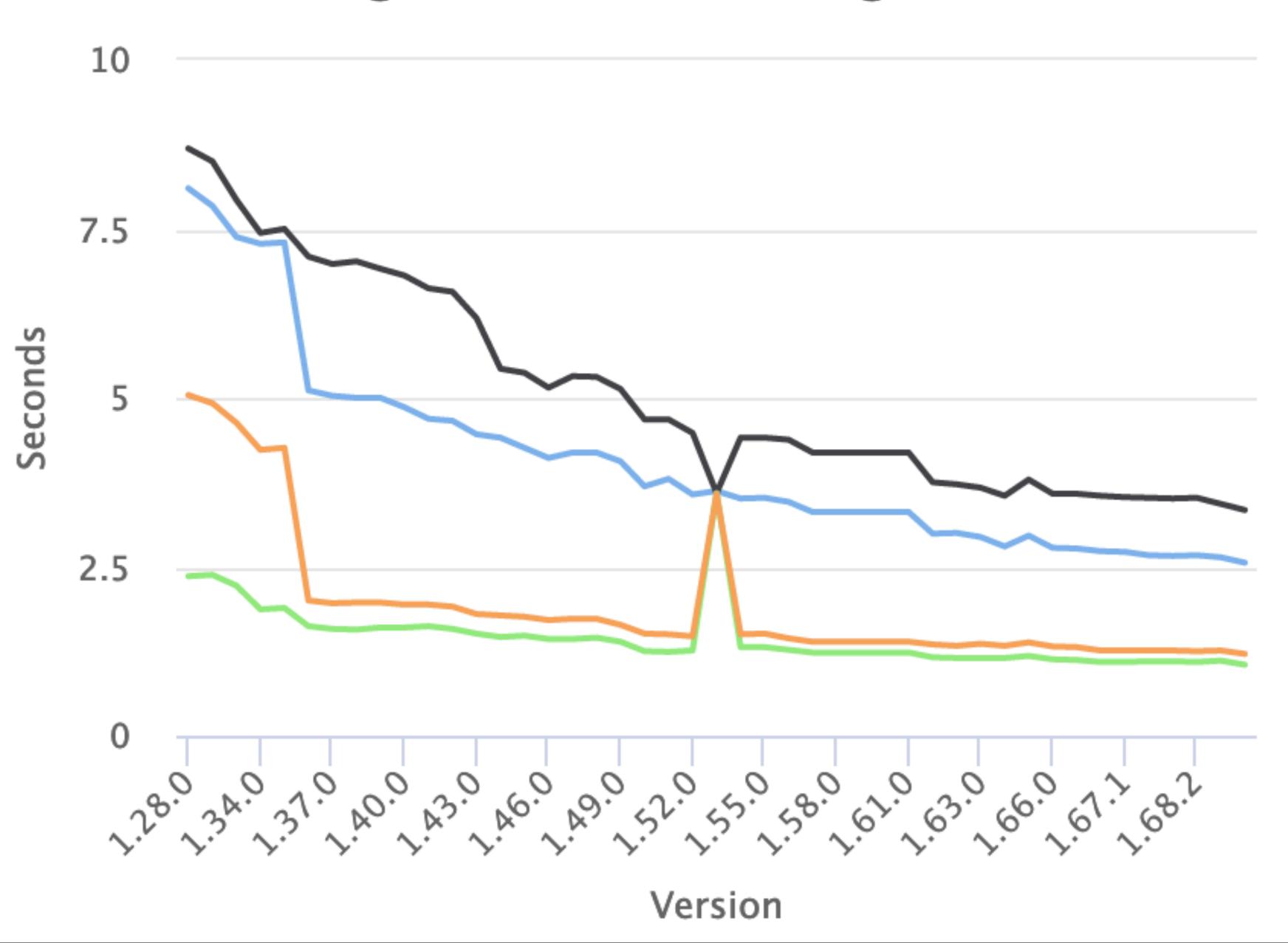
### The status of parallel rustc

Nicholas Nethercote RustNL 2023

### rustc is slow

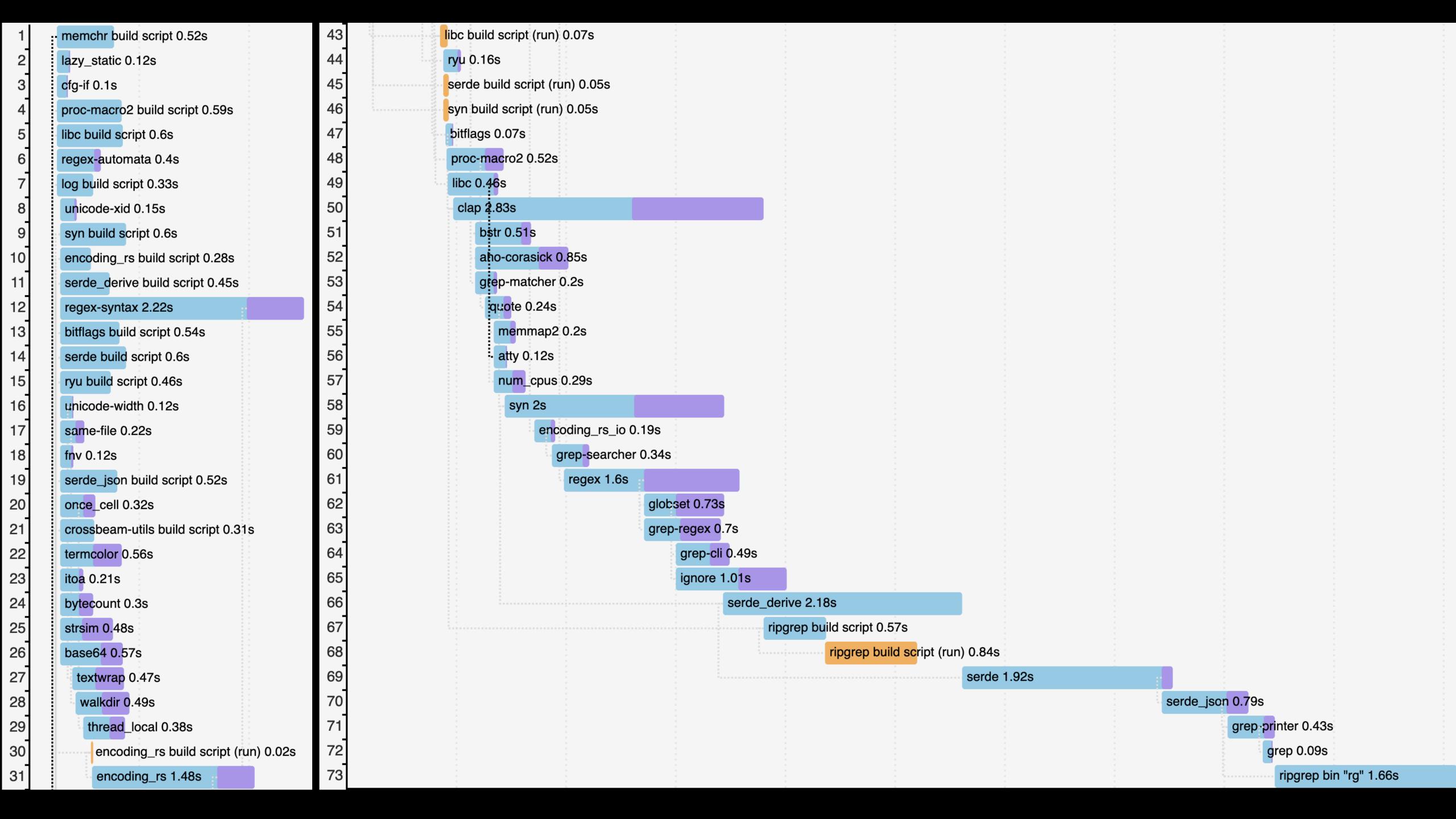
#### Average time for a debug build



### Parallel execution

### Parallel execution 1: cargo

1	:	memchr build script 0.52s
2		lazy_static 0.12s
3		cfg-if 0.1s
4		proc-macro2 build script 0.59s
5		libc build script 0.6s
6		regex-automata 0.4s
7		log build script 0.33s
8		unicode-xid 0.15s
9		syn build script 0.6s
10		encoding_rs build script 0.28s
11		serde_derive build script 0.45s
12		regex-syntax 2.22s
13		bitflags build script 0.54s
14		serde build script 0.6s
15		ryu build script 0.46s
16		unicode-width 0.12s
17		same-file 0.22s
18		fnv 0.12s
19		serde_json build script 0.52s
20		once_cell 0.32s
21		crossbeam-utils build script 0.31s
22		termcolor 0.56s
23		itoa 0.21s
24		bytecount 0.3s
25		strsim 0.48s
26		base64 0.57s
27		textwrap 0.47s
28		walkdir 0.49s
29		thread_local 0.38s
30		encoding_rs build script (run) 0.02s
31		encoding_rs 1.48s



#### Parallel execution 2: back-end

Thread: " opt webrende Process:	'GeckoMain" (1496518) "default" (1496518)
opt webrender.6	
rustc	

opt webrende Process:	GeckoMain" (1496518) "default" (1496518)	
opt webrender.6		
opt webrender.6	Front-end ←	→ Back-end
opt webrender.6		
rustc		

### Parallel execution 3: front-end

```
