's internals and will break at some point. Do not
, and update to graceful-fs@4.x.
C:\Users\TedP\AppData\Roaming\npm\pbiviz -> C:\Users\TedP\AppData\Roaming\npm\node_modules\powerbi-visuals-tools\
viz.js
+ powerbi-visuals-tools@1.11.3
updated 1 package in 33.604s

c:\Student\Projects>
```

Getting Started with PBIVIZ

- PBIVIZ.EXE is a command-line utility
  - You execute PBIVIZ commands from the NODE.JS command line

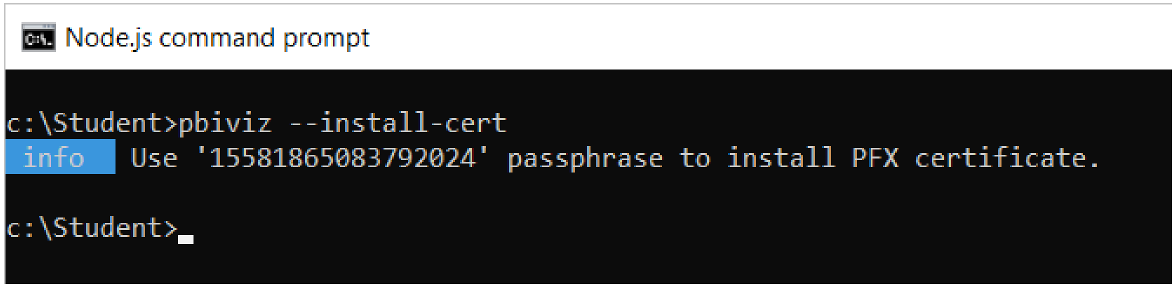


```
c:\Student>pbiviz --help

  Usage: pbiviz [options] [command]


  Commands:

    new [name]         Create a new visual
    info               Display info about the current visual
    start              Start the current visual
    package            Package the current visual into a pbiviz file
    validate [path]    Validate pbiviz file for submission
    update [version]   Updates the api definitions and schemas in the current visual. Changes the version if speci
    help [cmd]         display help for [cmd]

  Options:

    -h, --help       output usage information
    -V, --version    output the version number
    --create-cert    Create new localhost certificate
    --install-cert   Install localhost certificate


c:\Student>
```



Select Node.js command prompt

```
c:\Student>pbiviz --create-cert
 info   Certificate generated. Location is C:\Users\TedP\AppData\Roaming\npm\nod
werBICustomVisualTest_public.pfx. Passphrase is '15581865083792024'
```

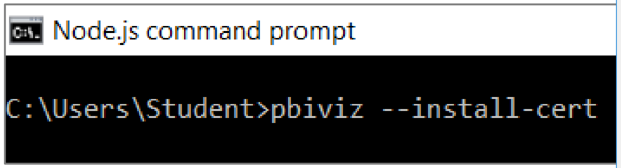


Node.js command prompt

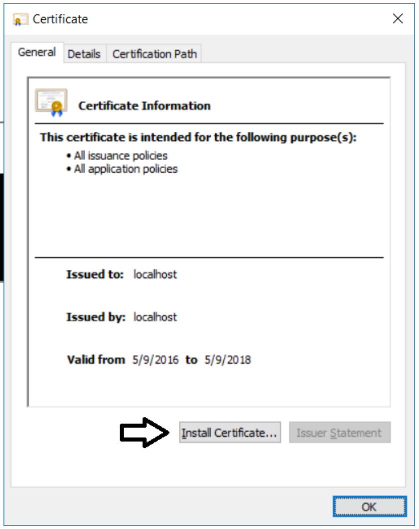
```
c:\Student>pbiviz --install-cert
 info   Use '15581865083792024' passphrase to install PFX certificate.

c:\Student>
```

Installing the Developer Certificate

- Debugging visuals inside PowerBI.com requires SSL
  - PBIVIZ leverages Node.js to provide debugging experience
  - Node.js acts as web service to serve project files through HTTP
  - Node.js debugging session uses http://localhost address
  - Installing certificate enables SSL through https://localhost
  - Installing certificate is a one time operation – not once per project


Node.js command prompt

