

What's New in TypeScript?

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Meet Doris Chen



- Developer Evangelist at Microsoft based in Silicon Valley, CA
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 - Twitter @doristchen
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- Speaks at numerous international conferences and user groups including O'Reilly OSCON, Fluent, PHP, Dev Nexus, HTML5 Dev Conference, JavaOne, and worldwide User Groups
- Received her Ph.D. from the University of California at Los Angeles (UCLA) in computer engineering

Session objectives and takeaways

- Why TypeScript?
- What is TypeScript?
- What's new in TypeScript?



WHY TYPESCRIPT?

**Developers should be able
to focus on creating
amazing things**

How Developers Spend Time

Understand Code

- Read source code
- Trace flow of execution
- Read library documentation
- Find bugs

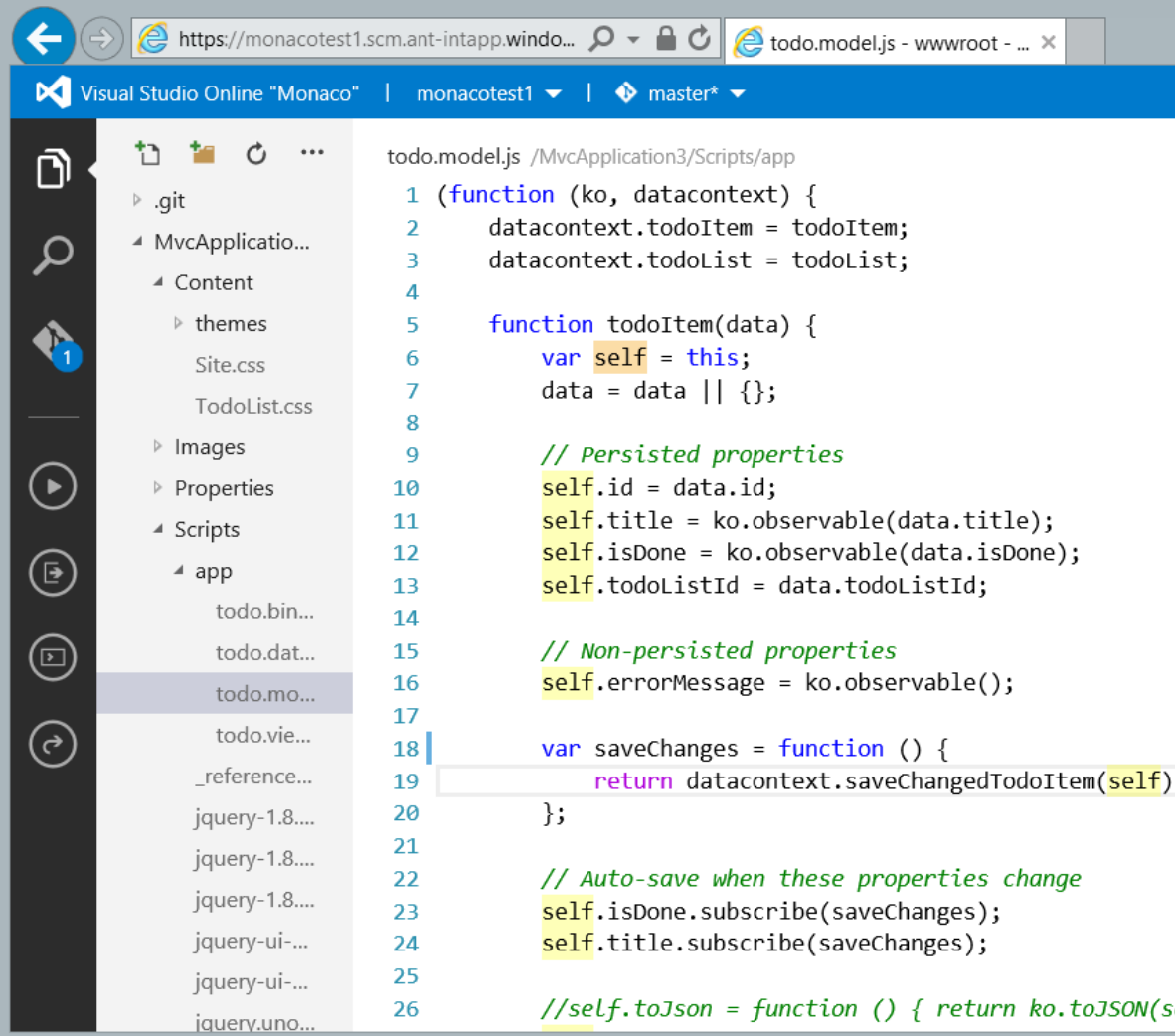
Maintain Existing Code

- Prepare for new features
- Fix bugs
- Refactor code

Write New Code

- New functions/classes
- New files or modules

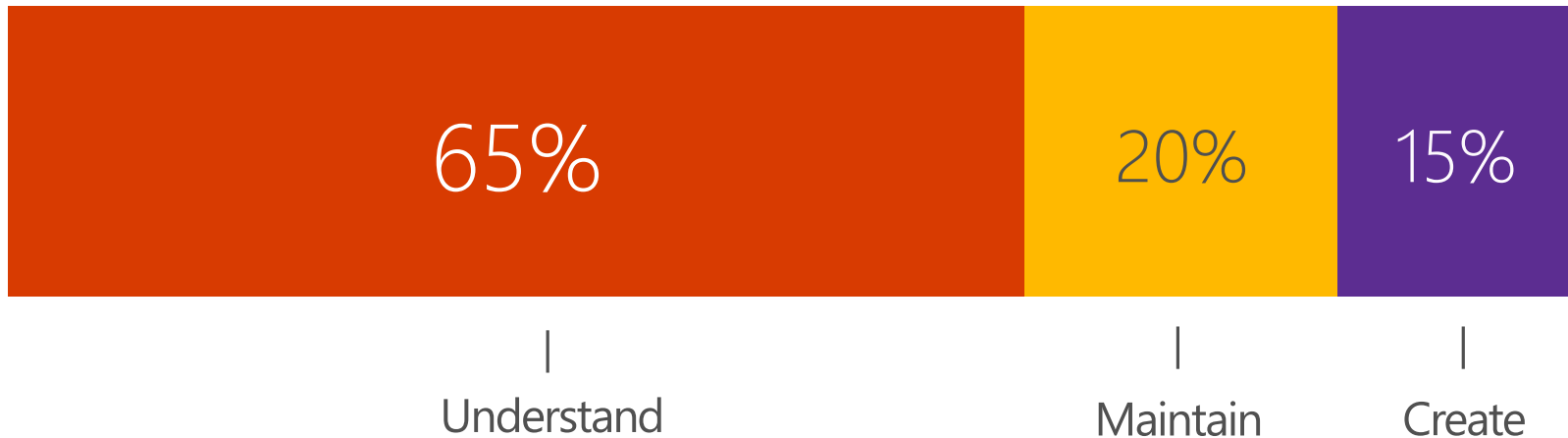
Monaco



What If?



What If?



What is TypeScript?

A typed superset of JavaScript that compiles to plain JavaScript

TypeScript

<http://typescriptlang.org>

- A statically typed superset of JavaScript that compiles to plain JavaScript
- Make JavaScript to scale
- Any browser. Any host. Any OS
- Open Source

