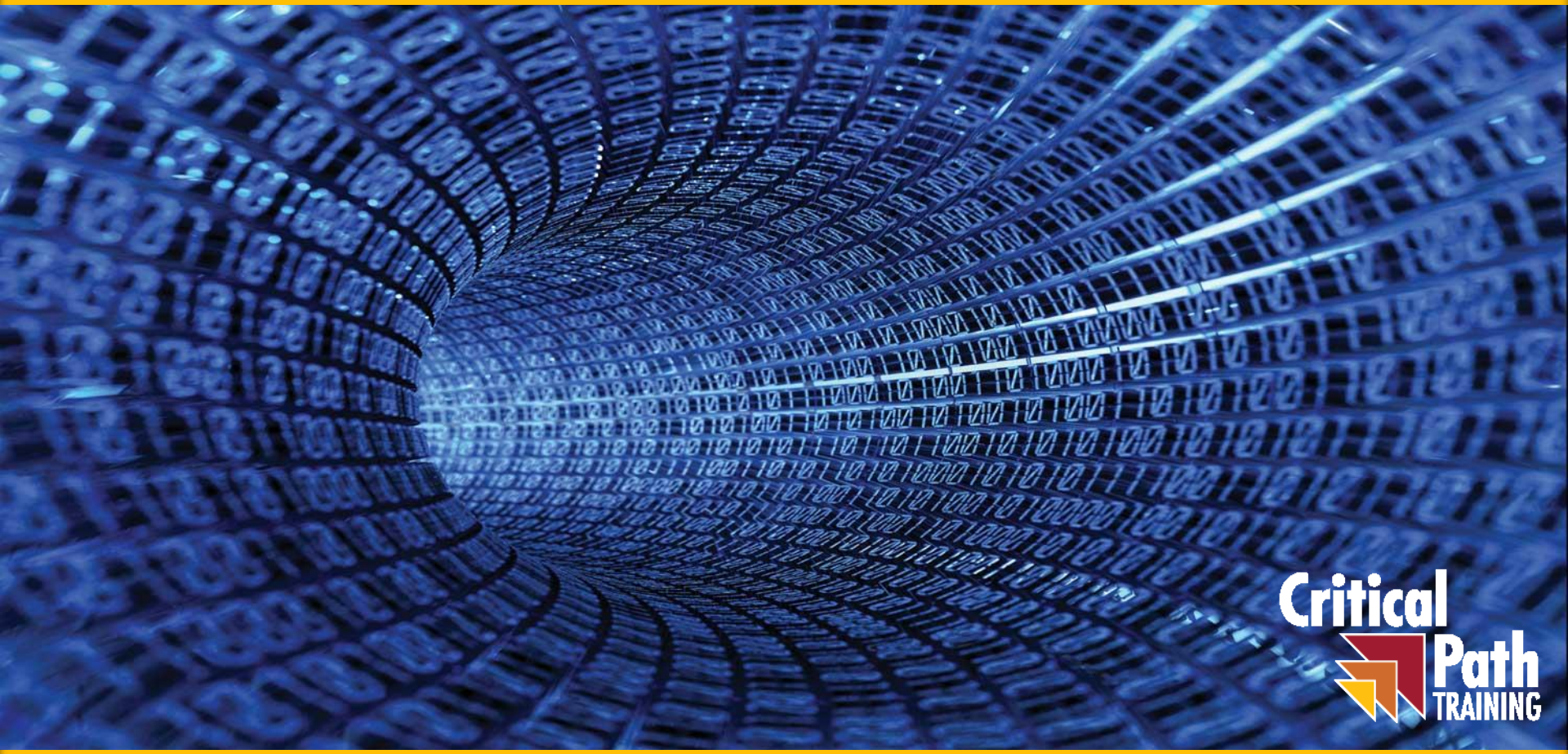
Getting Started with the Power BI Developer Tools



Agenda

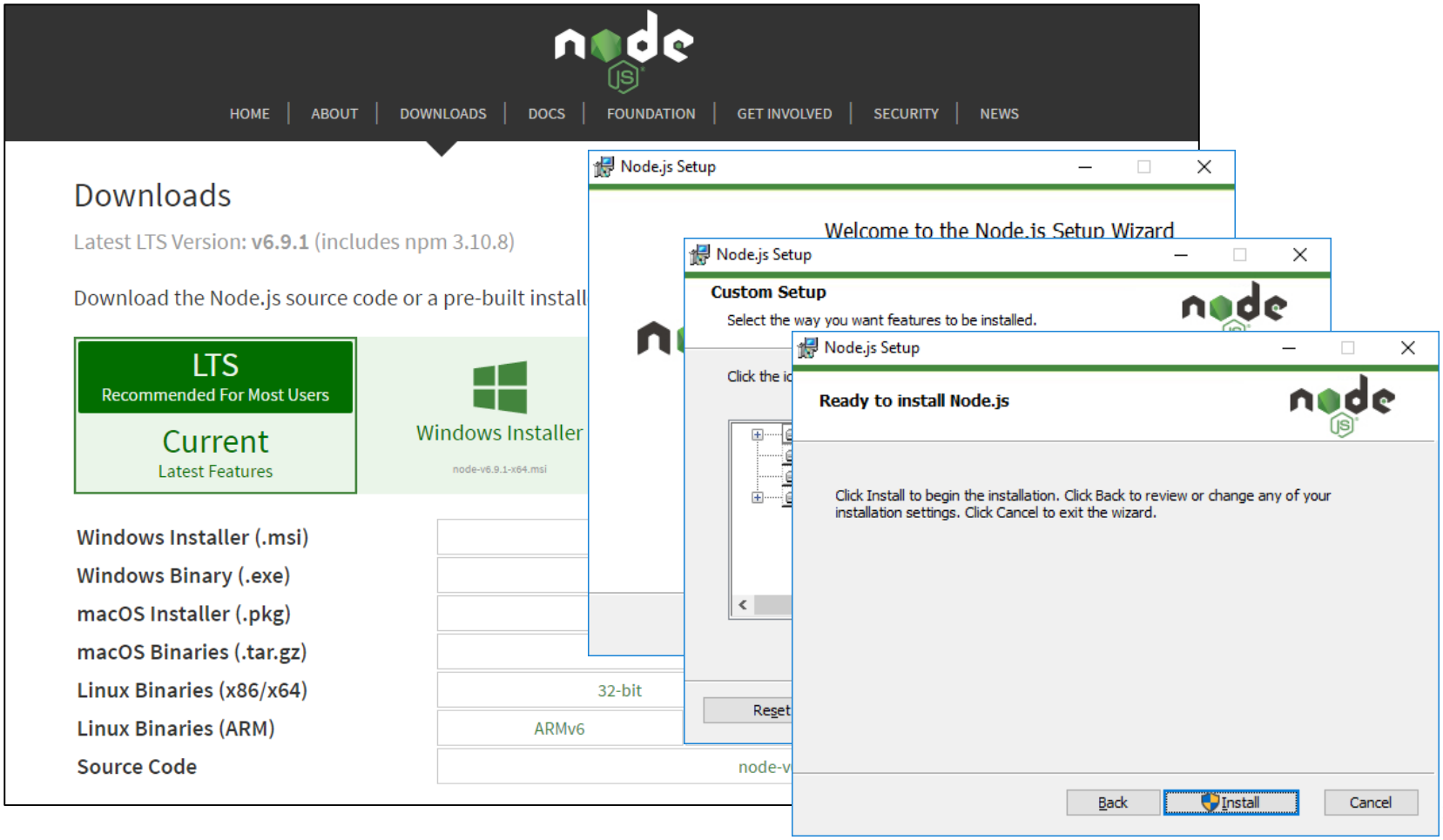
- Custom Visuals in Power BI
- Node.JS and the Cross-platform Toolchain
- Creating Projects with the PBIVIZ CLI
- Custom Visual Project Structure
- Adding Typed Definition Files
- Testing and Debugging a Custom Visual

