Retrospective

Seven VM Engineering Years

Andres Valloud

A typical VM project

A typical VM project

"do something about 64 bits"

do something
about 64 bits

ImageWriter

do something

about 64 bits

image
format

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Serialization

ImageWriter

do something

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32 vs 64 bits

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FFI, types

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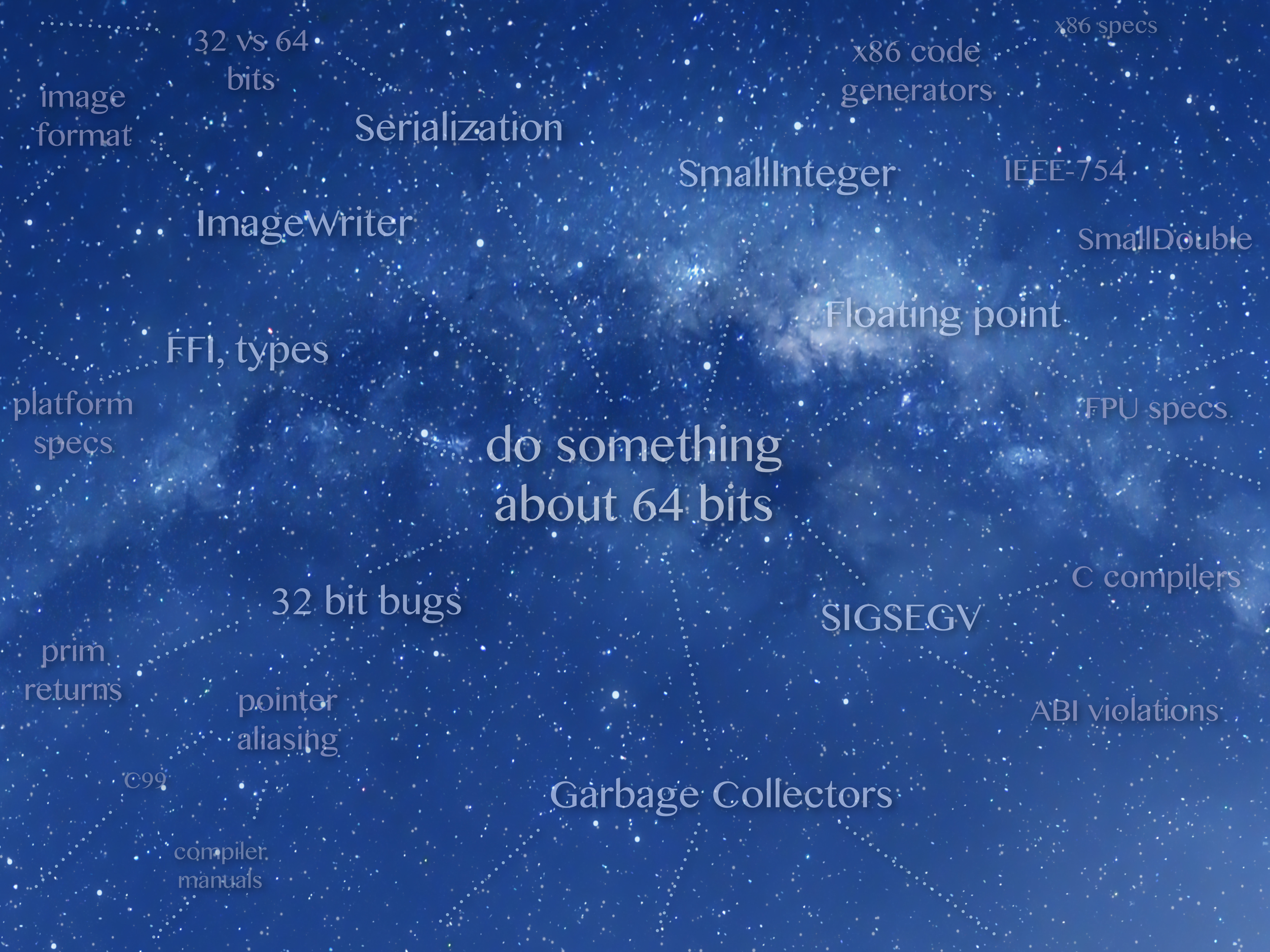
Garbage Collectors