```
C:\Users\Student>pbiviz --install-cert
```


Certificate

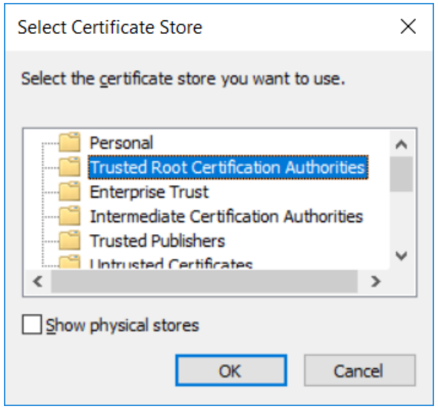
Certificate Information

This certificate is intended for the following purpose(s):
- All issuance policies
- All application policies

Issued to: localhost

Issued by: localhost

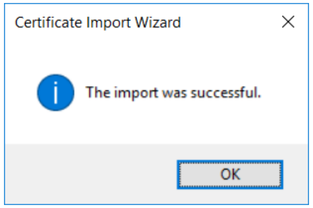
Valid from 5/9/2016 **to** 5/9/2018


Select Certificate Store

Select the certificate store you want to use.

Personal
Trusted Root Certification Authorities
Enterprise Trust
Intermediate Certification Authorities
Trusted Publishers
Untrusted Certificates

□ Show physical stores


Certificate Import Wizard

The import was successful.

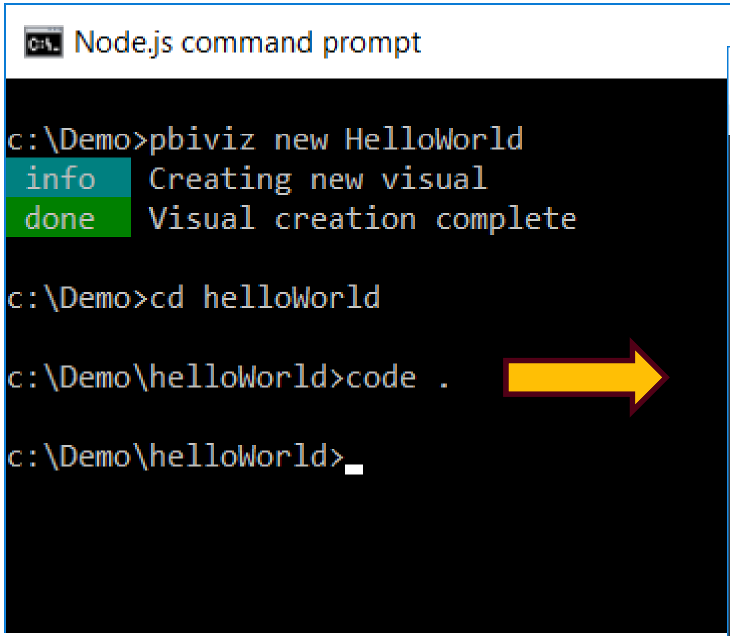
Creating a New Custom Visual Project

- Creating a new project

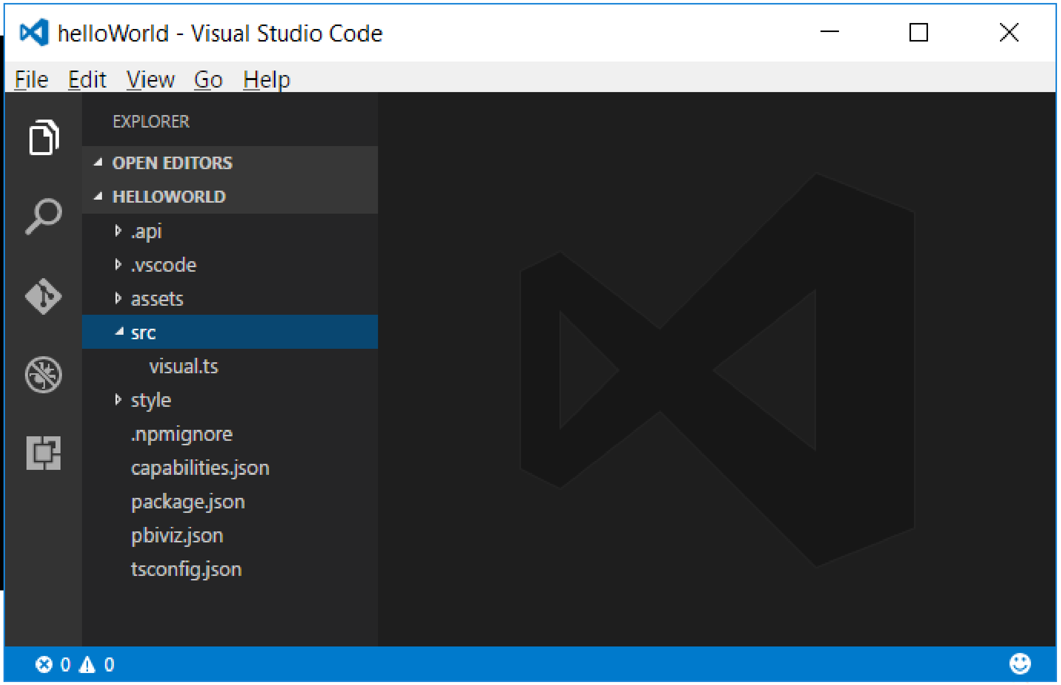
  ```
  pbiviz new <ProjectName>
  ```

- Open the Project with Visual Studio Code