$ cat config.toml
[rust]
parallel-compiler = true
```

\$ rustc +nightly -Zthreads=4

### Operations

```
join parallel par_iter par for each
```

# Types

Type	Parallel	Serial
Lrc <t></t>	sync::Arc <t></t>	rc::Rc <t></t>
Lock <t> RwLock<t></t></t>	parking_lot::Mutex <t>   parking_lot::RwLock<t></t></t>	RefCell <t>   RefCell<t>  </t></t>
AtomicBool AtomicU32	sync::atomic::AtomicBool   sync::atomic::AtomicU32	Cell Cell <u32></u32>
   ParallelIterator	   rayon::iter::ParallelIterator	   Iterator

## Shipping strategy

#### 0. Serial front-end

- 1. Parallel front-end, single-threaded by default
- 2. Parallel front-end, multi-threaded by default

### Performance tracking

Benchmark	Profile	Scenario	% Change
ripgrep-13.0.0	doc	full	-5.10%
ripgrep-13.0.0	opt	full	-4.14%
ripgrep-13.0.0	opt	incr-unchanged	-2.56%
ripgrep-13.0.0	opt	incr-full	-2.39%
ripgrep-13.0.0	debug	incr-patched: println	-1.91%
ripgrep-13.0.0	debug	incr-unchanged	-1.67%
ripgrep-13.0.0	opt	incr-patched: println	-1.04%
ripgrep-13.0.0	check	full	0.55%
ripgrep-13.0.0	debug	incr-full	-0.34%
ripgrep-13.0.0	check	incr-patched: println	0.25%
ripgrep-13.0.0	debug	full	-0.22%
ripgrep-13.0.0	check	incr-full	-0.21%
ripgrep-13.0.0	check	incr-unchanged	-0.07%

# Profiles Scenarios -Zthreads (1, 2, 4, ...?)

#### walltime

VS

instructions executed

### Conclusion