SIGSEGV

C compilers

ABI violations


32 vs 64 bits
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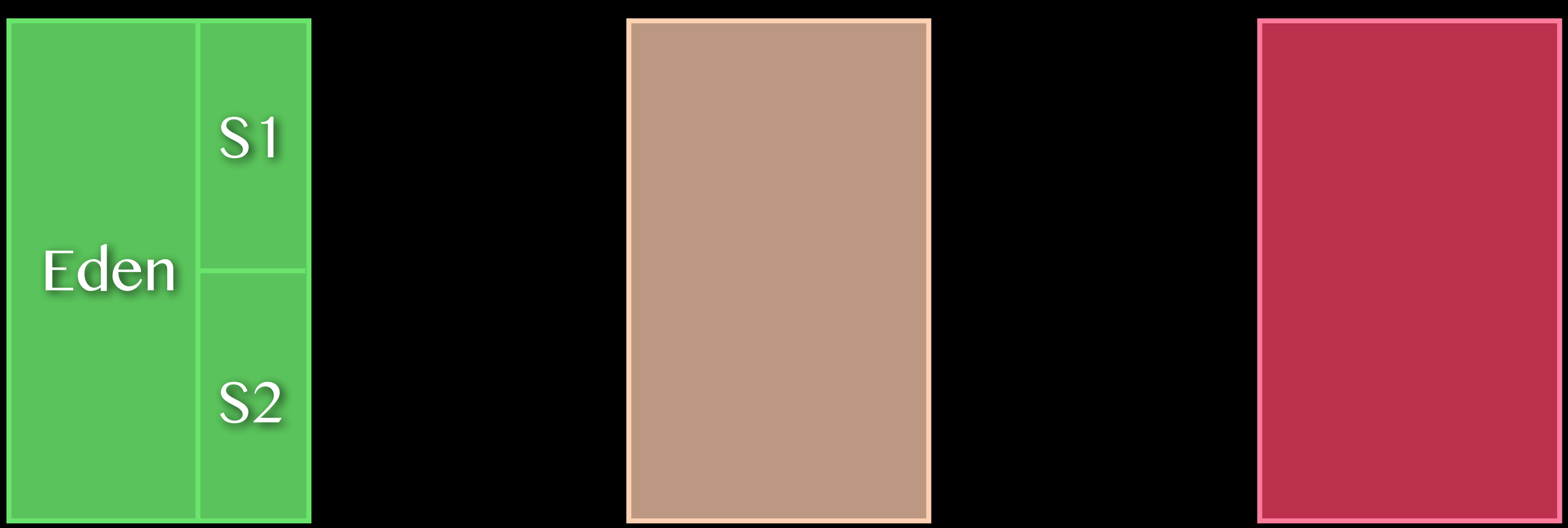
Speaking of GC

Speaking of GC

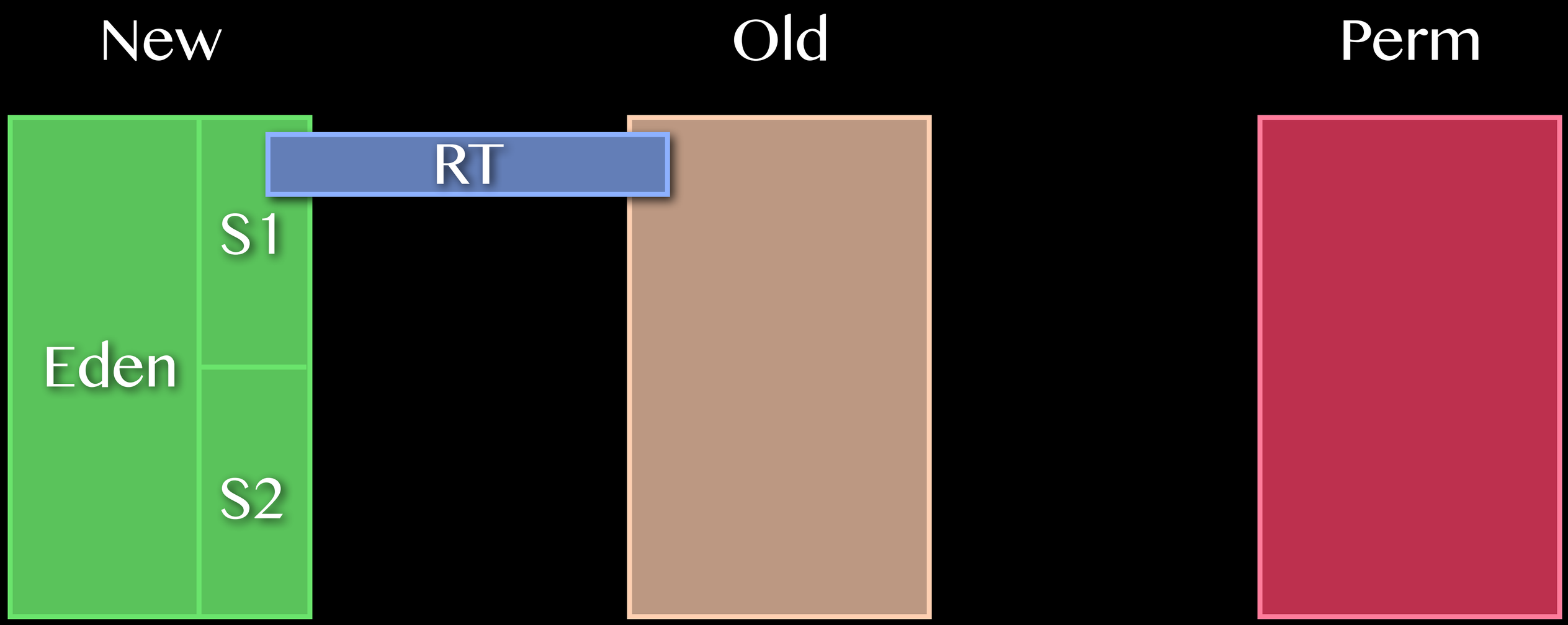
"every efficient GC is a hybrid of reference counting and tracing"