  ```
  code .
  ```



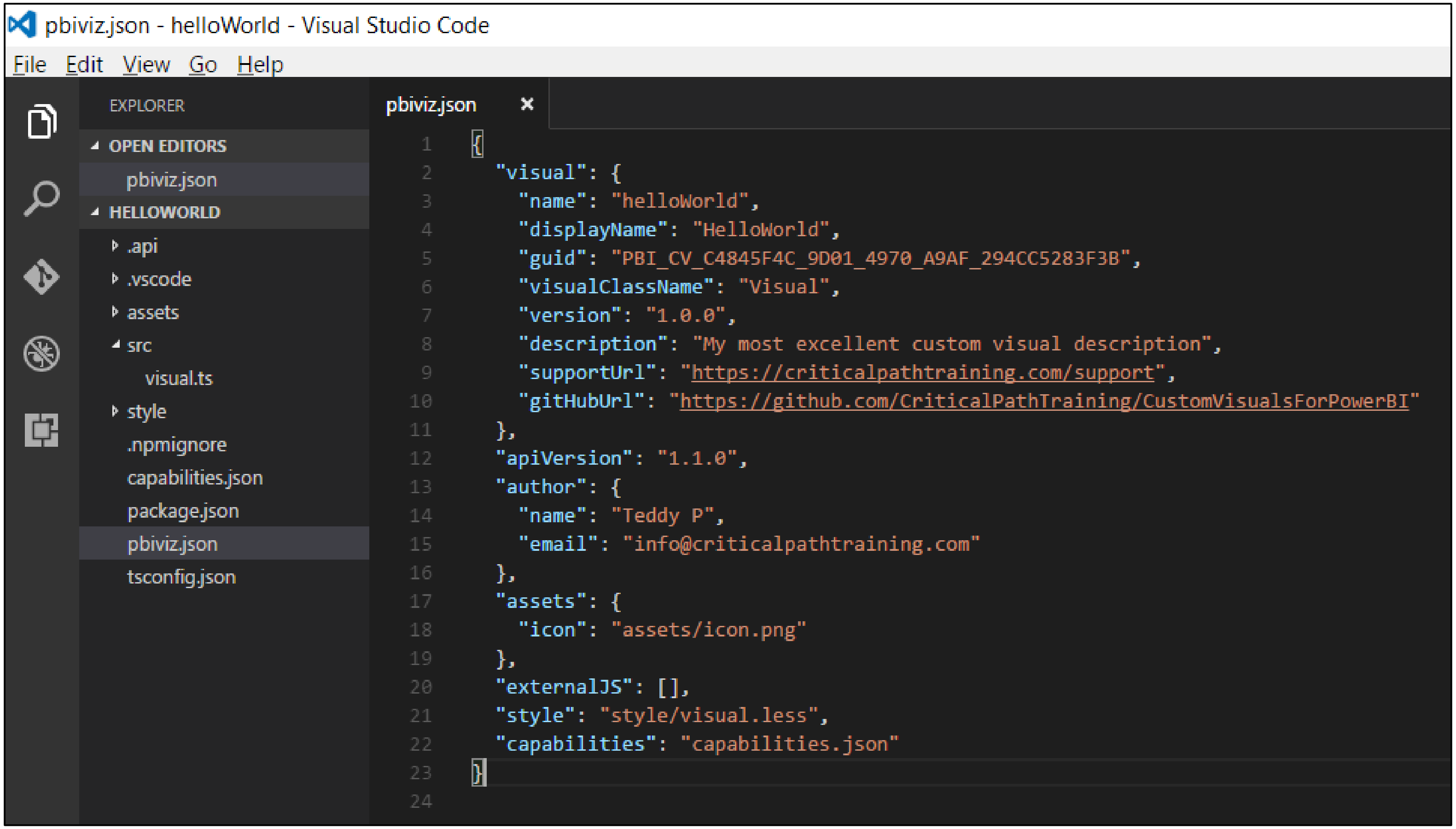
```
c:\Demo>pbiviz new HelloWorld
 info    Creating new visual
 done    Visual creation complete