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)

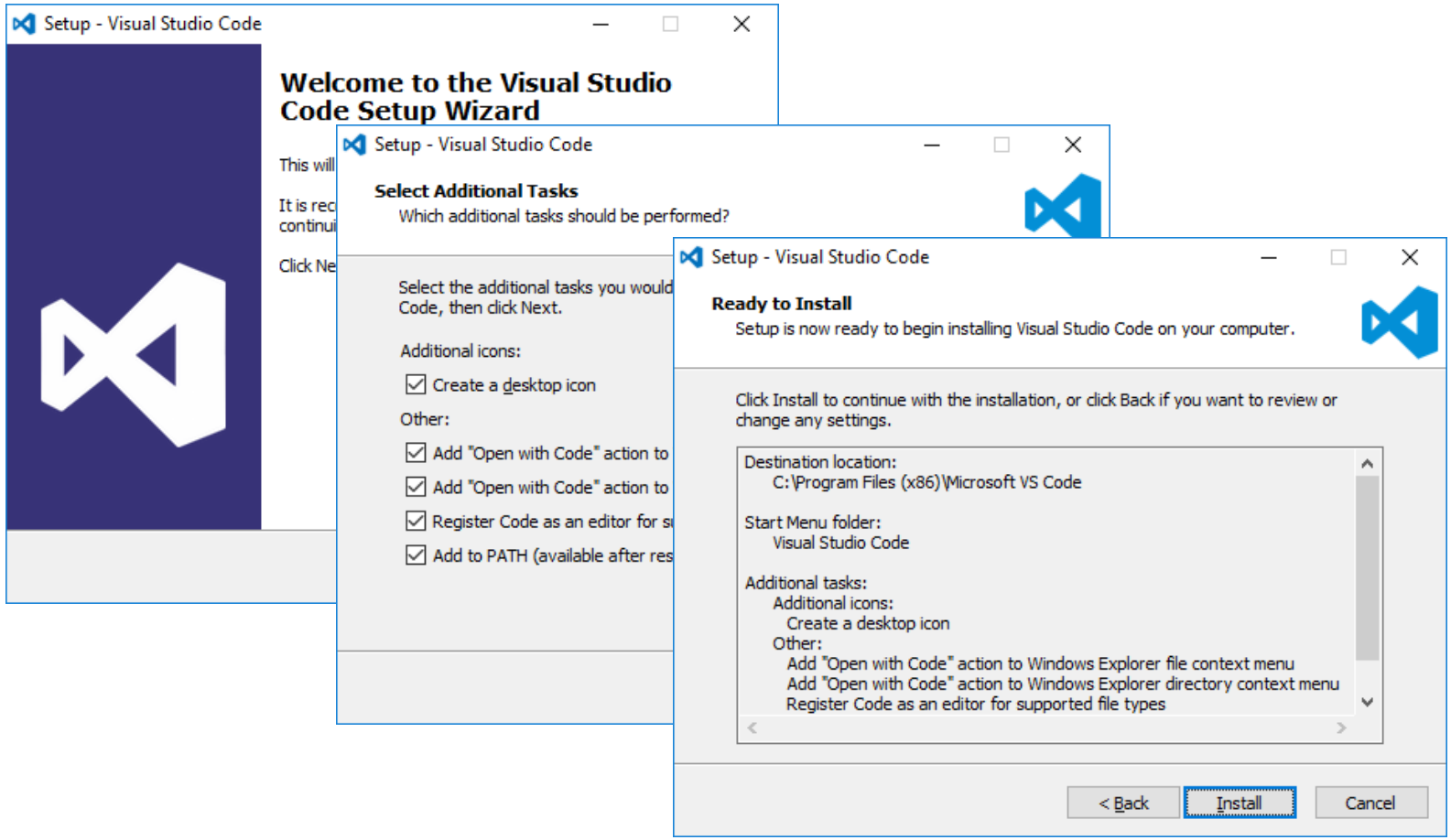
Installing node.js

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



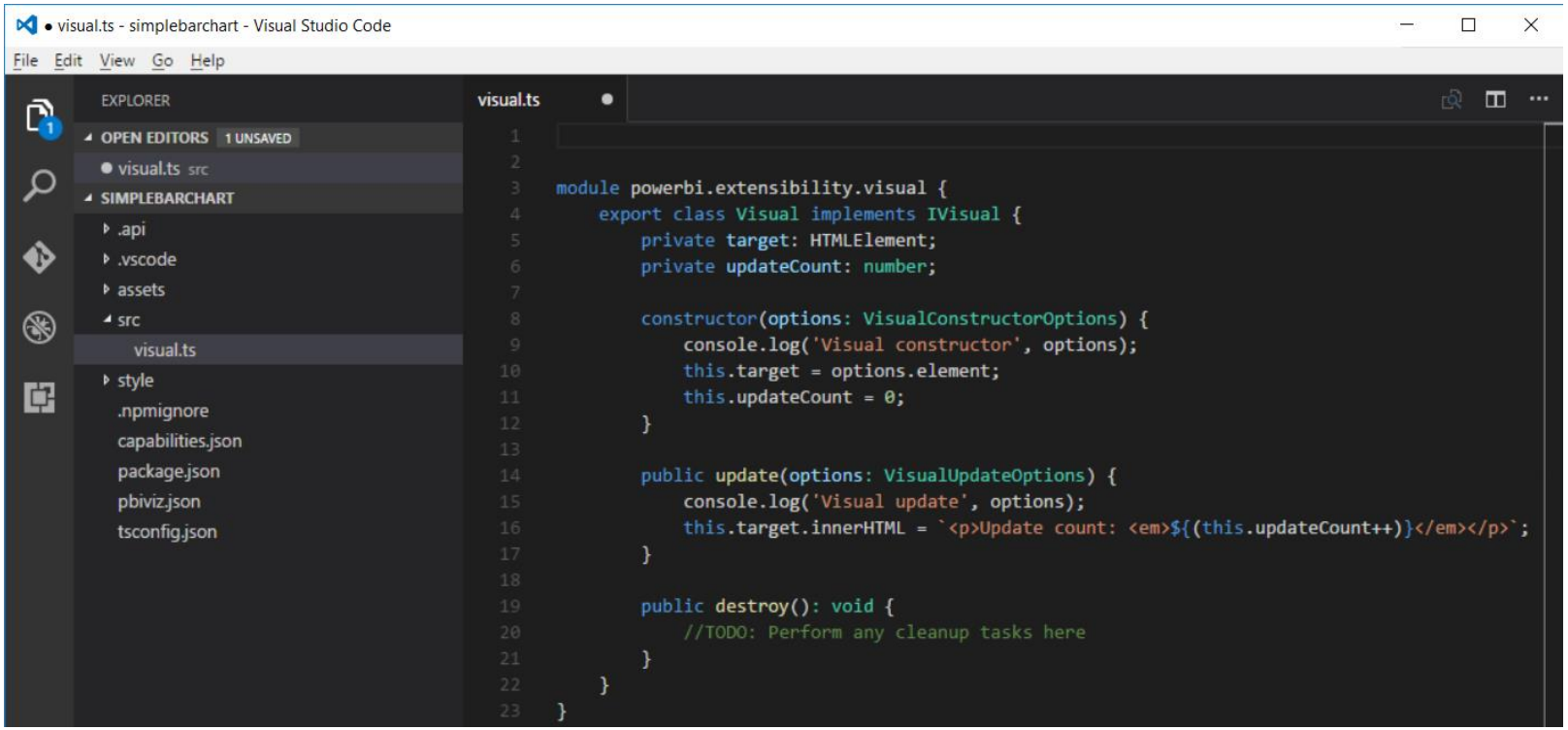