Reference counting and tracing

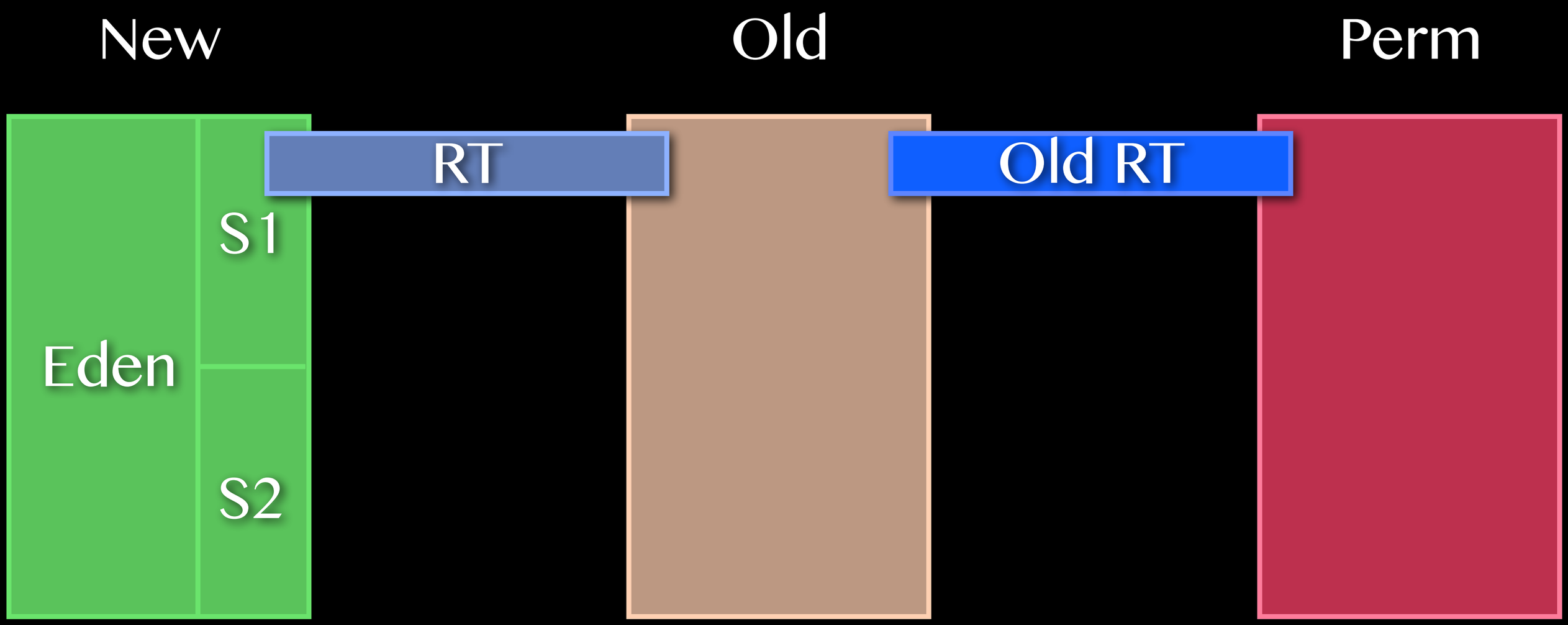
Reference counting and tracing



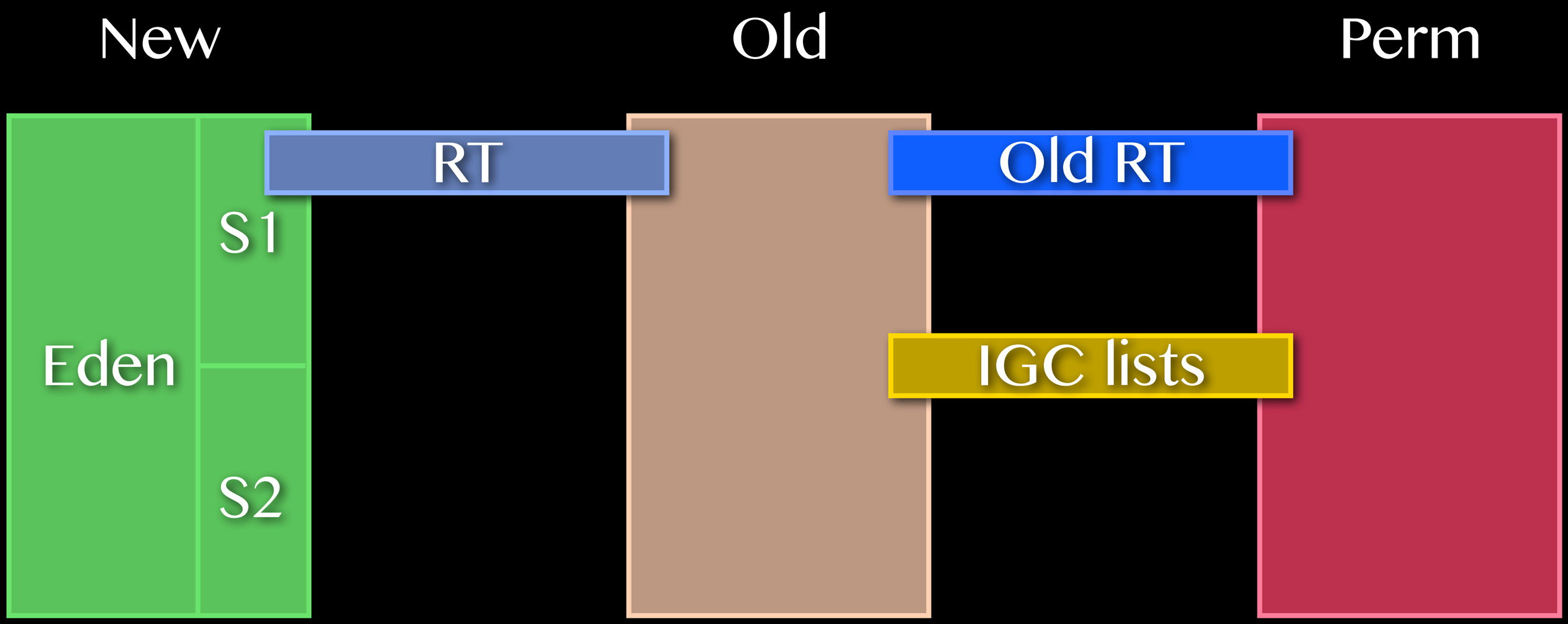
Reference counting and tracing