c:\Demo>cd helloWorld

c:\Demo\helloWorld>code .

c:\Demo\helloWorld>_
```



Files in the new project

- gitignore
  - tells git to ignore files that shouldn't be tracked in the repository
- capabilities.json
  - used to define the capabilities of your visual learn more about visual capabilities
- package.json
  - Used by npm to manage modules learn more about npm
- pbiviz.json
  - Main configuration file for your visual
- tsconfig.json
  - Typescript compiler settings learn more about tsconfig

The pbiviz.json File



```json
{
  "visual": {
    "name": "helloWorld",
    "displayName": "HelloWorld",
    "guid": "PBI_CV_C4845F4C_9D01_4970_A9AF_294CC5283F3B",
    "visualClassName": "Visual",
    "version": "1.0.0",
    "description": "My most excellent custom visual description",
    "supportUrl": "https://criticalpathtraining.com/support",
    "gitHubUrl": "https://github.com/CriticalPathTraining/CustomVisualsForPowerBI"
  },
  "apiVersion": "1.1.0",
  "author": {
    "name": "Teddy P",
    "email": "info@criticalpathtraining.com"
  },
  "assets": {
    "icon": "assets/icon.png"
  },
  "externalJS": [],
  "style": "style/visual.less",
  "capabilities": "capabilities.json"
}
```

Folders in the new project

- assets/
  - Used to store visual assets (icon, screenshots, etc)
- dist/
  - when you run pbiviz package the pbiviz file will be generated here
- src/
  - Typescript code for your visual goes here
- style/
  - Less styles for your visual go here

Installing Typed Definitions for D3

- Two choices for installing typed definitions files
  - Using the **typings** utility *(the original way)*
  - Using the **npm** utility *(the new and better way)*

- Installing typed definitions files using typings utility

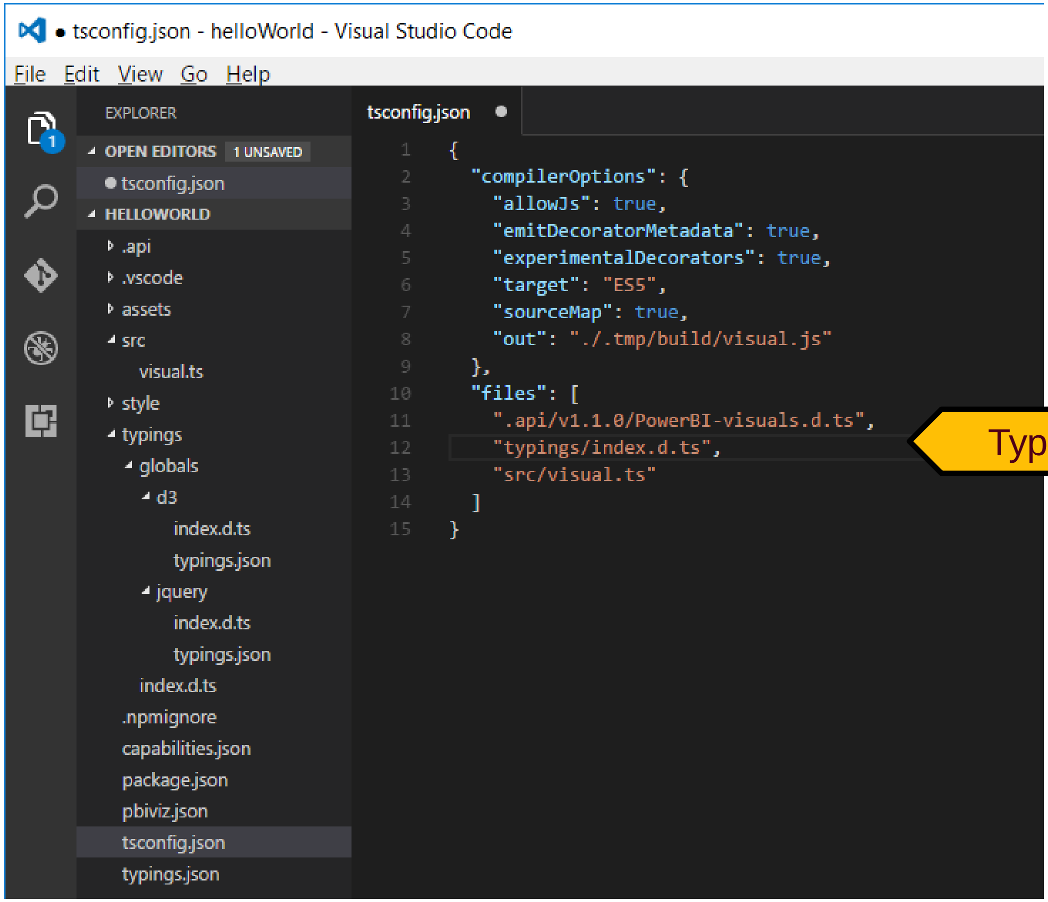
```
npm install typings –g
typings install --save --global dt~d3#0.0.0+20160907005744
```

- Installing typed definitions files using typings utility

