

How
Does
Javascript
Works ?

JS



JavaScript can execute not only in the browser, but also on the server, or actually on any device that has a special program called the JavaScript engine.

The browser has an embedded engine sometimes called a “JavaScript virtual machine”.

Different engines have different
“codenames”.

V8 – in Chrome, Opera and Edge.



V8



Crome



Opera



Edge

SpiderMonkey – in Firefox.



SpiderMonkey



Firefox

How do engines work?

The engine (embedded if it's a browser) reads ("parses") the script.

Then it converts ("compiles") the script to the machine language. And then the machine code runs, pretty fast.

The engine applies optimizations at each step of the process. It even watches the compiled script as it runs, analyzes the data that flows through it, and further optimizes the machine code based on that knowledge.

Is JavaScript compiled or interpreted ?

Javascript used to be a purely interpreted language but the problem with interpreted language is that they are much-much slower than compiled languages.

Modern Javascript engine now uses a mix between compilation and interpretation which is called Just-in-time (JIT) compilation.



V8 engine

V8 JavaScript engine is an open source JavaScript and WebAssembly engine that compiles JavaScript to optimized machine code before execution.

Just in time compilation

The V8 engine gets its speed from the Just in Time (JIT) compilation of JS code to native machine code. The ignition interpreter, a key component of V8, compiles the JS code and generates non-optimized machine code. On runtime, the machine code is analyzed and re-compiled for optimal performance. This optimization is handled by the TurboFan and Crankshaft components of V8.

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