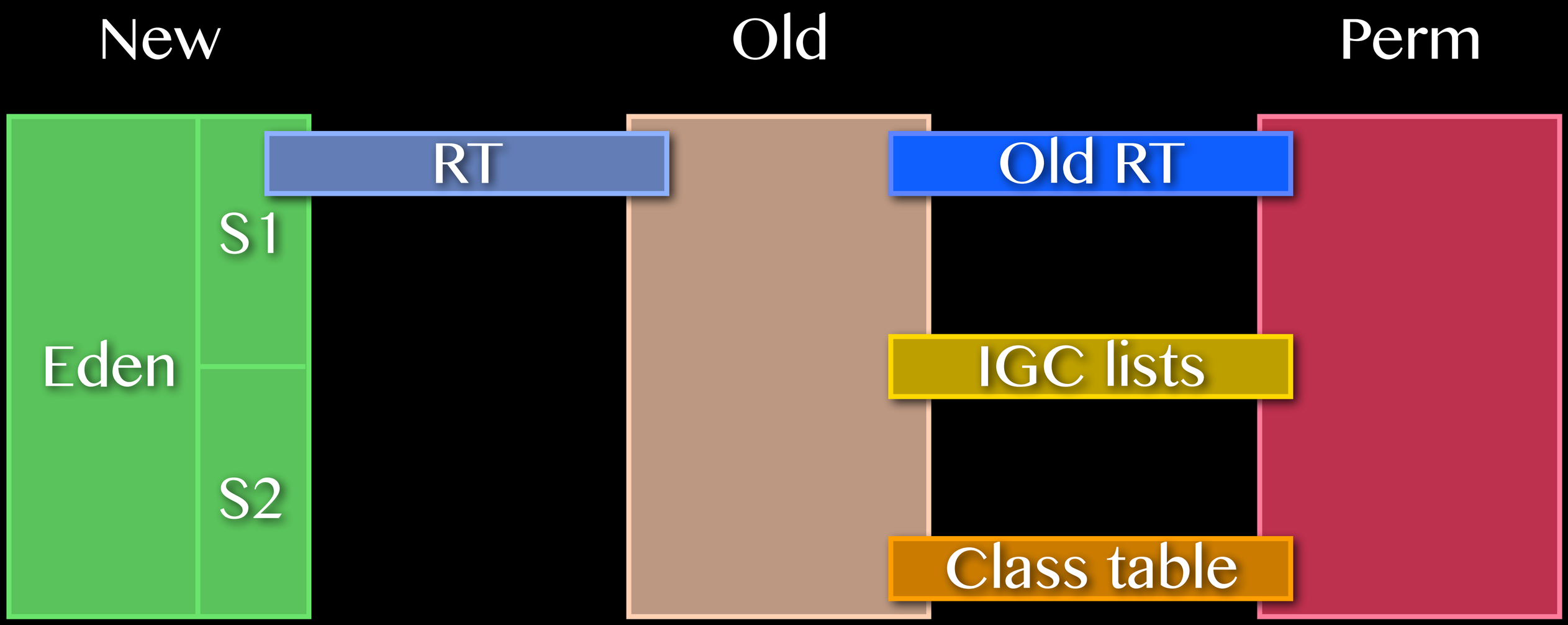
Reference counting and tracing



Reference counting and tracing



Reference counting and tracing



... problems...