```
npm install @types/d3@3 --save-dev
```

The tsconfig.json File

- Used to add references to typings files
  - This is what enables Intellisense

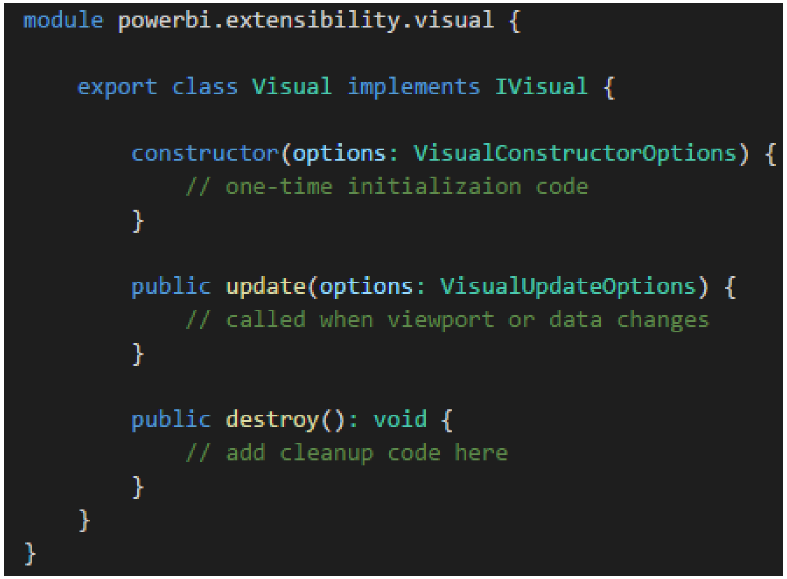