<https://github.com/Microsoft/TypeScript>

- Static Types → Better Tooling

Demo

JavaScript to TypeScript



Demo Recap

Benefit from TypeScript today

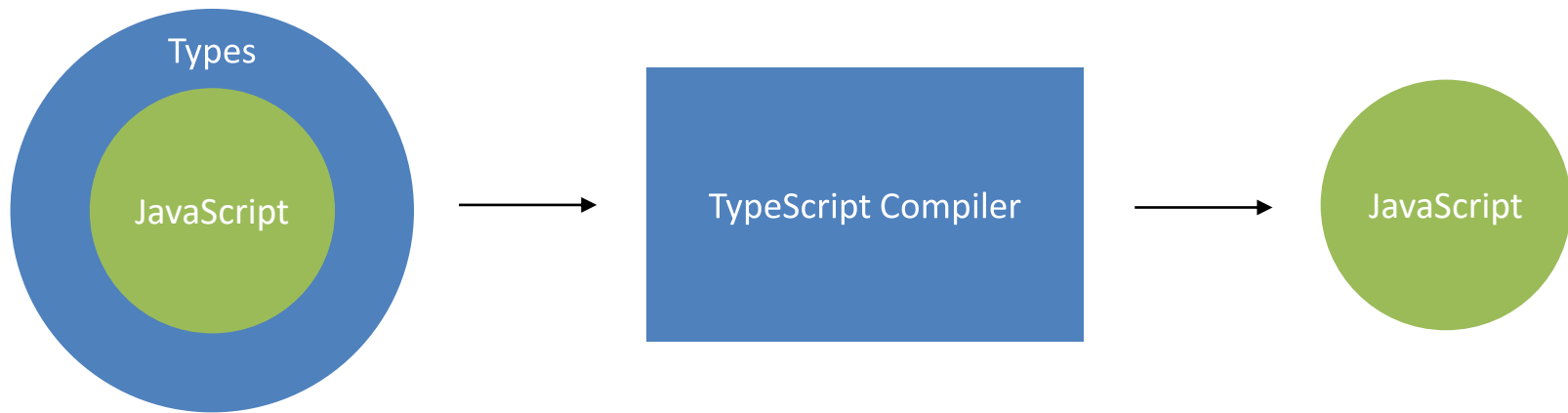
Consume JavaScript with `--allowJs`

