

A PEOPLE'S HISTORY OF THE RUBY GARBAGE COLLECTOR

@nateberkopec

民团结如一人试看天下谁能



BEGINNER-FRIENDLY

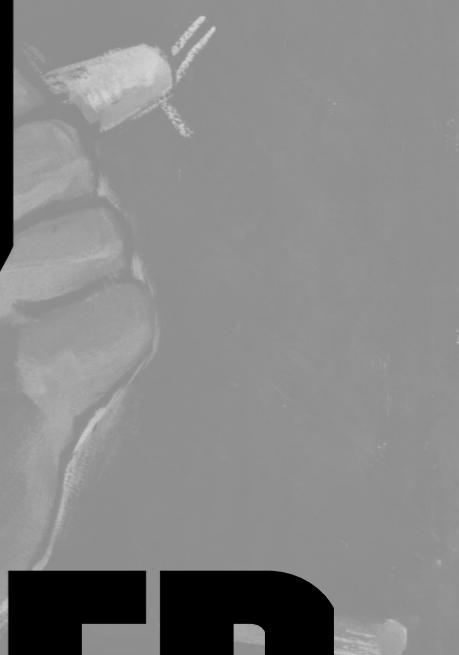
**HOW DO WE REDUCE
GC PAUSES?**

MARK AND SWEEP

800

MARK AND SWEEP

活的话
决心，
牺牲，
难胜天



**OBJECTSPACE
IS A LIST OF RVALUES**

rvalue-list of

FLAGS, SOME

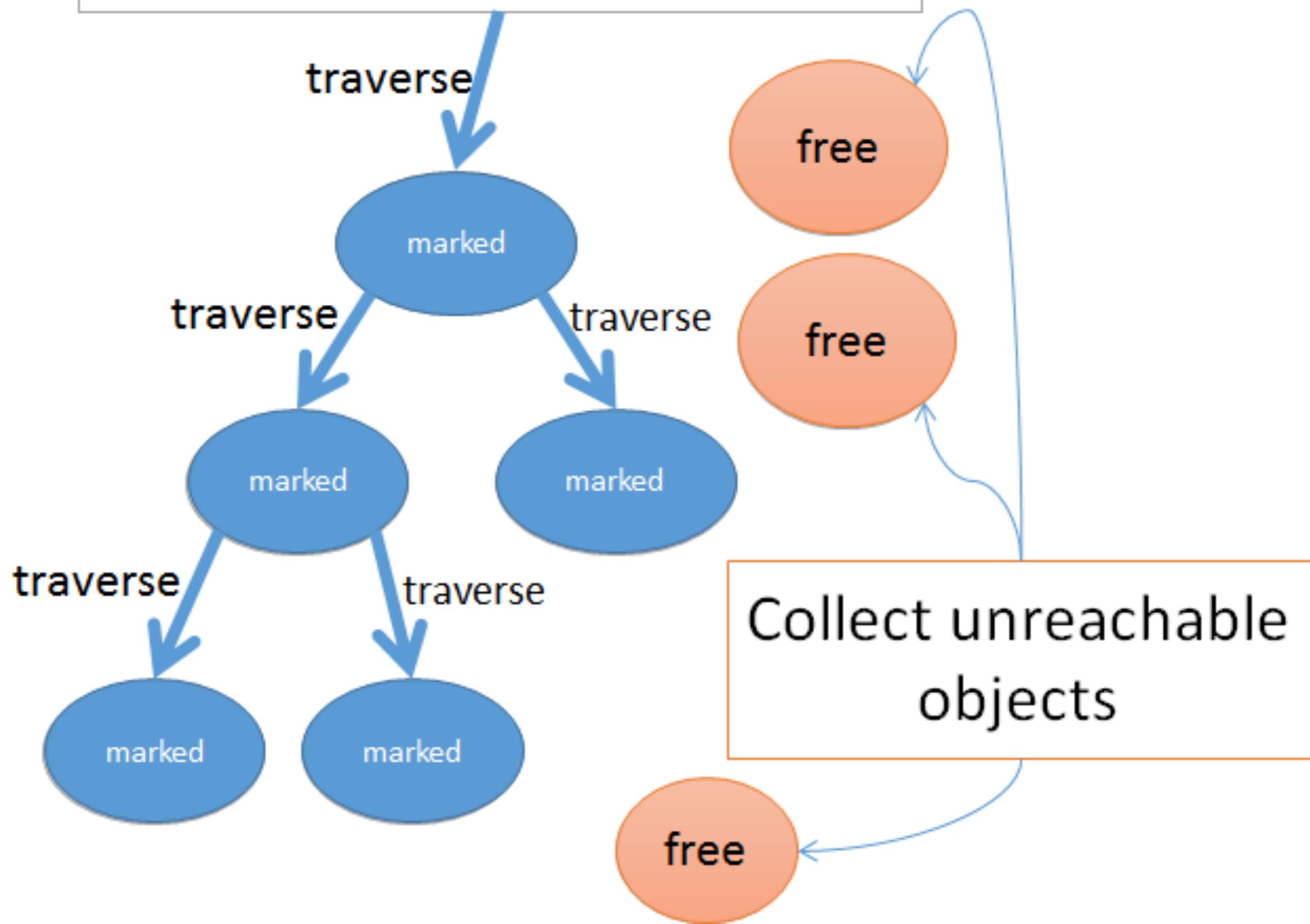
OBJECT INFO

**THE OBJECTSPACE IS
A LIST OF ~16KB PAGES OF ~400 RVALUES**

WHAT TRIGGERS GC?

**RUN OUT OF OPEN
SLOTS FOR NEW
RVALUES OR HIT
OFF-OBJECTSPACE
("MALLOC")
LIMITS**

Root objects



FILE MARK FLAG

MARK -> SWEEP -> MARK -> SWEEP

**NO RUBY
CAN BE EXECUTED**

1.8 PRET COPY ON WRITE

A Phusion project

全世界人民团结起来，打倒美帝！打倒苏修！打倒各国反动派！

香港浸會大學
HONG KONG BAPTIST UNIVERSITY
圖書館 LIBRARY

**FORKING
WEBSERVERS**

SHARED VS PRIVATE MEMORY

TOUCHING RValue

1993

LAZY SWEEP

BY NARIHIRO NAKAMURA

封書訓練林紅心赤邊系政七士席

**DON'T SWEEP
'TIL YOU NEED IT
OBJECT ALLOCATION**

**SWEEP UNTIL
FREE OBJECT IS FOUND**

**DECREASE
WORST-CASE TIMES**

MARK -> SWEEP -> SWEEP -> SWEEP -> MARK

2009

**BITMAP MARKING
BY NARIHIRO NAKAMURA**

**KEEP THE MARK BIT
SOMEWHERE ELSE!**

**THE BITMAP
SMALLER, EFFICIENT**

COPY ON WRITE FRIENDLY

YAY!

