**NPM and Nodejs**

* Npm is Node Package Manager
* Npm is world largest software registry or software market place
* Npm contains 8 lacs code packages.
* Npm is by dafault installed with Node.js

**Software Package Manager**

* All the packages are defined in file called **package.json**
* Command: **npm init** or **npm init –y**

**Why we use Nodejs**

[We use Node.js because it is a powerful and popular runtime environment for building fast and scalable web applications using JavaScript](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/).  Some of the reasons to use Node.js are:

* [It is fast, due to the Google V8 engine and the event loop architecture, which allows for efficient handling of concurrent requests](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/)
* [It is full-stack, meaning that you can use JavaScript for both the front-end and the back-end, which simplifies development and reduces the need for multiple languages and frameworks](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/)
* [It has a rich ecosystem, with the largest software library registry in the world (npm), which provides access to thousands of packages and modules that can be used to extend the functionality of Node.js applications](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/).
* [It is suitable for real-time applications, such as chat applications, collaborative tools, and multiplayer games, that require high performance and low latency communication between the server and the client](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/).
* [It is compatible and interoperable, as it can run on various platforms (Windows, Linux, Mac OS, etc.) and work with existing JavaScript libraries and frameworks, such as React, Angular, Vue, etc.](https://www.freecodecamp.org/news/what-exactly-is-node-js-and-why-should-you-use-it-8043a3624e3c/)
* Due to Nodejs, we can use npm commands and access the npm registery.
* After Installation we can check **node –v** and **npm -v**

We will learn the javascript with the help of typescript.

**Why to Learn Typescript**

* TypeScript is the super set of javascript.
* TypeScript just allows you to write the javascript in a much precise or accurate manner due to which your code will face much less error in the runtime.
* During typing the code we will see the error and we should not do like that.
* TypeScript is all about type safety.
* Javascipt will not stop you to add number with string.
  + 2+"2"
  + '22'
  + null +2
  + 2
  + undefined+2
  + NaN
* All the browser understand only javascript, so we need to transpile or convert the typescript into javascript.