Opt-in types strengthen type system

Utilize future JavaScript features in JS and TS

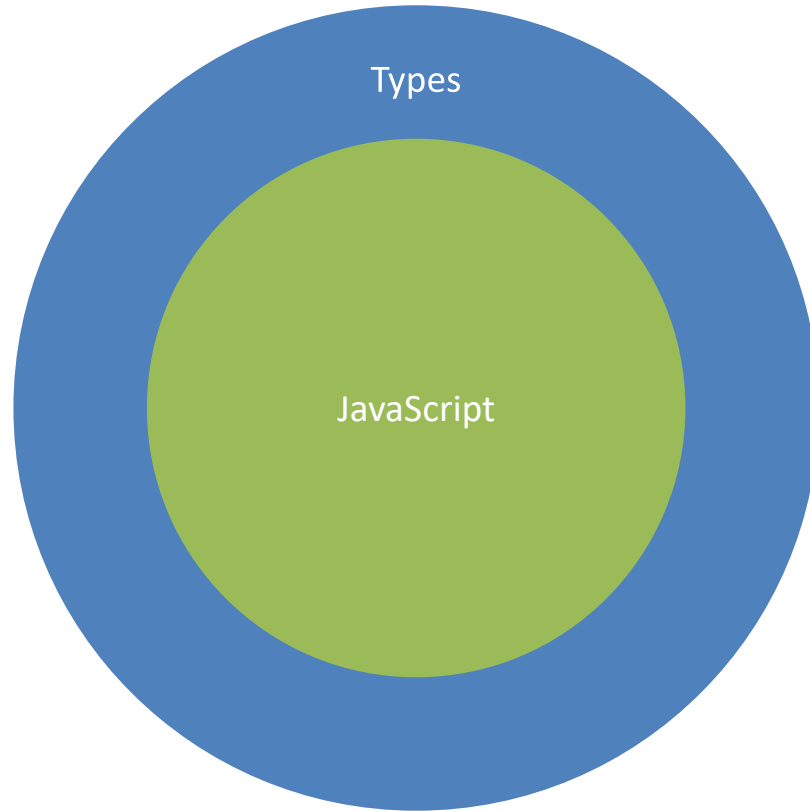


The TypeScript Language



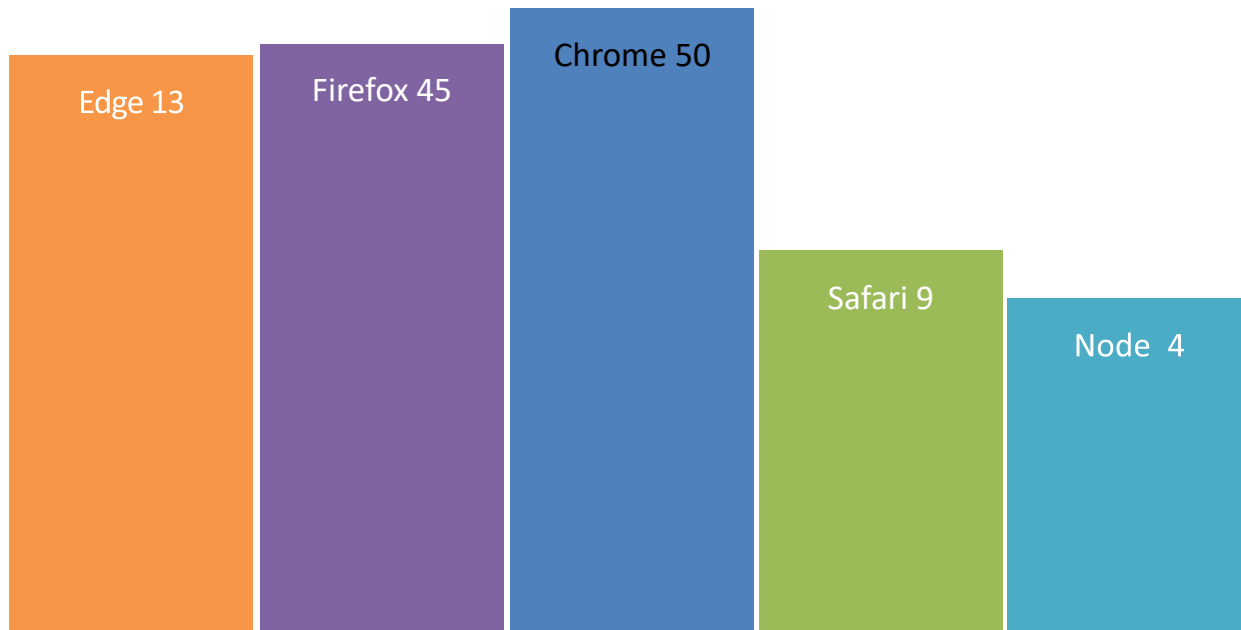
JavaScript IS TypeScript

JavaScript IS TypeScript