Install Visual Studio Code

- http://code.visualstudio.com/



Developing with Visual Studio Code

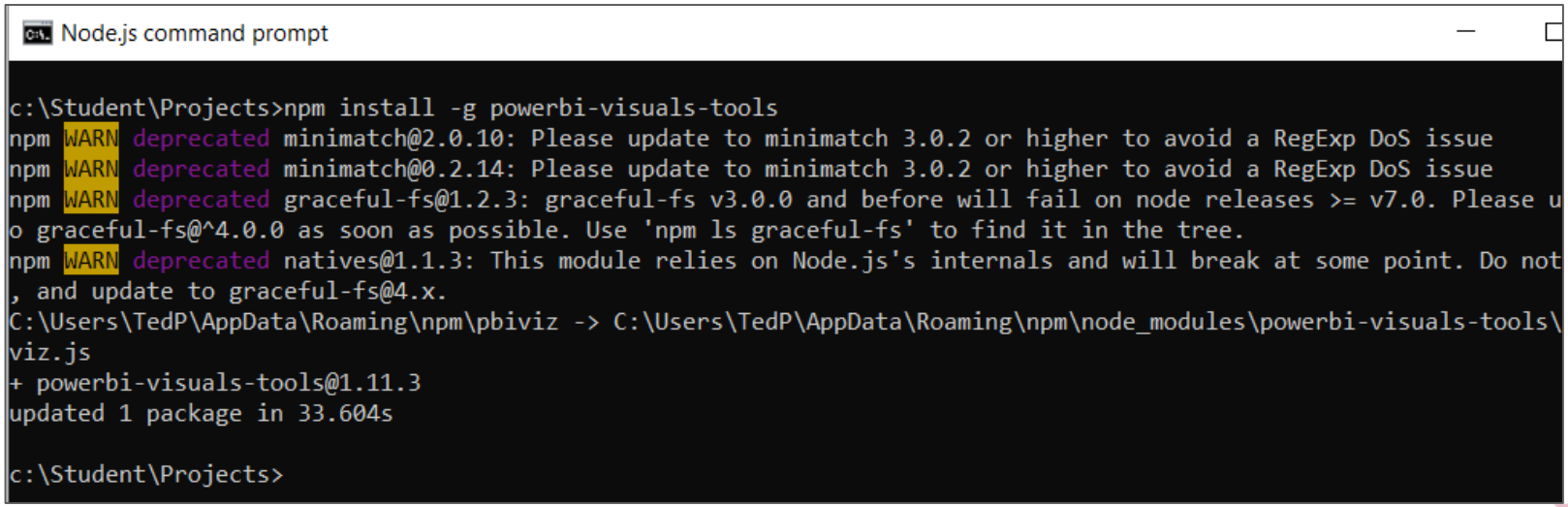
- Provides great development experience with node.js



Power BI Visual CLI Tool (PBIVIZ)