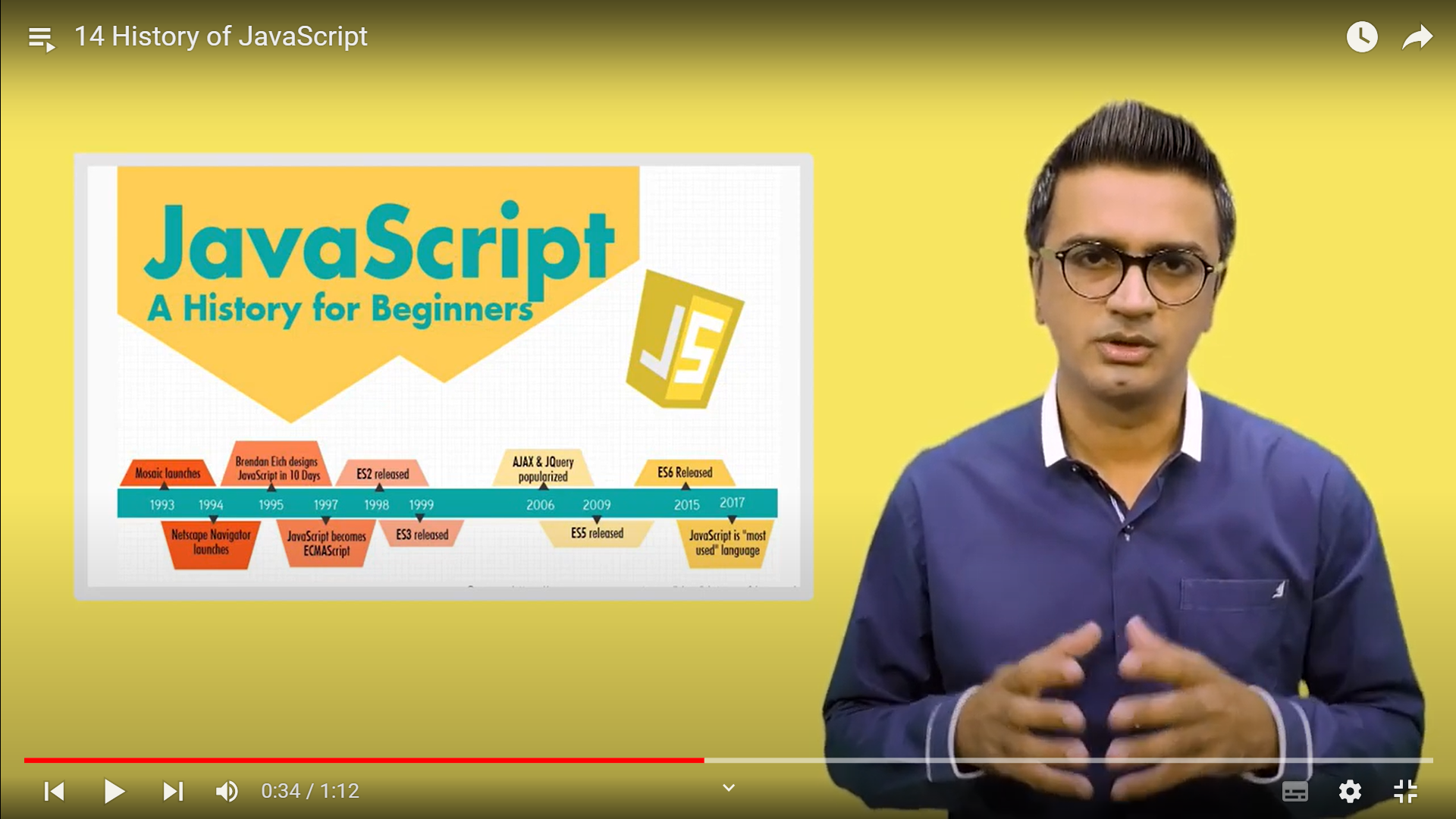
**What TypeScript does:**

* **Static checking:** with other languages the syntax is analyzed by IDE. But not the case of Javascript but the errors are thrown when you run the code in nodejs. But it will great when we write the code and errors caught before the run the code which is called static checker.

**why is javascript is called scripting language**

* [JavaScript is called a scripting language because it is a programming language that does not require an explicit compilation step](https://yesfordev.com/why-javascript-is-scripting-language/).
* [A scripting language is a subset of programming languages that can be executed directly by an interpreter, such as a web browser, without producing a separate executable file](https://yesfordev.com/why-javascript-is-scripting-language/).
* [JavaScript was originally designed as a scripting language for web browsers, to add dynamic and interactive features to web pages](https://stackoverflow.com/questions/2018731/why-is-javascript-called-javascript-since-it-has-nothing-to-do-with-java).
* [The name JavaScript was chosen as a marketing tactic to divert some attention from Java, which was the most buzzed-about language at the time](https://stackoverflow.com/questions/2018731/why-is-javascript-called-javascript-since-it-has-nothing-to-do-with-java). [However, JavaScript has nothing to do with Java, except for some superficial similarities in syntax](https://stackoverflow.com/questions/17253545/scripting-language-vs-programming-language).

**ECMA Script**

**History of JavaScript** 

**Javascript language is de facto laguage of the internet**

* JavaScript is the de facto language of the internet, meaning that it is the most widely used and accepted language for web development .
* JavaScript is supported by all major web browsers, and it can run on both the client-side and the server-side, thanks to platforms like Node.js .
* JavaScript is also the basis for many popular web frameworks and libraries, such as React, Angular, Vue, jQuery, etc.

**JavaScript is also constantly evolving and improving, with new features and standards being introduced regularly**

* The official specification for JavaScript is called ECMAScript, which is developed and maintained by Ecma International .
* Standard is called EcmaScript or ES and the implementation is JavaScript.
* Javascript is submitted to ECMA international by Natscape in Nov, 1996 for consistent adoption across browsers and for intractivity and dynamic web to succeed.
* ECMAScript has several editions that introduce new features and improvements to the language. The latest edition is ECMAScript 2022, which was published in June 2022 .

**JavaScript Engine**

* It is computer program that executes JavaScript (JS) code.
* It convert human readable text into machine language.
* Every browser has its own Javascript engine.
* That engine follows the standards of EcmaScript
* Chrome has engine called **V8**, which follow the standard specifications.
* So this is the reason behind the standardization of javascript to follow by all the browser engine.
* **V8** engine is used by chrome, edge, opera
* **Firefox** uses SpiderMonkey. FireFox previously called **Netscape**
* Safari uses JavaScript core(Nitro)
* JavaScript Engine works with Rendering Engine (DOM). Redering Engine work with UI.
* V8 JavaScript engine is a core component of Node.js. It is responsible for executing JavaScript code in Node.js
* Asynchronous execution: V8 supports asynchronous execution, which allows Node.js applications to handle multiple requests simultaneously.

**Power Shell setting**

If you want to run TypeScript tsc command in Windows Powershell:

Open Powershell in Adminstrator mode

Run command:

Set-ExecutionPolicy RemoteSigned or Set-ExecutionPolicy Unrestricted

Policy updated and now you can run tsc command in powershell.

**Github**

**giving you better tooling at any scale.**

That is a valid statement. TypeScript is a superset of JavaScript that adds optional static type checking and other features to the language. TypeScript can give you better tooling at any scale, meaning that it can help you write, debug, and maintain code more easily and efficiently, regardless of the size or complexity of your project. Some of the benefits of TypeScript are:

- Error detection and prevention: TypeScript can catch errors and bugs at compile time, before they cause trouble at run time. TypeScript can also enforce coding standards and best practices, such as using strict mode, avoiding implicit any types, and following interface contracts.

- Code completion and intellisense: TypeScript can provide code completion and intellisense features in your editor or IDE, such as suggesting variable names, methods, properties, and parameters. TypeScript can also show you the type information, documentation, and definition of any symbol in your code.

- Refactoring and navigation: TypeScript can support code refactoring and navigation tools, such as renaming, extracting, moving, finding references, and jumping to definition. TypeScript can also generate declaration files (.d.ts) that describe the types and signatures of your code for other consumers.

- Compatibility and interoperability: TypeScript is a superset of JavaScript, which means that any valid JavaScript code is also valid TypeScript code. TypeScript can also compile to different versions of JavaScript, such as ES5 or ES3, to ensure compatibility with older browsers. TypeScript can also work with existing JavaScript libraries and frameworks, such as React, Angular, Vue, etc., by using type definitions from DefinitelyTyped or other sources.