```json
{
  "compilerOptions": {
    "allowJs": true,
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
    "target": "ES5",
    "sourceMap": true,
    "out": "./.tmp/build/visual.js"
  },
  "files": [
    ".api/v1.1.0/PowerBI-visuals.d.ts",
    "typings/index.d.ts",
    "src/visual.ts"
  ]
}
```

Typings file reference

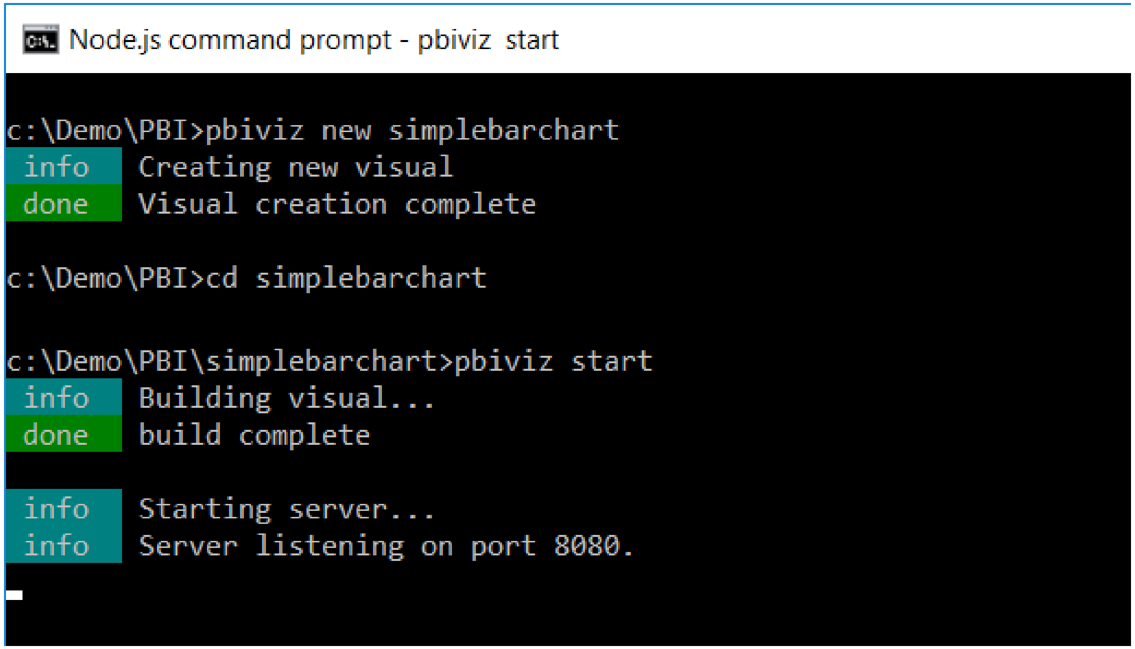
Developing a Custom Visual?

- Create a class that implements IVisual
  - Class wrapped in module with namespace to APIs
  - You code can program again PBI APIs types



```
module powerbi.extensibility.visual {

    export class Visual implements IVisual {

        constructor(options: VisualConstructorOptions) {
            // one-time initializaion code
        }

        public update(options: VisualUpdateOptions) {
            // called when viewport or data changes
        }