MARK -> SWEEP -> SWEEP -> SWEEP -> MARK

21
00

GENERATIONAL GC - RGENGC
BY KOICHI SASADA

**MARKED OBJECTS
ARE ALSO MARKED "OLD" (3 SURVIVALS)**

MINOR/MAJOR GCS

PROBLEM:
KEEPING TRACK OF NEW OBJECTS

**BLACK
GRAY
WHITE**

THE WRITE-BARRIER

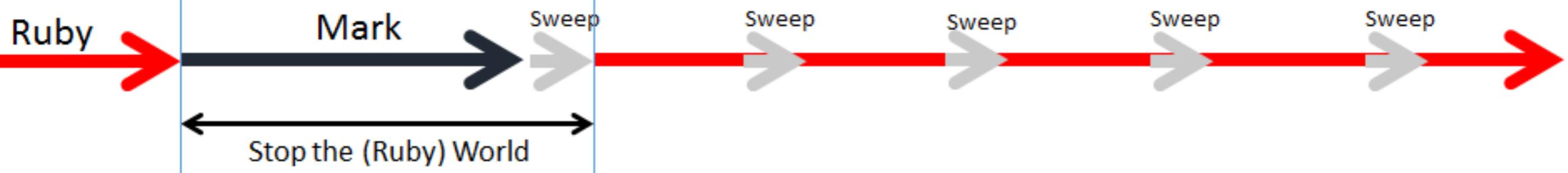
SUNNY/SHADY OBJECTS

WB PROTECTED/UNPROTECTED

**SHADY/UNPROTECTED OBJECTS
ARE NEVER "OLD"**

REMEMBERED SET

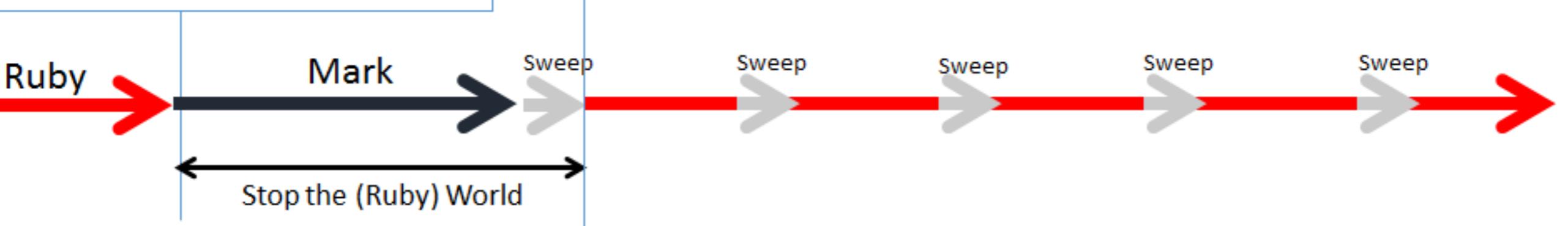
2.0.0 GC (M&S w/lazy sweep)



w/RGenGC (Minor GC)

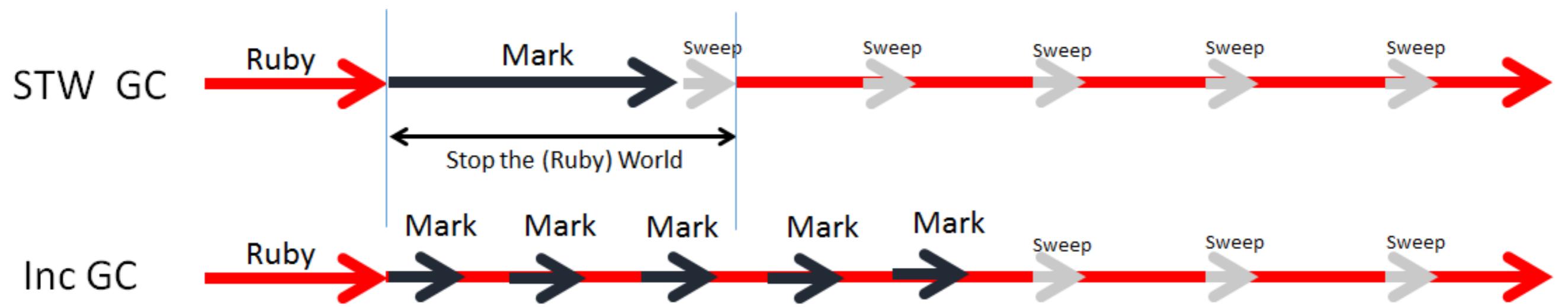


w/RGenGC (Major GC)



2020
10/10

INCREMENTAL GC
BY KOICHI SASADA



"INTERLEAVE" MAJOR GC

TOTAL GC TIME REMAINS SAME

O O B G C

NOT REALLY REQUIRED

**BLACK OBJECTS CAN
NOW REFER TO WHITE**

**WRITE BARRIER
TRACKS NEW OBJECTS**

GCASTAT

S Y M B O L G C

2013

**NEW WRITE
BARRIER**

**“WE CAN ASSUME
NEW OBJECTS
REFERRED FROM
OLD OBJECTS ARE
MAYBE LONG-
LIVED OLD
OBJECTS”**

DIDN'T WORK?

2014

MORE LITTLE CHANGES

СССР

БЕЗ ВІДНОВЛЕННЯ

FREE SLOT CONTROL



**THE FUTURE
COMPACTING GC**



JRUBY/TRUFFLE ALREADY DO THIS



AARON'S WORK

**OLD/NEW PAGES
IMPROVE COW PERFORMANCE**

GUILDS

MORE READING
PAT SHAUGHNESSY
KOICHI SASADA
SAM SAFFRON

350+ PAGES, 18+
HOURS OF VIDEO

RAILSSPEED.COM

What HTTP/2 Means for Ruby Developers

by **Nate Berkoperc** (@nateberkopec)



34 points on reddit



Summary: Full HTTP/2 support for Ruby web frameworks is a long way off - but that doesn't mean you can't benefit from HTTP/2 today! (*2112 words/11 minutes*)

HTTP/2 is coming! No, wait, HTTP/2 is here! After publication in Q1 of 2015, HTTP/2 is now an "official thing" in Web-land. As of writing (December 2015), caniuse.com estimates about 70% of browsers globally can now support HTTP/2. So, I can use HTTP/2 in my Ruby application *today*, right? After all, Google says that some pages can load up to 50% faster just by adding HTTP/2/SPDY support, it's magical web-speed pixie dust! Let's get it going!



Okay, way too much magical pixie dust.

SPEEDSHOP.CO

THANKS!

SLIDES AND NOTES ON TWITTER

@NATEBERKOPEC

SPEEDSHOP.CO & RAILSSPEED.COM

Tell me your problems !