Typescript for the C# developer

AKA: Lessons Learned on the ~~Front~~Client Line

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Who am I

- Microsoft UK community leader
- Lidnug group manager (UK & Europe)
- Independent Systems Consultant
- Original 80’s UK back bedroom programmer
- Established Technical Author
- 30+ years in I.T covering everything from radio communications to enterprise software development

What's this talk about?

- I'll be telling you what TypeScript is and showing you a couple of small comparisons.
- I'll be explaining to you why TypeScript is important in todays developer environment.
- I'll be showing you some TypeScript code and explaining it's similarities to C#

What this talk is not about?

- I won't be teaching "TypeScript" as a language
- I won't be showing direct conversions from C# to TypeScript
- But first…….

Please Note:

- **I am Partially Deaf…..**
- If you ask a question, and I don't respond please don't be offended, unless you're very close to me, and speaking fairly loud, it's very likely I won't hear you.
- Because of this, you're welcome to come up front and ask questions, but you're more than likely better waiting until the end of the session.

If you want to contact me…

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Would You Like To Play Along?

If you go to the typescript website, you'll find an online playground.

http://www.typescriptlang.org/play/

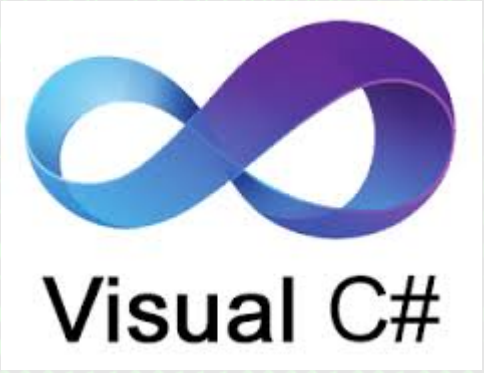
Code entered in the left pane will be converted to JavaScript in real time and displayed in the right pane, complete with syntax checking.

Why Use Typescript?

Why Use Typescript?

To Answer that question, we first have to ask another…

As A C#/Backend developer, why should I even care about Frontend/Client development?



?????

Why Go Frontend?

- More and more code these days is based in the browser.
- JavaScript is “Eating the World”, it’s everywhere.
- Apps increasingly need to be delivered online, and are expected to work offline.
- Backend is becoming more and more API-oriented…..

Why Use Typescript?

- Typescript was developed by Anders Hejlsberg's team at Microsoft, Anders is a veteran of backend languages.
- Typescript was designed with the object-orientated developer in mind.
- It produces plain old JavaScript that runs on anything that regular JS code runs on.

Why Use Typescript?

- It’s amazingly productive once you get into the swing of things.
- Its syntax is very similar to that of C#
- There’s a huge community built around it.
- It has a zero cost, to get started
- You can use ANY tooling you want to work with it.

What Exactly is Typescript?

What exactly is Typescript?

- JavaScript === TypeScript (or to put it another way, JavaScript is TypeScript)
- People call TypeScript a compiler, however it's more of a "pre-processor"
- TypeScript in Visual Studio is a Language Provider Extension, in other environments it's a command line binary.

What exactly is Typescript?

- TypeScript is an ES6 transpiler (This is one of its best features…)
- More than anything else in these bullet points however
- TypeScript is a “Safety Net” that let’s you write enterprise scale JS apps without shooting yourself in the foot.

Typescript Misconceptions

Typescript Misconceptions

- TypeScript is SLOW
- UNTRUE – TypeScript produces standard JavaScript code, if the code it produces is slow, it’s because the developer wrote poor TS code.

Typescript Misconceptions

- TypeScript requires expensive Microsoft tools to use it.

- UNTRUE – TypeScript does come shipped with most versions of Visual Studio, but as I've mentioned it's also available to install from NPM using standard JavaScript tools and editors you may already be using.

Typescript Misconceptions

- You have to learn a completely new language to use TypeScript

- UNTRUE – Any developer who's serious about using JavaScript these days, should be using Modern JS syntax anyway, and since TS embraces Modern JS, it's a match you should explore.

What does all this mean for a C# dev?

What does this mean for a C# dev?

- It means your journey to Frontend dev is to be honest relatively painless, and quite straight forward.
- It means you can start writing browser and node.js based code while staying in reasonably familiar surroundings.
- There are even frameworks and toolkits that look and feel like desktop WinForms development.

What does this mean for a C# dev?

- It means you can leverage existing development skills.
- It means you can challenge your OSS & JS peers, and advertise yourself as a “Full Stack Developer”
- It means you can spend more time developing and less time worrying about learning new things.