        public destroy(): void {
            // add cleanup code here
        }
    }
}
```

Running a Custom Visual Project

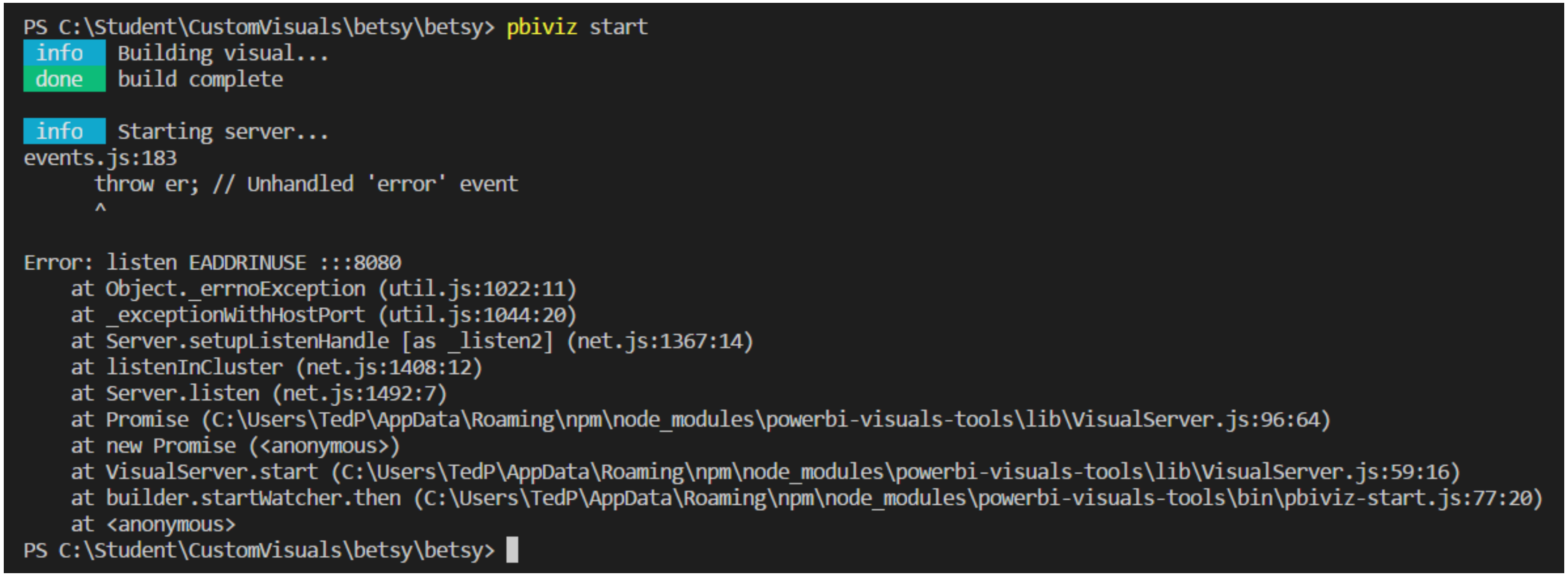


Node.js command prompt - pbiviz start

```
c:\Demo\PBI>pbiviz new simplebarchart
 info   Creating new visual
 done   Visual creation complete

c:\Demo\PBI>cd simplebarchart

c:\Demo\PBI\simplebarchart>pbiviz start
 info   Building visual...
 done   build complete