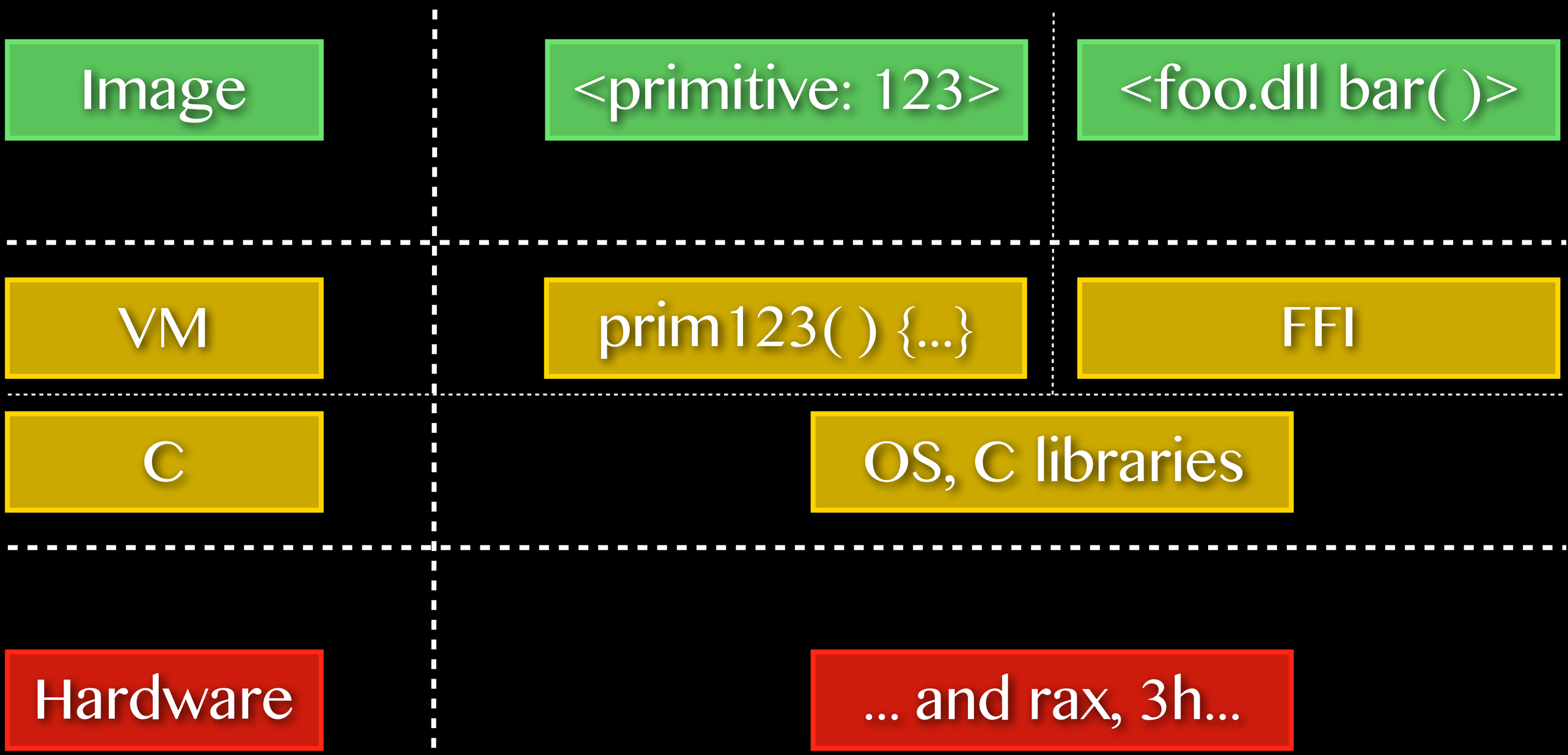


Image
<primitive: 123>
<foo.dll bar( )>
VM
prim123( ) {...}
FFI
C
OS, C libraries
Hardware
... and rax, 3h...

... problems...

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FFI
macros, GetLastError()

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OS, C libraries
port

Hardware

... and rax, 3h...