Types

AKA: Where/Why TypeScript started in the first place

Types

- TypeScript originally started as a way to strongly type JavaScript.
- TypeScript can often figure out what you're doing and WILL enforce type safety
- There are 3 basic types provided
- ~~Beware of 'null' and 'undefined'~~
- You can easily build your own types

Defining Variable Types

- In C# types are typically defined before the variable name:
  - public string foo { get; set; }
  - string bar = “abc”;
- In typescript the type comes after the variable name, separated by a colon:
  - public foo:string = “foo”;
  - let bar:string = “abc”;

Union Types

- TypeGuards – or the “or’ing” of types. **(Now known as ‘Union Types’)**

```
let myVar : string | number;

myVar = “Hello”; // Works
myVar = 2; // Works
myVar = true; // Fails
```

Classes

Classes

- In C# classes are usually declared in the following manner:

```
public class test
{
    public string foo { get; set; }
}
```

- In typescript a class is declared in exactly the same way but without the modifier:

```
class test (or ‘export [default] class test’)
{
    public foo:string = undefined;
}
```

Classes

- C# allows you to extend classes:

```
public class test::classToExtend
{}
```

- In typescript a class is extend using the extend keyword:

```
class test extends classToExtend
{}
```

Classes

- TypeScript classes can also have a constructor, using the constructor keyword :

```
class test
{
  constructor()
  {}
}
```

Classes

- If your extending a class you ~~MUST~~ call super in your constructor to call the base constructor ~~otherwise you'll get a build error~~:

```
class test extends foo
{
  constructor()
  {
    super();
  }
}
```

Classes

- Property access must be performed using ‘this’, there is no default. This applies to all local AND abstracted members (Data and functions)

- TypeScript also has something similar to .NET namespaces. These are called modules, and the syntax is as shown in the next slide:

Classes

```
module myNameSpace
{
  export class test
  {
  }
}
```

To Access or use this class you would use ‘myNameSpace.test’, as the export makes it public.

Classes

- Be aware of your module and class name length.
- Unlike C# there is **NO** equivalent to the ‘using’ statement, so if you have deeply nested classes, you’ll end up doing this:

```
Let myClass = new myModule.anotherModule.myClass();
```

Generics (and Interfaces)

Generics

- TypeScript has interfaces, they work the same way as C# interfaces, the syntax is the same too, except for the TS class naming.
- TypeScript has generics, and the syntax is very similar to that of C# but not quite identical
- To use generics, you need to use TypeScript's interface specification in order to define the type to use.
- Once the interface is defined, you can then use it as you would expect, in a similar way to C#

Generics

```
interface myGenericsType<T>
{
  myMethod(someParameter: string): T;
}

class myGenericsClass implements myGenericsType<string>
{
  myMethod(someParameter: string)
  {
    return “[“ + someParameter + “]”;
  }
}

let testClass = new myGenericsClass();
alert(testClass.myMethod);
```

ES6

ES6

- Many of the newer ES6 features have been implemented in TypeScript.
- I’m not going to go through all of them (There’s far too many), there’s a great compatibility chart available here:

http://kangax.github.io/compat-table/es6/

ES6 (Highlights)

- **Arrow Functions (Lambdas)**

```
class Person{
    constructor(public age: number) {
    }
    growOld = () => { this.age++; }
}


setTimeout(() => {
    alert("I will show after 5 seconds....");
}, 5000);
```

ES6 (Highlights)

- **Default Parameters**

```
class myClass{
    public doSomething(text: string, aFlag = false) {
        if (!aFlag) {
            alert(text);
        } else {
            alert("Not allowed to display Text as flag is set");
        }
    }
}
Let aThing = new myClass;
aThing.doSomething(“Hello World”);
aThing.doSomething(“Hello World”, true);
```

Definition Files & External Libs

Definition Files & External Libs

- TypeScript can use files with a ‘.d.ts’ extension, these files will have a special meaning
- You can use existing JavaScript libraries, by creating a definition file to describe to TypeScript what the JS lib looks like.

Definition Files & External Libs

- Many of the most common libraries in use today, have already been created and are available from:

http://definitelytyped.org/

npm install tsd

npm install typings

npm install @types/packagename

Definition Files & External Libs

- If you're using Visual Studio, you can also find them in NuGet using 'tag:typescript'
- If you're using web essentials, right clicking on a JS file in your project and left clicking on 'Search for Typings'

Summary

Summary

- TypeScript is very C# developer friendly.
- TypeScript removes a vast amount of the pain associated with JavaScript development.
- It costs nothing to get started, esp if you already have Visual Studio

Summary

- TypeScript is a route to modern and future JavaScript standards, a simple configuration or command line parameter change, allows you to change from ES3/ES5 to ES6, while still writing everything in ES6

Summary

- TypeScript has a fantastic community supporting it.
- Even the “Angular” team have decided to support it by writing Angular2 onwards completely in TypeScript
- The Aurelia team support it by writing all of the Aurelia framework using it.

Summary

- TypeScript is supported in ALL the tools you're already using.
- There is NO easier way for a back-end C# dev to make the move into front-end development.

Thanks for Listening

If you're still awake, you did better than me, the person you see on stage now is a remote controlled robot, powered by TypeScript ;-)

If you want to contact me…

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- I'll make a PDF copy of these slides available for those who want it, keep a watch on my Twitter Feed for the link.