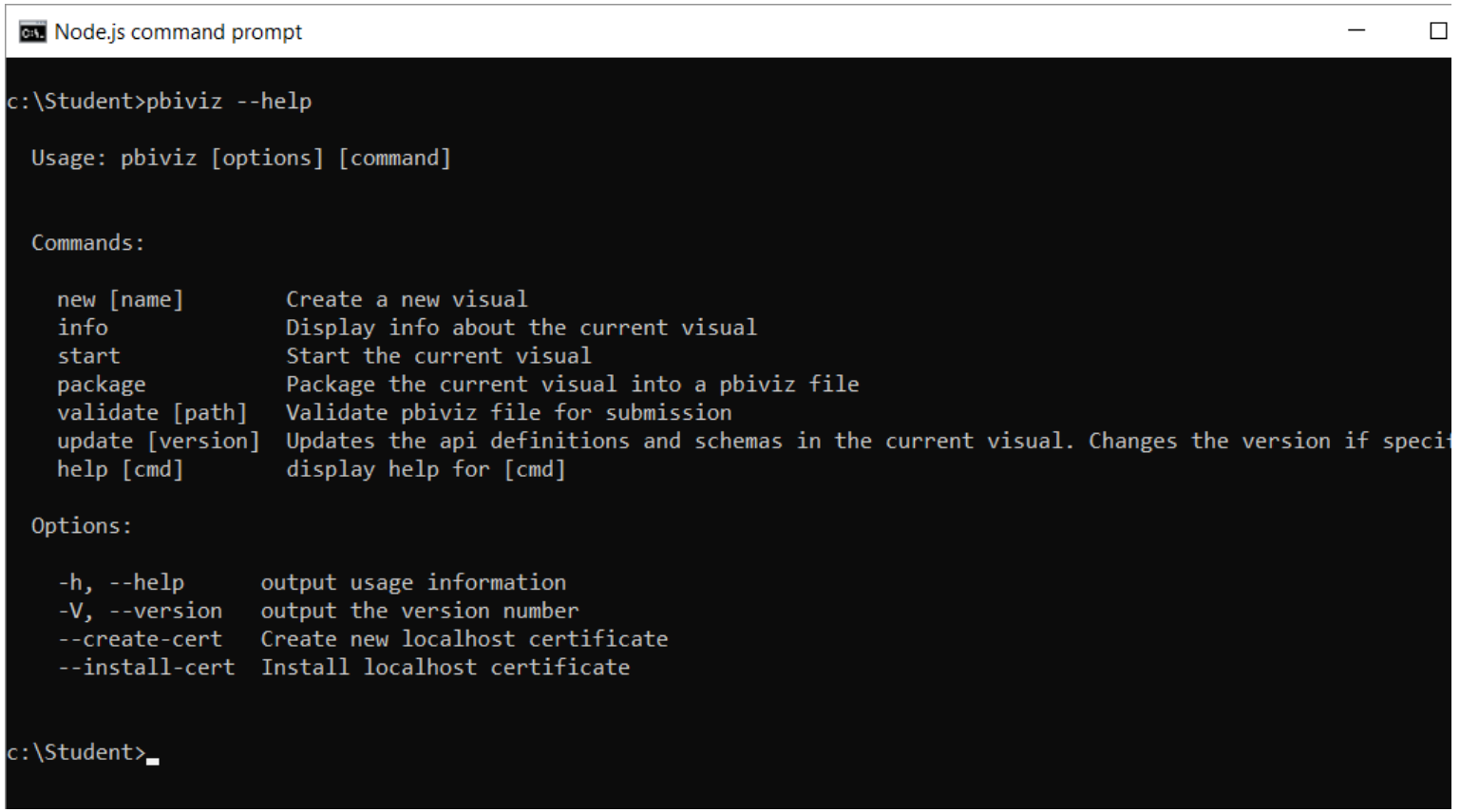
- What is the Power BI Custom Visual Tool?
  - Command-line utility for cross-platform dev
  - Use it with Visual Studio or Visual Studio Code
  - Requires that you first install node.js
  - Install by running command from node.js command prompt