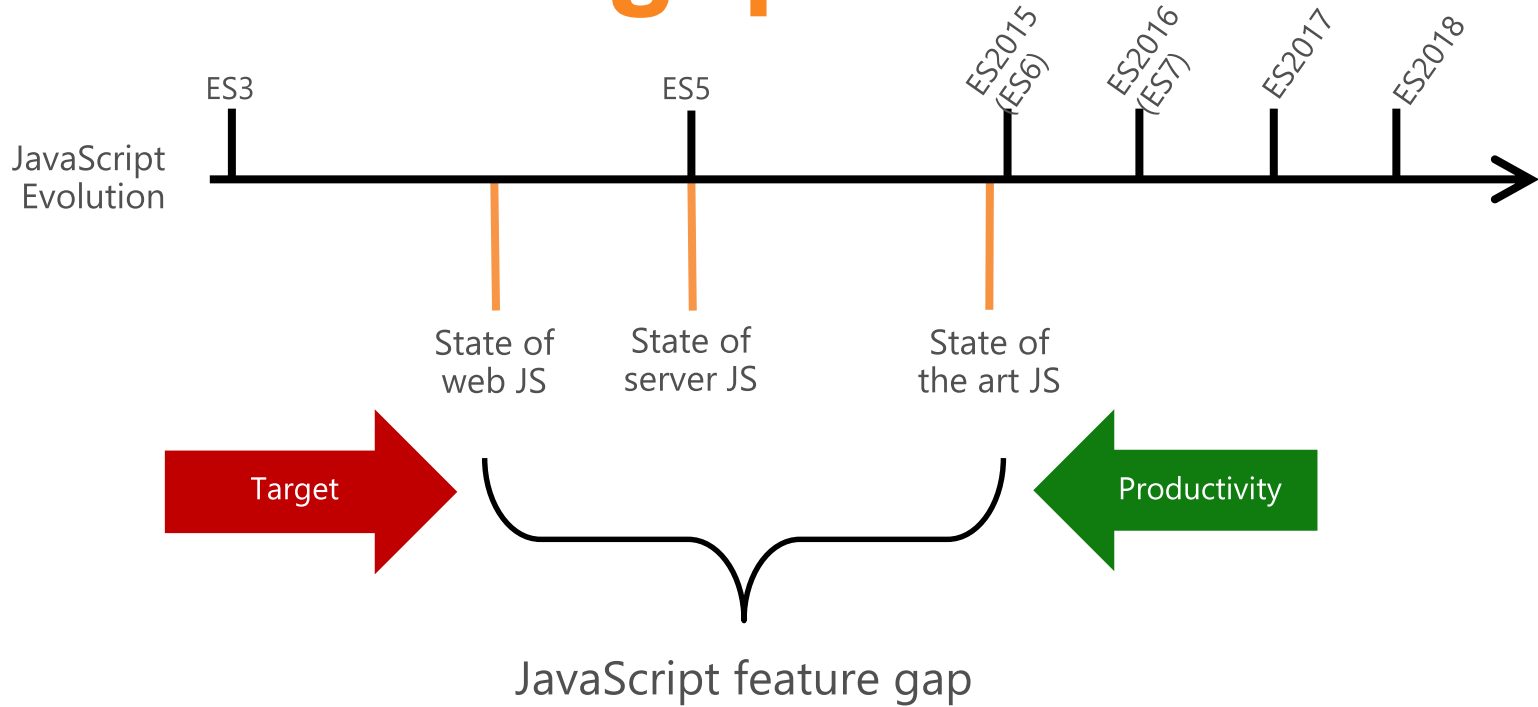
ES Support Today

ES6 Engine Support

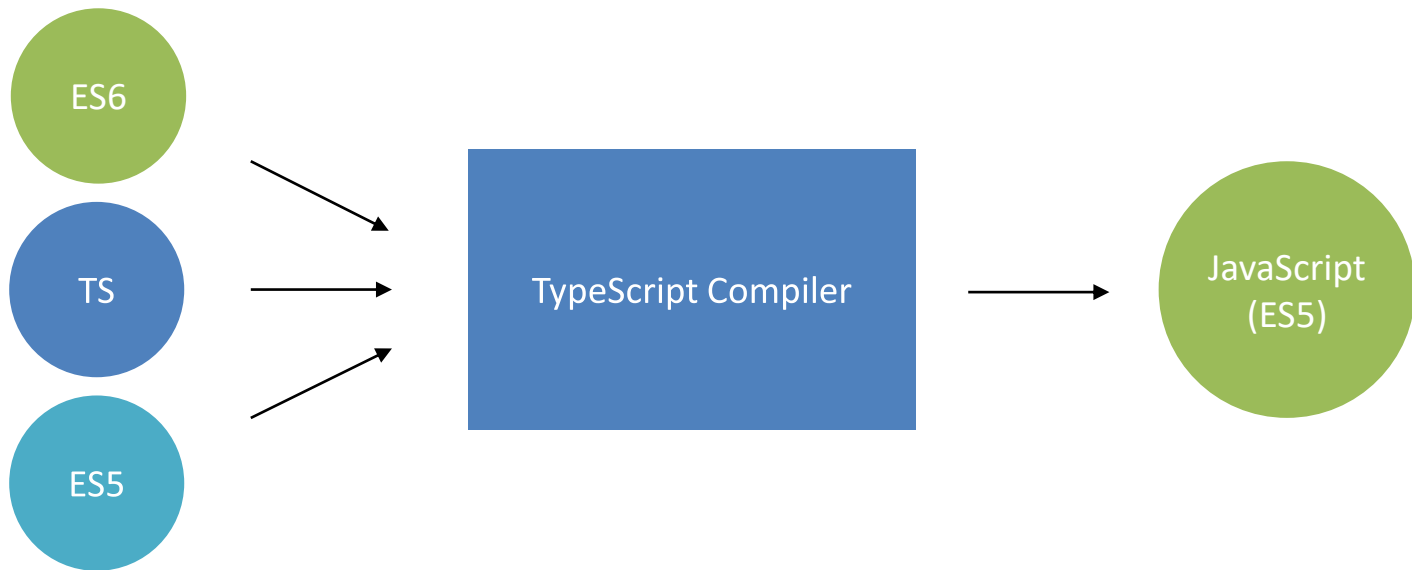


(<http://kangax.github.io/compat-table/es6/>)

The feature gap



Downlevel Compilation



WHAT'S NEW IN TYPESCRIPT?