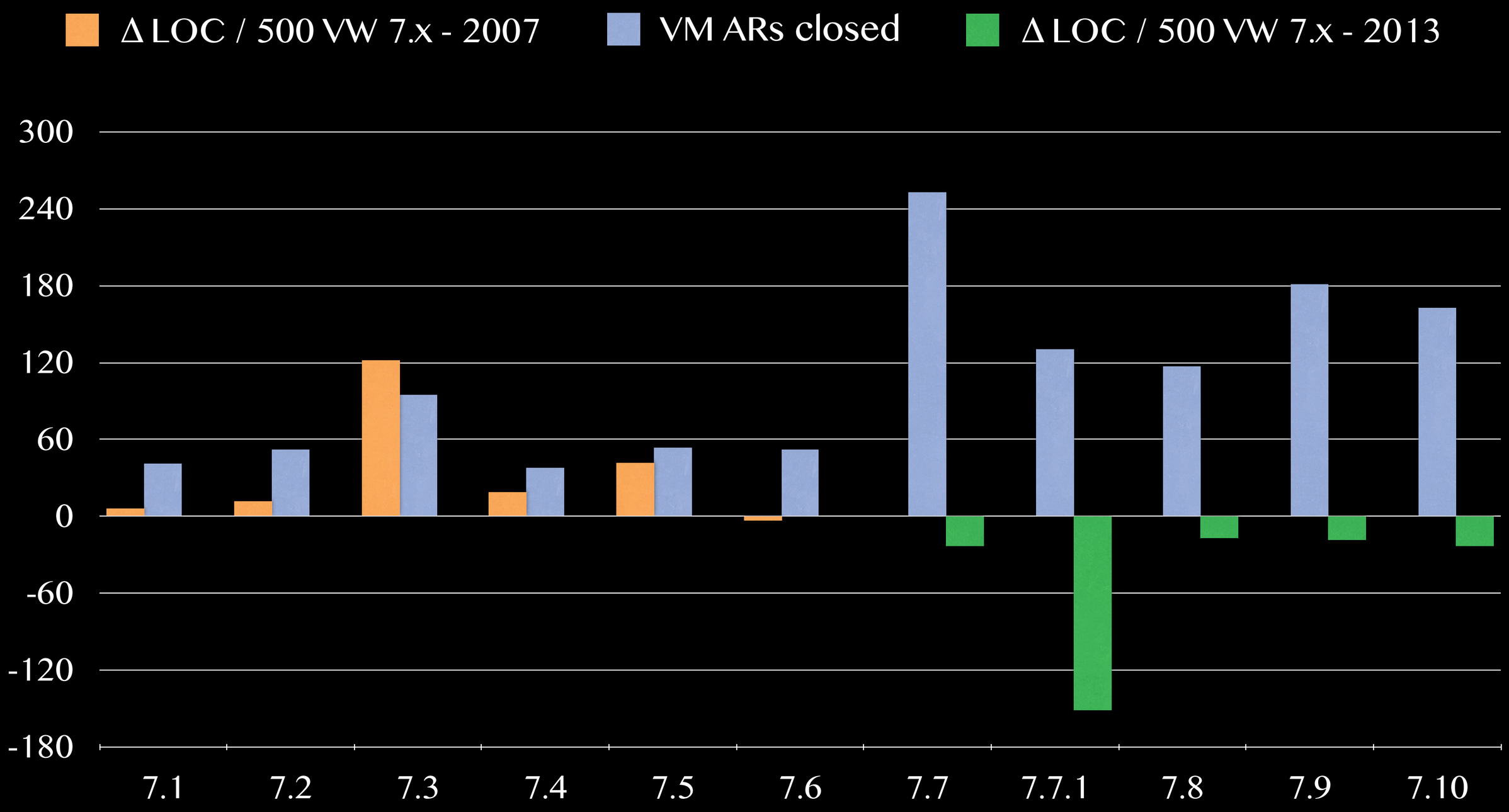
Long term vision

Long term vision