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



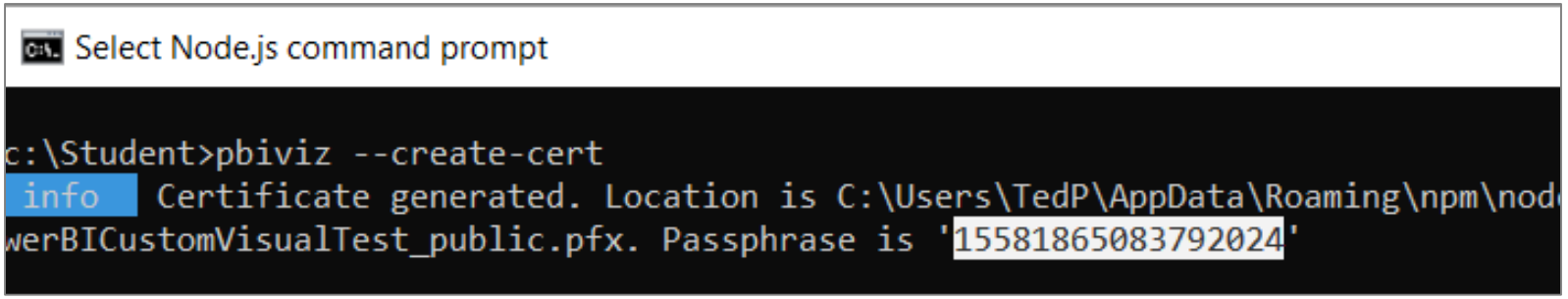
Getting Started with PBIVIZ

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



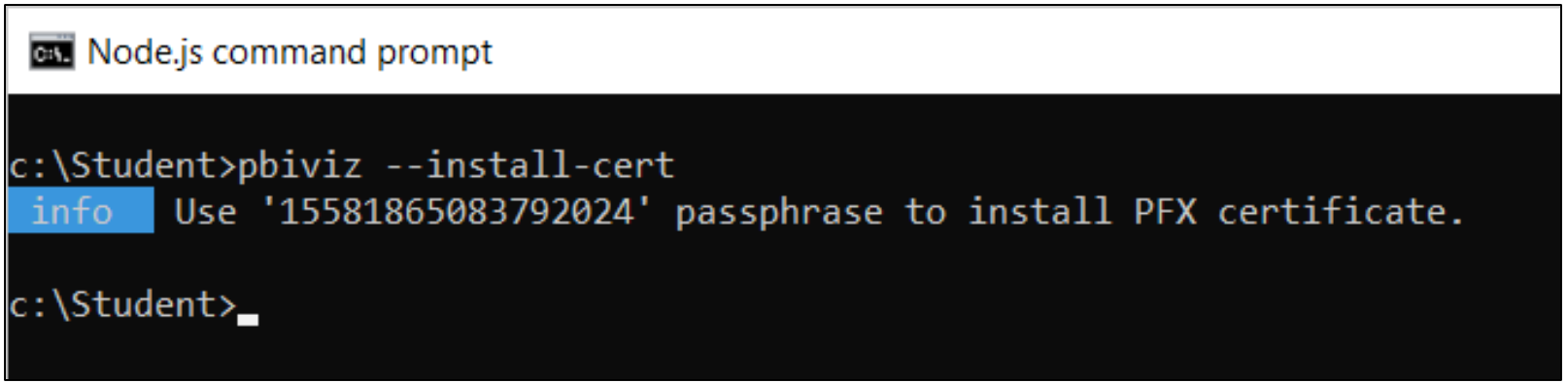
Creating a Certificate for Local Testing

- PBIVIZ provide local web server for testing & debugging
  - Web server runs locally on developer's workstation in Node.js
  - Makes it possible to test custom visuals in Power BI Service
  - Custom visual resources served up from https://localhost
  - Setup requires creating self-signed SSL certificate
  - SSL certificate created using **pbiviz --create-cert** command
  - You must copy a passphrase to properly install the certificate



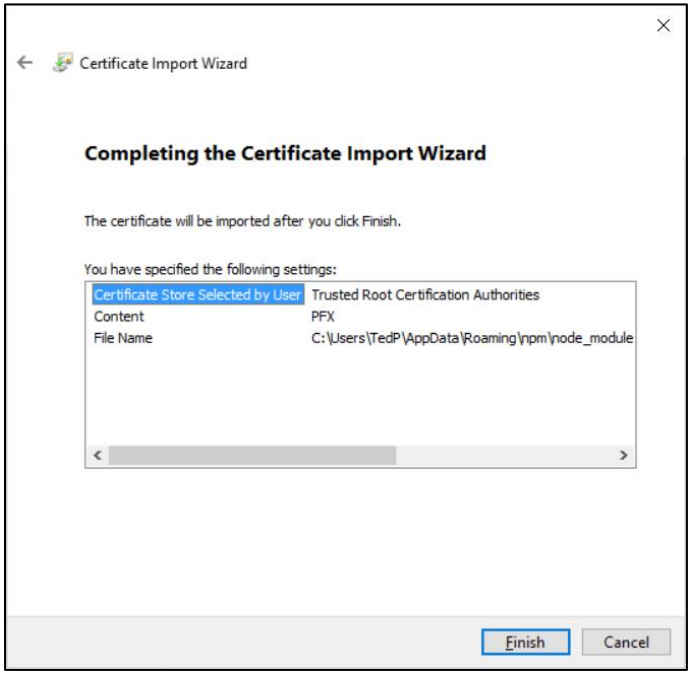
Installing the SSL Certificate

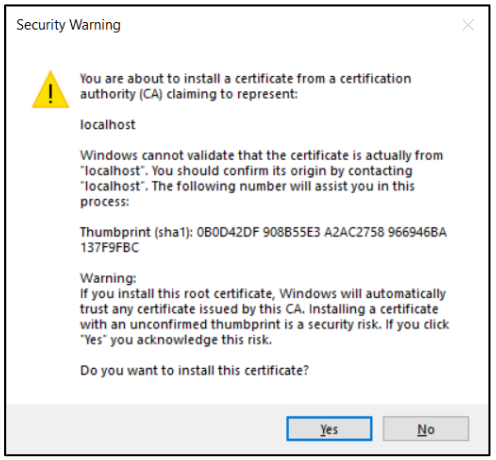
- Installing certificate enables SSL through https://localhost
  - Installing certificate is a one time operation – not once per project
  - SSL certificate installed using **pbiviz --install-cert** command
  - Running **--install-cert** command starts Certificate Import Wizard

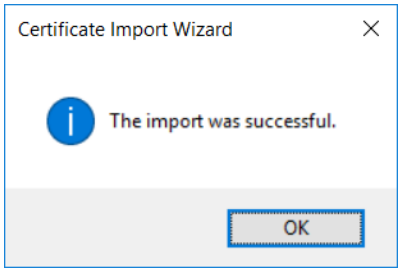


The Certificate Import Wizard

- Wizards steps you through process of installing certificate
  - You enter certificate passphrase as part of installation process