What's New: ES6+ Support

| ES6 | ES7 |
|---------------------------------|---|
| Class expressions Generators | Async/Await Exponentiation Decorators |

New features

- Non-nullable types
- Control flow analysis
- Discriminated union types
- Literal types
- Definition files as NPM packages (@types)
- Downlevel async/await
- Generator support for ES3/ES5
- Asynchronous iterators
- Type parameter defaults
- Object spread and rest
- Mixin classes
- Mapped types
- Lookup types and 'keyof' type operator
- Type checking for plain JavaScript
- Infer types from JSDoc in JavaScript files
- Language service extensibility
- Configuration inheritance
- Transformation based emitter
- Quick fixes
- Untyped imports
- New 'object' type
- Explicitly typed 'this' in functions
- Readonly properties and index signatures
- Path mappings in module resolution
- Glob support in tsconfig.json
- UMD module definitions

TypeScript 2.X

Packed with Features

Non-nullable types

Control flow analysis

Discriminated Union types

Never types

Read-only properties

This types for functions

Glob support in tsconfig

New module resolution

Quick ambient modules

@types .d.ts acquisition

UMD module definitions

Optional class properties

Private constructors

So much more...

Packed with Features

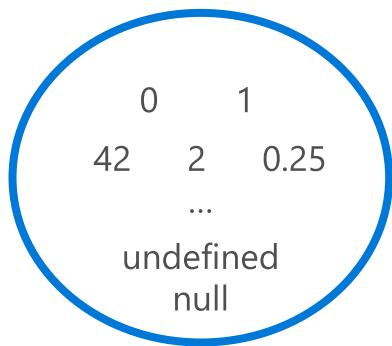
Non-nullable types

Control flow analysis

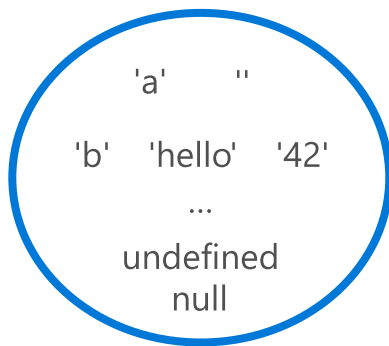
@types .d.ts acquisition

Nullable types

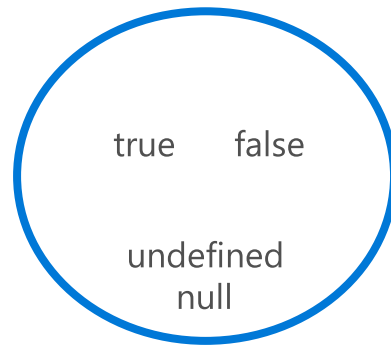
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string

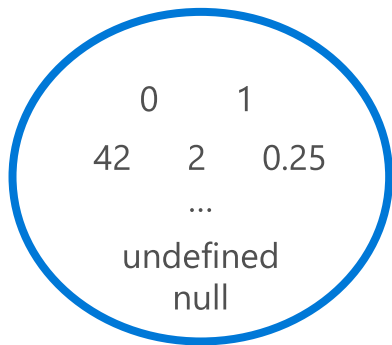


boolean

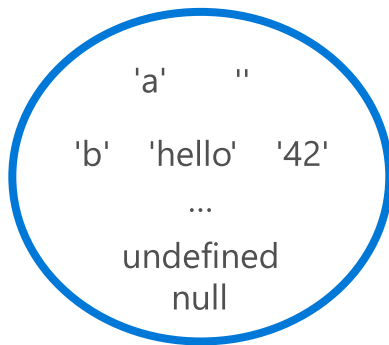


Nullable types

number



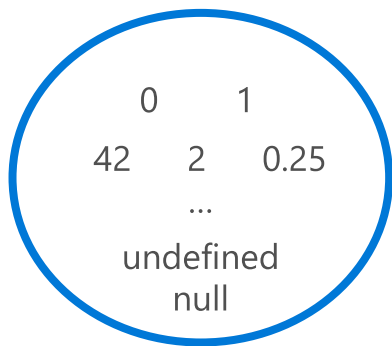
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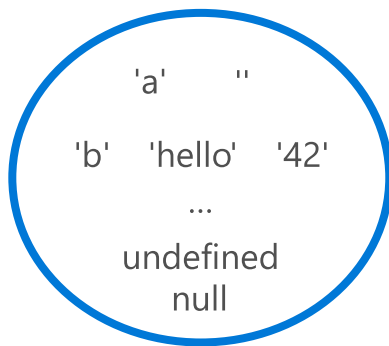
number | string

Nullable types

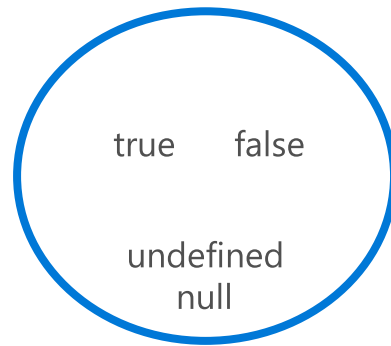
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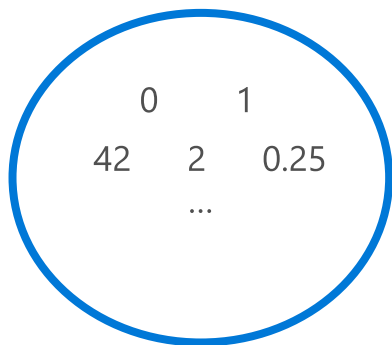


