

WebAssembly Reproducibility

- Because the WebAssembly format is platform-neutral, one single binary can be compiled and then executed on a variety of operating systems and architectures.
 - Website
- By design, very limited places where non-determinism is allowed: Website

Docker inconsistencies

Hardware floating point

Binary-level differences

The same software can give different binary output depending on the type of hardware (e.g. ARM vs x86_64 vs RISC)

```
> solve(matrix(c(
  1,  3,  11,  0,  -11, -15,
  18, 55, 209, 15, -198, -277,
  -23, -33, 144, 532, 259, 82,
  9, 55, 405, 437, -100, -285,
  3, -4, -111, -180, 39, 219,
  -13, -9, 202, 346, 401, 253
), nrow=6, byrow = TRUE))[[1]]
[1] 2850763023
> █
```

```
> solve(matrix(c(
  1,  3,  11,  0,  -11, -15,
  18, 55, 209, 15, -198, -277,
  -23, -33, 144, 532, 259, 82,
  9, 55, 405, 437, -100, -285,
  3, -4, -111, -180, 39, 219,
  -13, -9, 202, 346, 401, 253
), nrow=6, byrow = TRUE))[[1]]
[1] 2850763015
> █
```

```
> solve(matrix(c(
+ 1,  3,  11,  0,  -11, -15,
+ 18, 55, 209, 15, -198, -277,
+ -23, -33, 144, 532, 259, 82,
+ 9, 55, 405, 437, -100, -285,
+ 3, -4, -111, -180, 39, 219,
+ -13, -9, 202, 346, 401, 253
+ ), nrow=6, byrow = TRUE))[[1]]
[1] 2850763046
> █
```