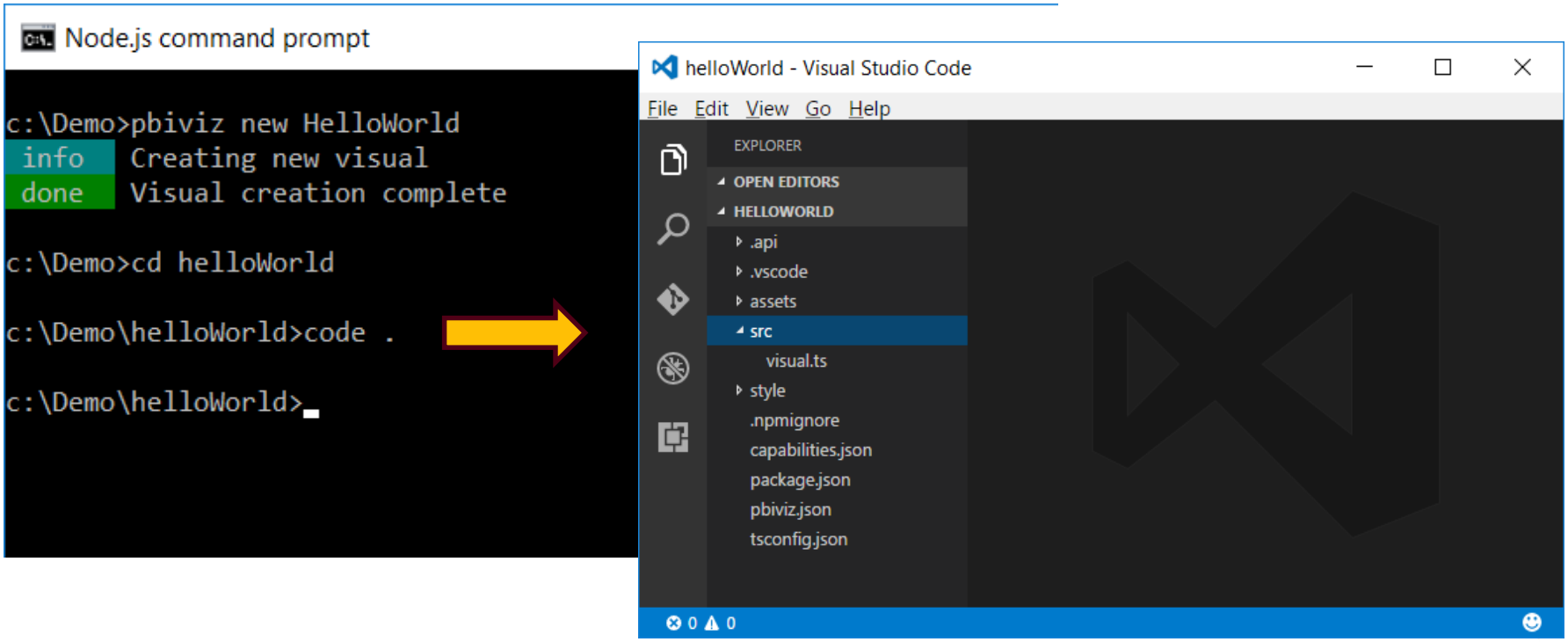
Creating a New Custom Visual Project

- Creating a new project

  ```
  pbiviz new <ProjectName>
  ```

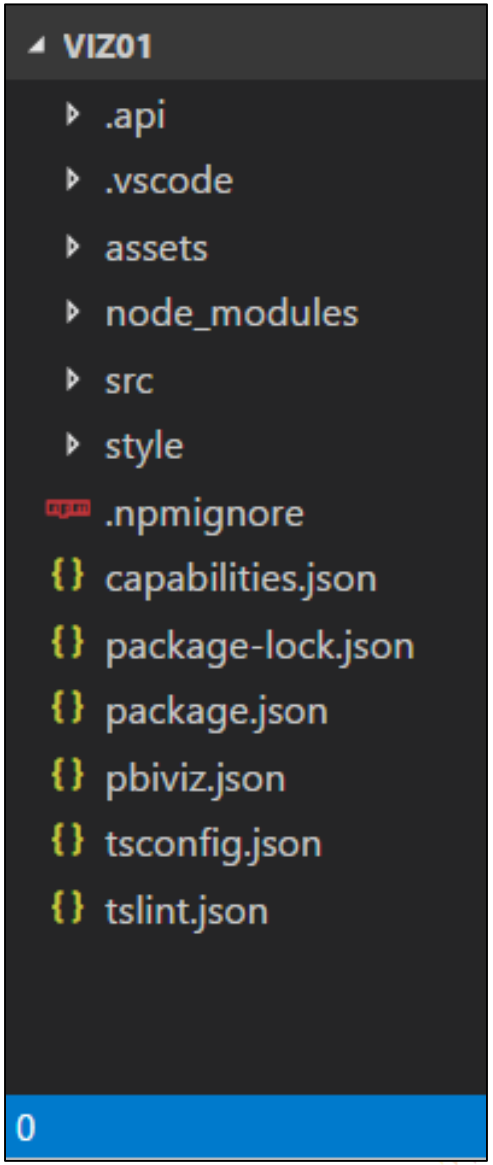
- Open the Project with Visual Studio Code

  ```
  code .
  ```