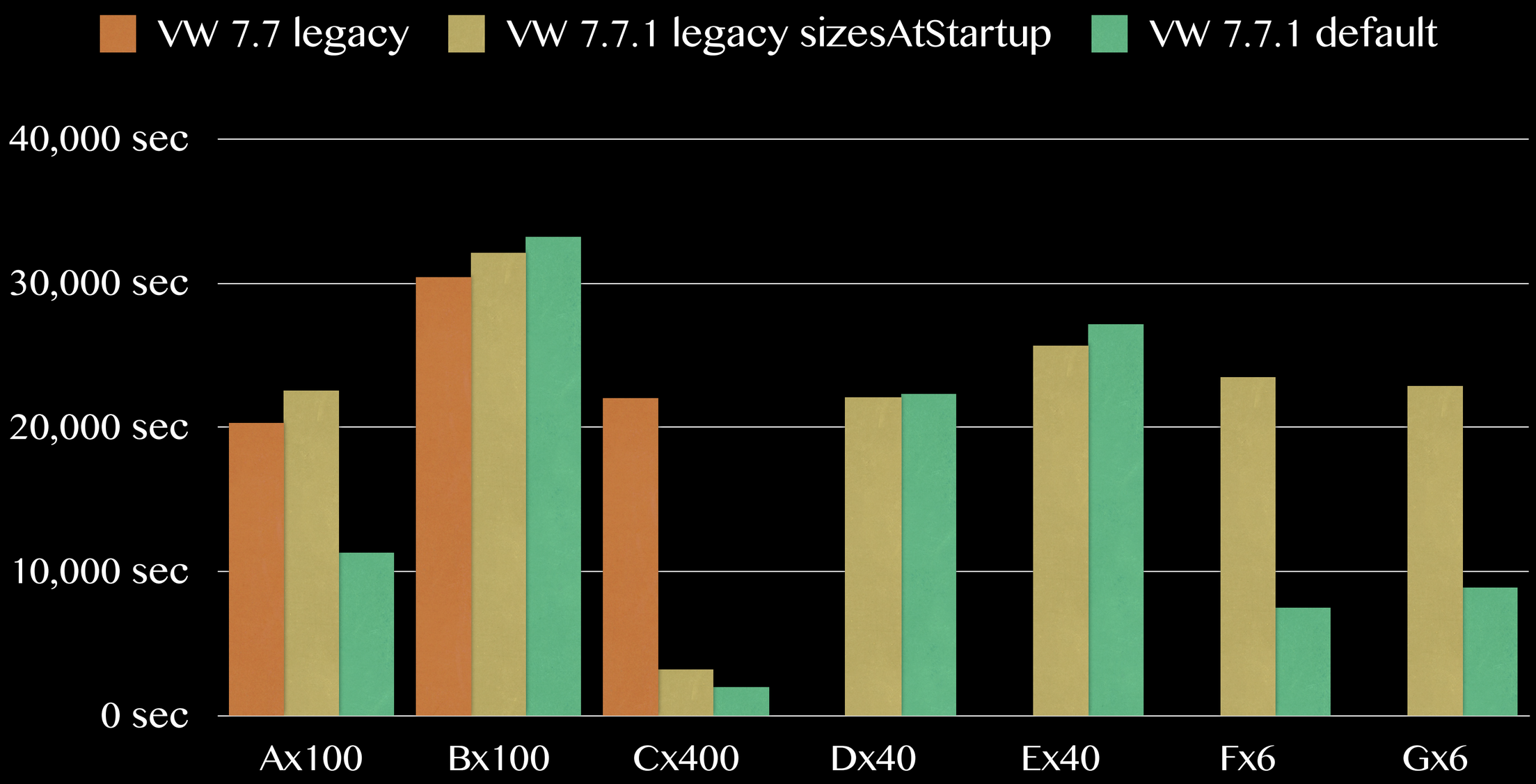
"an excess of code cruft is preventing us from doing our jobs"