 info   Starting server...
 info   Server listening on port 8080.
```

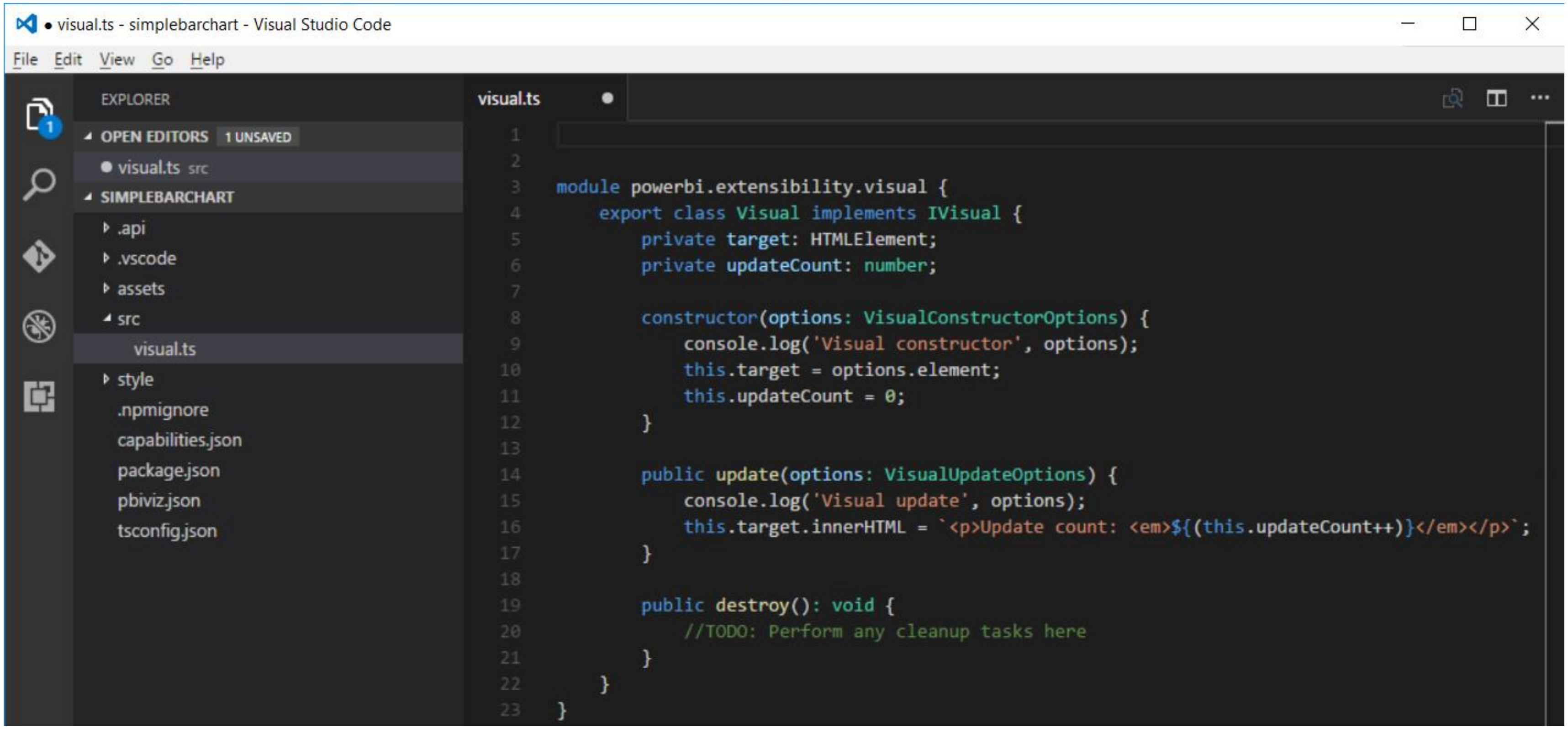
Address In Use Error

- You can only start one session of PBIVIZ at a time
  - Session takes exclusive control of https://localhost:8080
  - Attempts to create secondary sessions will fail



```
PS C:\Student\CustomVisuals\betsy\betsy> pbiviz start
 info   Building visual...
 done   build complete

 info   Starting server...
events.js:183
      throw er; // Unhandled 'error' event
      ^

Error: listen EADDRINUSE :::8080
    at Object._errnoException (util.js:1022:11)
    at _exceptionWithHostPort (util.js:1044:20)
    at Server.setupListenHandle [as _listen2] (net.js:1367:14)
    at listenInCluster (net.js:1408:12)
    at Server.listen (net.js:1492:7)
    at Promise (C:\Users\TedP\AppData\Roaming\npm\node_modules\powerbi-visuals-tools\lib\VisualServer.js:96:64)
    at new Promise (<anonymous>)
    at VisualServer.start (C:\Users\TedP\AppData\Roaming\npm\node_modules\powerbi-visuals-tools\lib\VisualServer.js:59:16)
    at builder.startWatcher.then (C:\Users\TedP\AppData\Roaming\npm\node_modules\powerbi-visuals-tools\bin\pbiviz-start.js:77:20)
    at <anonymous>
PS C:\Student\CustomVisuals\betsy\betsy> 
```

Developing with Visual Studio Code



```


module powerbi.extensibility.visual {
    export class Visual implements IVisual {
        private target: HTMLElement;
        private updateCount: number;

        constructor(options: VisualConstructorOptions) {
            console.log('Visual constructor', options);
            this.target = options.element;
            this.updateCount = 0;
        }

        public update(options: VisualUpdateOptions) {
            console.log('Visual update', options);
            this.target.innerHTML = `<p>Update count: <em>${(this.updateCount++)}</em></p>`;
        }

        public destroy(): void {
            //TODO: Perform any cleanup tasks here
        }
    }
}
```

Summary

- ✓ Custom Visuals in Power BI
- ✓ Node.JS and the Cross-platform Toolchain
- ✓ Creating Projects with the PBIVIZ CLI
- ✓ Custom Visual Project Structure
- ✓ Adding Typed Definition Files
- ✓ Testing and Debugging a Custom Visual