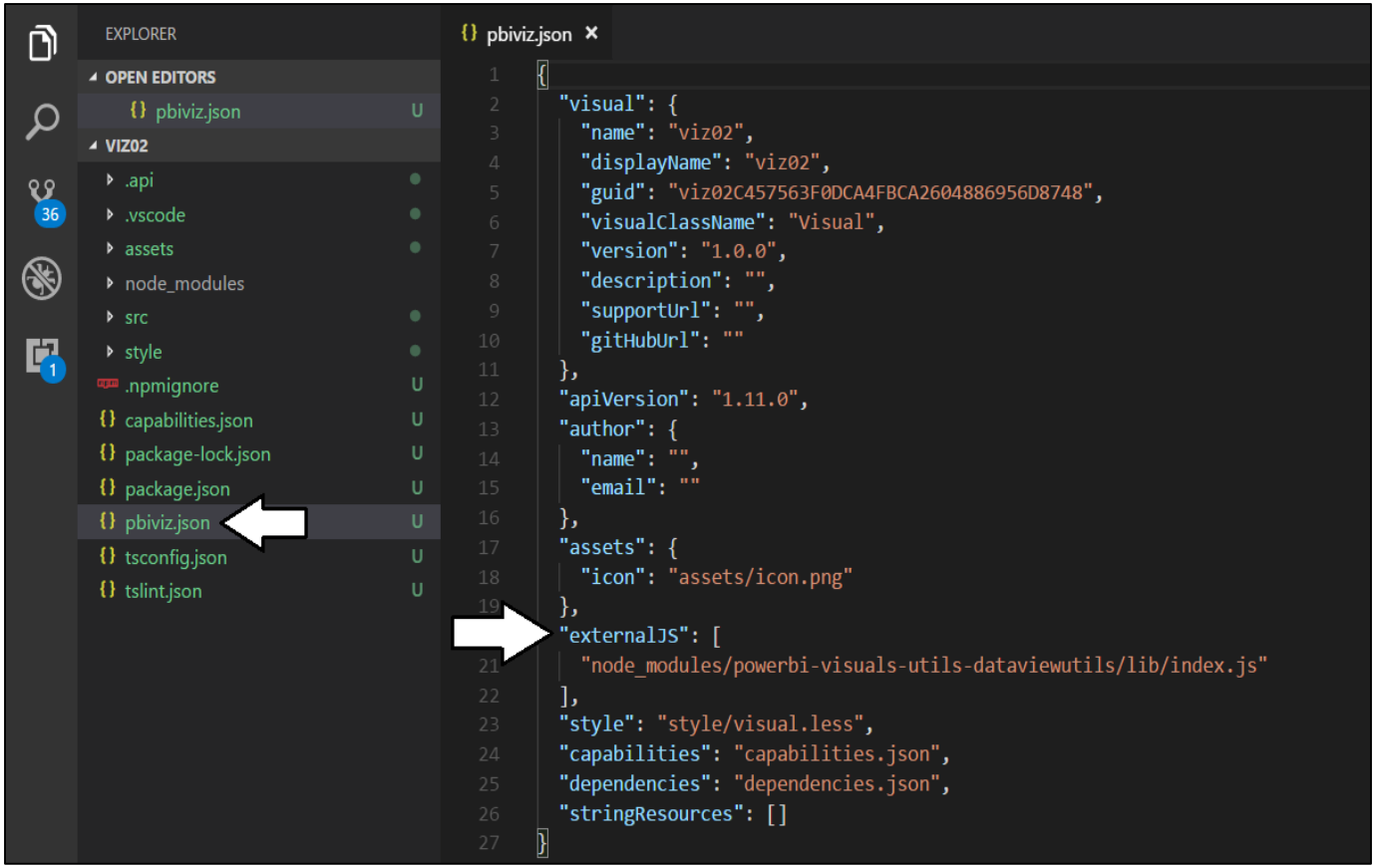
Files in the new project

- package.json
  - Used by npm to manage package
- pbiviz.json
  - Main manifest file for your custom visual project
- capabilities.json
  - File used to define visual capabilities
- tsconfig.json
  - Typescript compiler settings



The pbiviz.json File

- Acts as top-level manifest file for custom visual project
  - External JS library files must be referenced in **externalJS** section



Installing Support for jQuery

- Install package for jQuery library
  npm install jquery --save-dev
- Install package for type definition files version 2.0.46
  npm install @types/jquery@2.0.46 --save-dev
- Update **externalJS** section of **pbiviz.json**

```
"assets": {
  "icon": "assets/icon.png"
},
"externalJS": [
  "node_modules/powerbi-visuals-utils-dataviewutils/lib/index.js",
  "node_modules/jquery/dist/jquery.js"
],
"style": "style/visual.less",
```

Installing Support for D3

- Install package for D3 library version 3
  npm install d3@3 --save-dev
- Install package for type definition files version 3
  npm install @types/d3@3 --save-dev
- Update **externalJS** section of **pbiviz.json**

```
17    "assets": {
18      "icon": "assets/icon.png"
19    },
20    "externalJS": [
21      "node_modules/powerbi-visuals-utils-dataviewutils/lib/index.js",
22      "node_modules/d3/d3.js"
23    ],
24    "style": "style/visual.less",
25    "capabilities": "capabilities.json",
26    "dependencies": "dependencies.json",
27    "stringResources": []
28  }
```

The tsconfig.json File

- Used to add references to other TypeScript files
  - Controls which TypeScript files are passed to TypeScript compiler
  - No need to reference *.d.ts files in the **node_modules/@types** folder

tsconfig.json

```
{
  "compilerOptions": {
    "allowJs": true,
    "emitDecoratorMetadata": true,
    "experimentalDecorators": true,
    "target": "ES5",
    "sourceMap": true,
    "out": "./.tmp/build/visual.js"
  },
  "files": [
    ".api/v1.11.0/PowerBI-visuals.d.ts",
    "node_modules/powerbi-visuals-utils-dataviewutils/lib/index.d.ts",
    "node_modules/powerbi-visuals-utils-typeutils/lib/index.d.ts",
    "node_modules/powerbi-visuals-utils-formattingutils/lib/index.d.ts",
    "src/settings.ts",
    "src/visual.ts"
  ]
}
```