LOC over time

Progress over time



GC improvements 2010

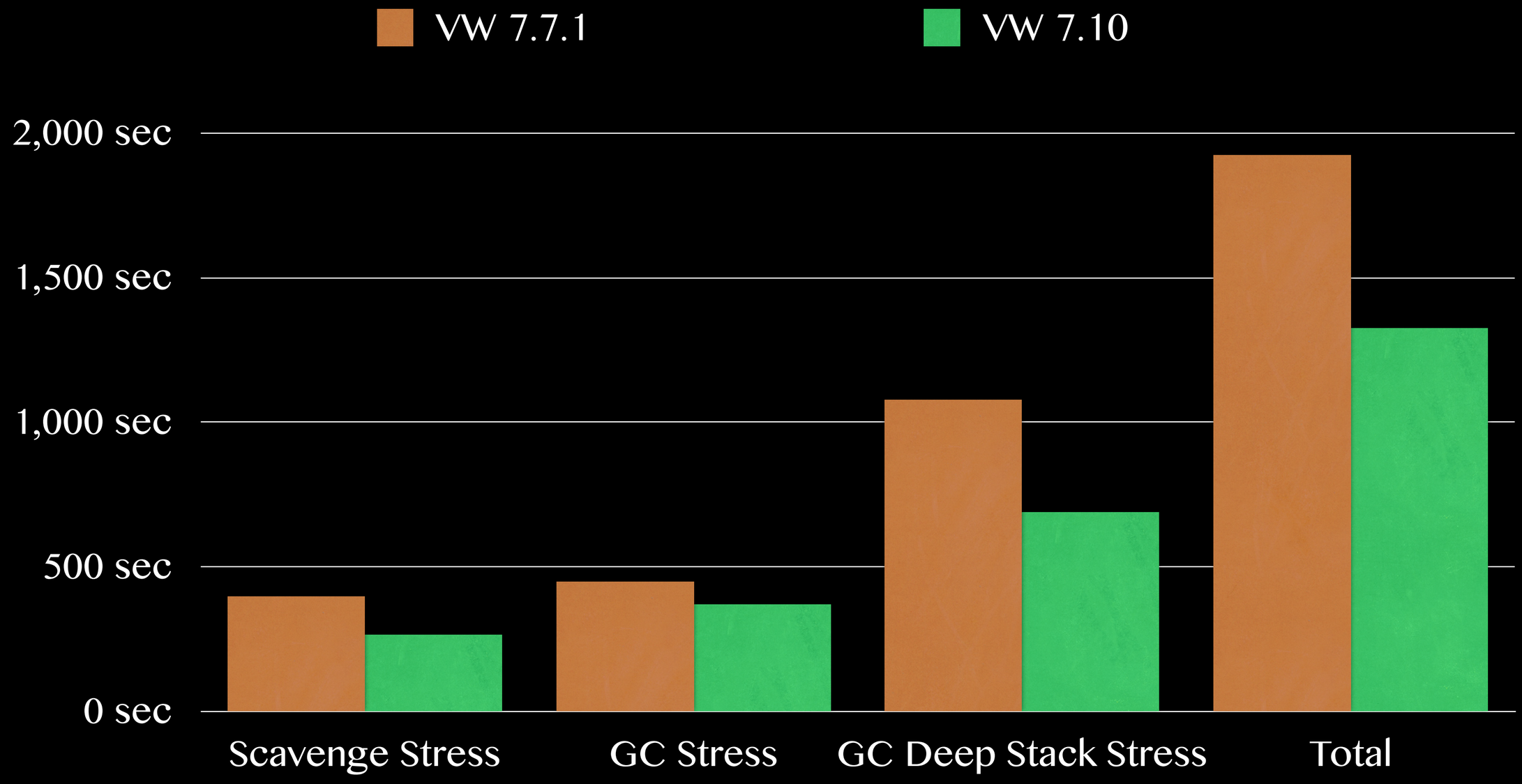


A: pointer garbage
B: byte garbage
C: point creation

Segmented container
D: byte allocation
E: pointer allocation

Large container
F: byte allocation
G: pointer allocation

GC improvements 2013



VW 7.10's GC ~45% faster than VW 7.7.1 overall

The message

The message

“pauca sed matura”