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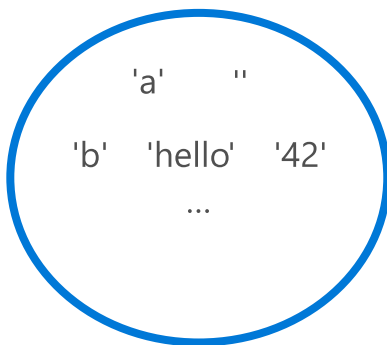


Nullable types

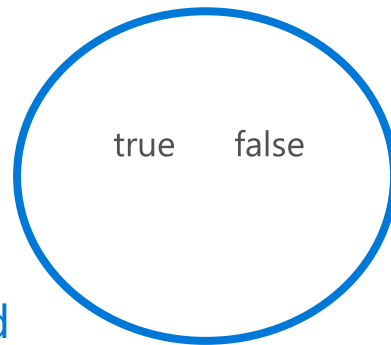
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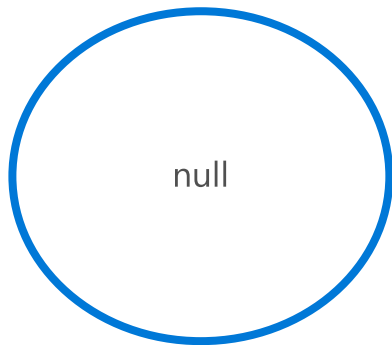
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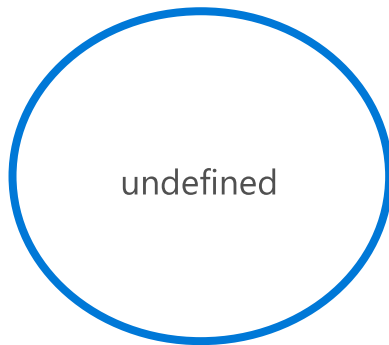
boolean



null

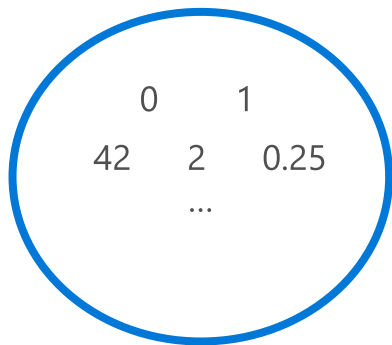


undefined



Nullable types

number



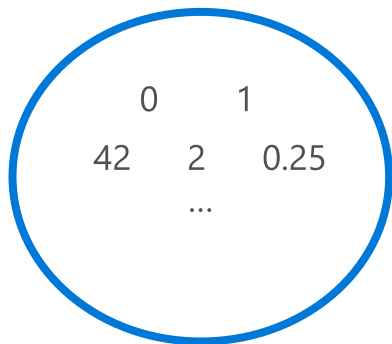
null

number | null

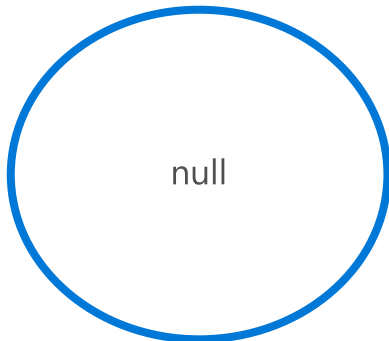
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Nullable types

