



as a Research Platform

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Toon Verwaest, Google

Michael Starzinger, Google

JS

node



WA





Agenda

- 14:00 - 14:15: Introduction and overview of V8 (10 min) - *Hannes Payer*
- 14:15 - 14:45: Object model, type feedback, parsing and streaming (40 min) - *Toon Verwaest*
- 14:45 - 15:30: Compilation pipeline, TurboFan overview, JavaScript focused optimizations (40 min) - *Michael Starzinger*
- 15:30 - 16:00: Break
- 16:00 - 16:20: WebAssembly (20 min) - *Michael Starzinger*
- 16:20 - 17:00: Garbage collection and MMTK in V8 (40 min) - *Hannes Payer & Steve Blackburn*
- 17:00 - 17:35: Benchmarks, metrics, and tools (35 min) - *Ulan Degenbaev*

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What is V8?

V8 is Google's open source high-performance JavaScript and WebAssembly engine, written in C++. It is used in Chrome and in Node.js, among others. It implements [ECMAScript](#) and [WebAssembly](#), and runs on Windows 7 or later, macOS 10.12+, and Linux systems that use x64, IA-32, ARM, or MIPS processors. V8 can run standalone, or can be embedded into any C++ application.

<https://v8.dev>

Twitter: [@v8js](#)

Latest blog posts

- 89. [Code caching for WebAssembly developers](#) 17 June 2019 [WebAssembly](#) [internals](#)
- 88. [V8 release v7.5](#) 16 May 2019 [release](#)
- 87. [Faster and more feature-rich internationalization APIs](#) 25 April 2019 [ECMAScript](#) [Intl](#)
- 86. [A year with Spectre: a V8 perspective](#) 23 April 2019 [security](#)
- 85. [Blazingly fast parsing, part 2: lazy parsing](#) 15 April 2019 [internals](#) [parsing](#)
- 84. [Code caching for JavaScript developers](#) 08 April 2019 [internals](#)
- 83. [Blazingly fast parsing, part 1: optimizing the scanner](#) 25 March 2019 [internals](#) [parsing](#)
- 82. [V8 release v7.4](#) 22 March 2019 [release](#)
- 81. [JIT-less V8](#) 13 March 2019 [internals](#)
- 80. [V8 release v7.3](#) 07 February 2019 [release](#)

More articles can be found in [the blog archive](#).

V8's Git repository is located at:

<https://v8.dev/git>

Official mirror on GitHub:

<https://github.com/v8/v8>

Technical discussions and design docs:

v8-dev@googlegroups.com



SPLASH Conference

@splashcon

Following



Google's V8 wins the ACM SIGPLAN
Software Award! Congrats! #splash16

10:06 AM - 3 Nov 2016

Recent Research Papers

Ulan Degenbaev, Michael Lippautz, Hannes Payer:

Garbage collection as a joint venture. Commun. ACM 62(6): 36-41 (2019)

Ulan Degenbaev, Michael Lippautz, Hannes Payer:

Garbage Collection as a Joint Venture. ACM Queue 17(1): 60 (2019)

Ulan Degenbaev, Michael Lippautz, Hannes Payer:

Concurrent marking of shape-changing objects. ISMM 2019: 89-102

Ross McIlroy, Jaroslav Sevcík, Tobias Tebbi, Ben L. Titzer, Toon Verwaest:

Spectre is here to stay: An analysis of side-channels and speculative execution. CoRR abs/1902.05178 (2019)

Ulan Degenbaev, Jochen Eisinger, Kentaro Hara, Marcel Hlopko, Michael Lippautz, Hannes Payer:

Cross-component garbage collection. PACMPL 2(OOPSLA): 151:1-151:24 (2018)

Nadja Peters, Sangyoung Park, Daniel Clifford, S. Kyostila, R. McIlroy, Benedikt Meurer, Hannes Payer, Samarjit Chakraborty:

Phase-Aware Web Browser Power Management on HMP Platforms. ICS 2018: 274-283

Recent Research Papers

Nadja Peters, Sangyoung Park, Daniel Clifford, S. Kyostila, Ross McIlroy, Benedikt Meurer, Hannes Payer, Samarjit Chakraborty:
API for power-aware application design on mobile systems. MOBILESoft@ICSE 2018: 90-91

Andreas Rossberg, Ben L. Titzer, Andreas Haas, Derek L. Schuff, Dan Gohman, Luke Wagner, Alon Zakai, J. F. Bastien, Michael Holman:

Bringing the web up to speed with WebAssembly. Commun. ACM 61(12): 107-115 (2018)

Andreas Haas, Andreas Rossberg, Derek L. Schuff, Ben L. Titzer, Michael Holman, Dan Gohman, Luke Wagner, Alon Zakai, J. F. Bastien:

Bringing the web up to speed with WebAssembly. PLDI 2017: 185-200

Ulan Degenbaev, Jochen Eisinger, Manfred Ernst, Ross McIlroy, Hannes Payer:

Idle-time garbage-collection scheduling. Commun. ACM 59(10): 34-39 (2016)

Nadja Peters, Sangyoung Park, Samarjit Chakraborty, Benedikt Meurer, Hannes Payer, Daniel Clifford:

Web browser workload characterization for power management on HMP platforms. CODES+ISSS 2016: 26:1-26:10

Ulan Degenbaev, Jochen Eisinger, Manfred Ernst, Ross McIlroy, Hannes Payer:

Idle time garbage collection scheduling. PLDI 2016: 570-583

... plus many more from other researchers

For example at this PLDI'19:

Jiho Choi, Thomas Shull, Josep Torrellas:

Reusable inline caching for JavaScript performance. PLDI 2019: 889-901

V8/Google Research

Google's 7th Compiler and Programming Language Summit, 9th-11th 2019
December in Munich.

We are always looking for amazing engineers, research visitors, and interns!

Chrome Research Projects, Google PhD Fellowships, Faculty Research Awards, etc.

<https://ai.google/research/outreach>