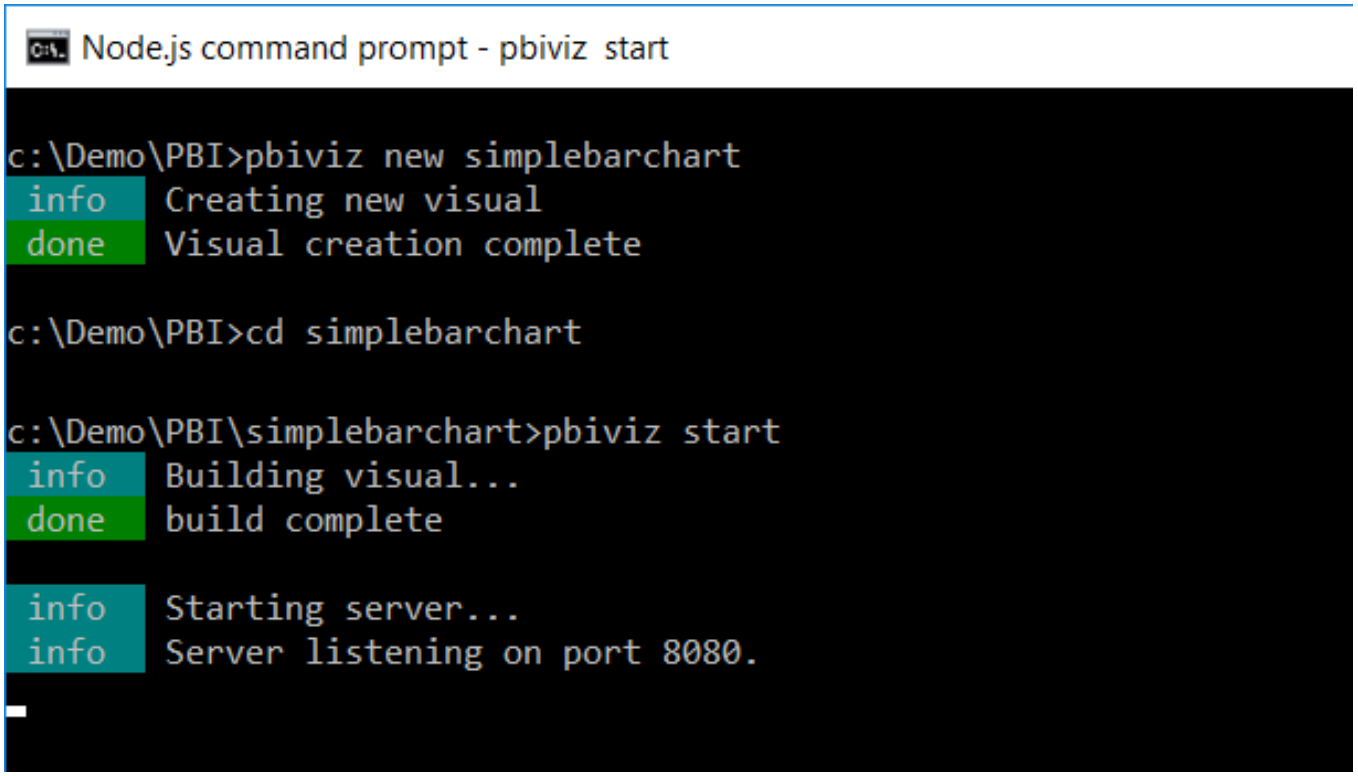
Authoring a Custom Visual Class

- Custom visual is a class that implements **IVisual**
  - Class must be defined in **powerbi.extensibility.visual** namespace
  - Minimum visual class must provide **update** method
  - Constructor and other lifecycle methods can be added

```
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

- Visual projects run & tested using **pbiviz start** command
  - Command starts local debugging session in node.js.
  - Provides ability to run custom visual in the Power BI Service



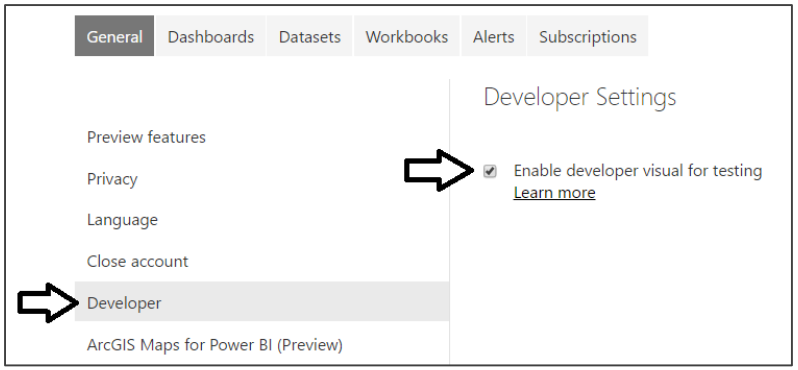
Address In Use Error

- 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

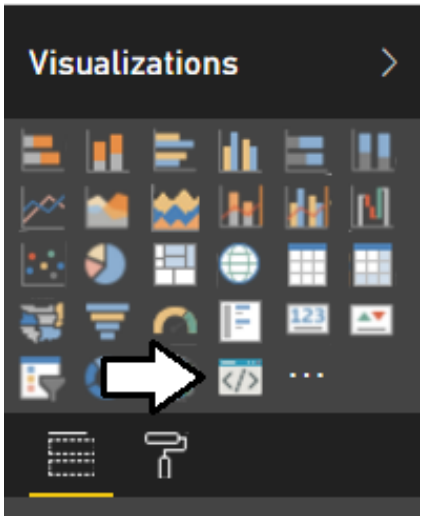
```
PS C:\Student\CustomVisuals\betsy\betsy> pbiviz start
 info   Building visual...
 done   build complete

 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>
```

The Developer Visual

- Must be enabled on Developer Settings page

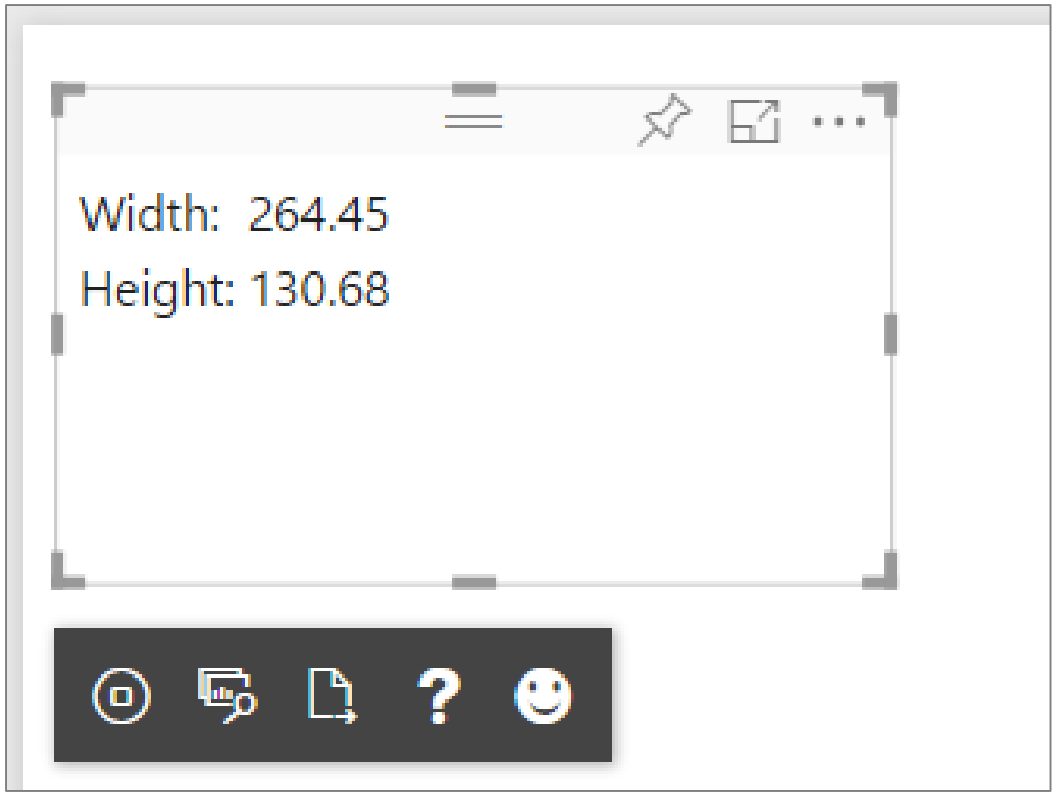


- Provides new visual for testing and debugging custom visuals



Working with the Developer Visual

- Developer visual loads custom visual from node.js
  - Makes it possible to test custom visual inside Power BI Service
  - Developer visual provides toolbar with development utilities



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