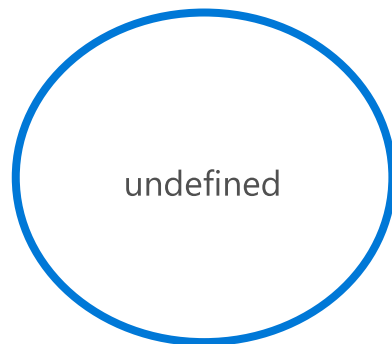
number



null



undefined



number | null | undefined

Demo

Non-Nullable Types & Control Flow Analysis



Demo Recap

Managing nullability in JS is painful

Non-nullable types provide null/undefined coverage

Control flow analysis traces flow for you



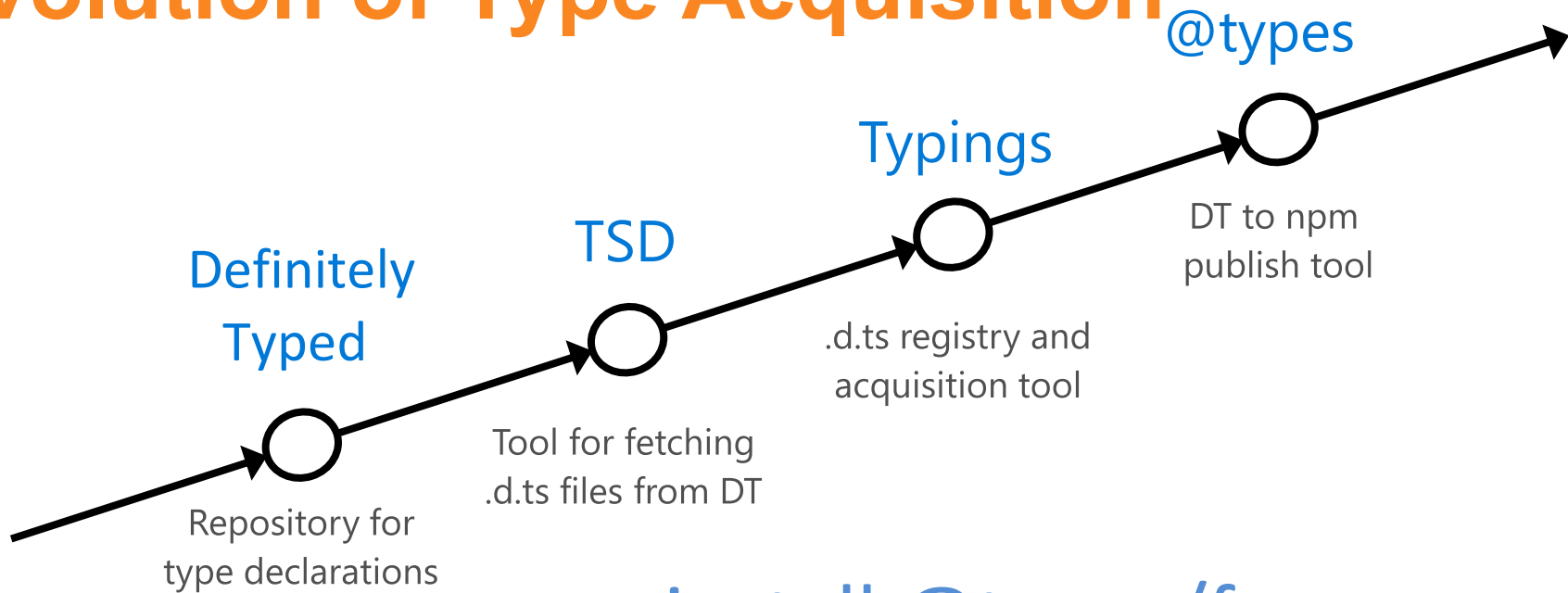
Packed with Features

Non-nullable types

Control flow analysis

@types .d.ts acquisition

Evolution of Type Acquisition



```
npm install @types/foo  
npm install --save-dev  
@types/node
```

Demo

Angular2/React/Node and TypeScript



Demo Recap

TypeScript can work in any workflow

- Angular2
- React/JSX
- Node

ES6+ features work great with TypeScript



TypeScript tools



Visual Studio



Sublime Text



Atom



WebStorm



Visual Studio Code



Eclipse



Emacs



Vim

TypeScript and frameworks



"With TypeScript, several of our team members have said things like "I now actually understand most of our own code!" because they can easily traverse it and understand relationships much better."

-- Brad Green, Engineering Director at Google



"One of Ionic's main goals is to make app development as quick and easy as possible, and the tooling support TypeScript gives us with autocompletion, type checking and source documentation really aligns with that."

-- Tim Lancina, Tooling Developer at Ionic



"TypeScript helped us to reuse the team's knowledge and to keep the same team velocity by providing the same excellent developer experience as C# ... A huge improvement over plain JavaScript."

-- Valio Stoychev, PM Lead NativeScript



"By combining Aurelia with TypeScript for modern web, mobile and desktop development, we've seen what is perhaps the most beautiful and elegant app development workflow to date."

-- Rob Eisenberg, Architect - Aurelia



"TypeScript has helped ensure that Dojo 2 will be built on rock solid foundations, which will make enterprise development better. TS gives us all the benefits of ES6, plus more productivity, ... and responsive support from the TypeScript team "

-- Dylan Schiemann, Co-founder - Dojo Toolkit, CEO - SitePen



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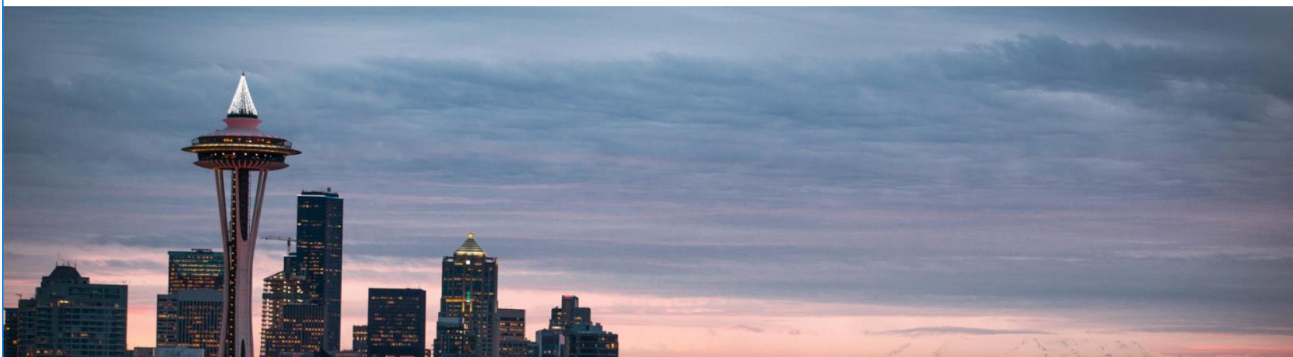
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TypeScript at Slack

Or, How I Learned to Stop Worrying & Trust the Compiler



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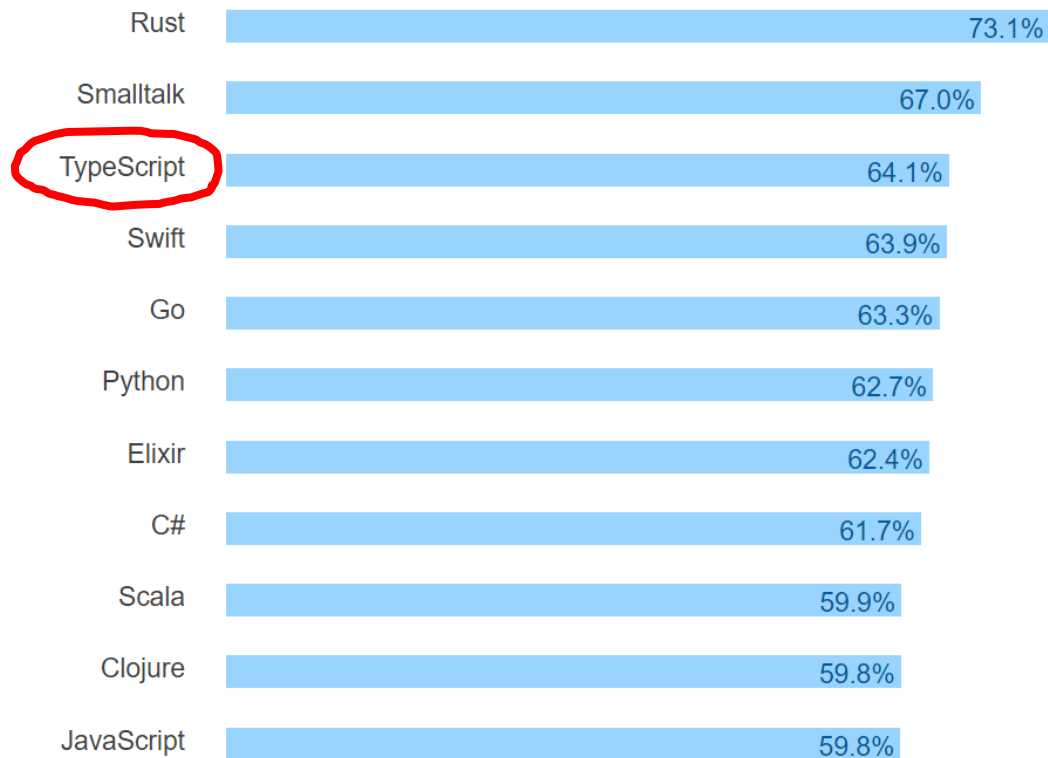
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Loved

Dreaded

Wanted



<http://typescriptlang.org>



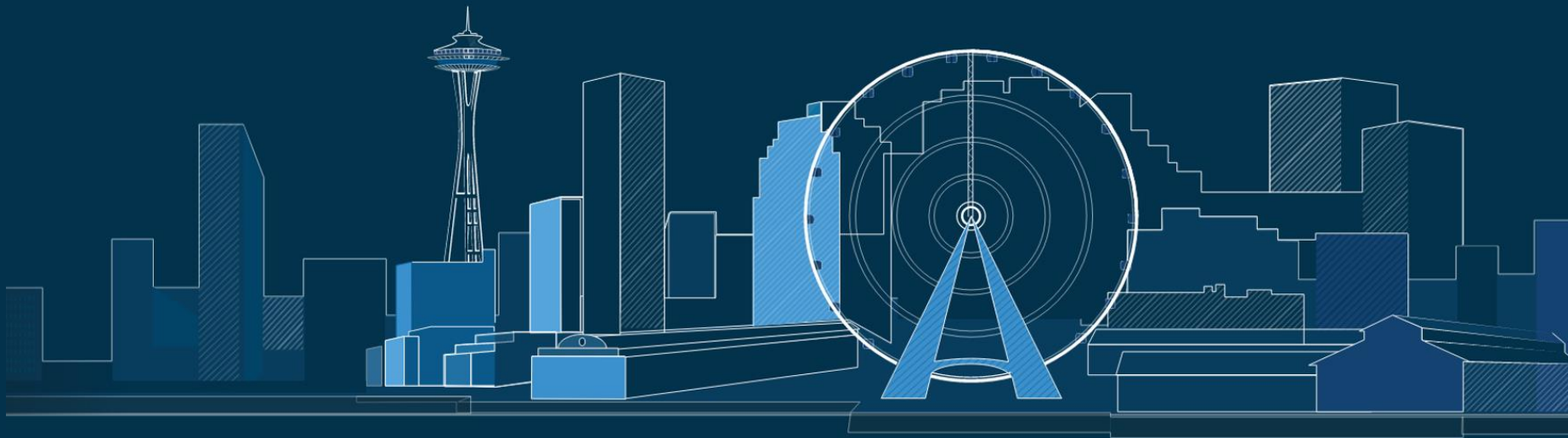
Starts and ends with JavaScript



Strong tools for large apps



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Join the Community!

- We're on GitHub! <https://github.com/Microsoft/TypeScript>
- And Twitter! @typescriptlang
- And Gitter! (<https://gitter.im/Microsoft/TypeScript>)

TypeScript lets you focus on **creation**