

A PEOPLE'S HISTORY OF THE RUBY GARBAGE COLLECTOR

以毛泽东思想

宣传队

@nateberkopec

毛主席万万岁!

认真搞好斗批改。

民团结如一人 试看天下谁能

NOON

speedshop

BEGINNER-FRIENDLY

**HOW DO WE REDUCE
GC PAUSES?**

100

MARK AND SWEEP

请的话
决心，
牺牲，
万难，
胜利

**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

traverse

marked

free

traverse

traverse

free

marked

marked

traverse

traverse

marked

marked

Collect unreachable
objects

free

FL_MARK FLAG

MARK -> SWEEP -> MARK -> SWEEP

**NO RUBY
CAN BE EXECUTED**

1.8 REE 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!

HONG KONG BAPTIST UNIVERSITY

圖書館

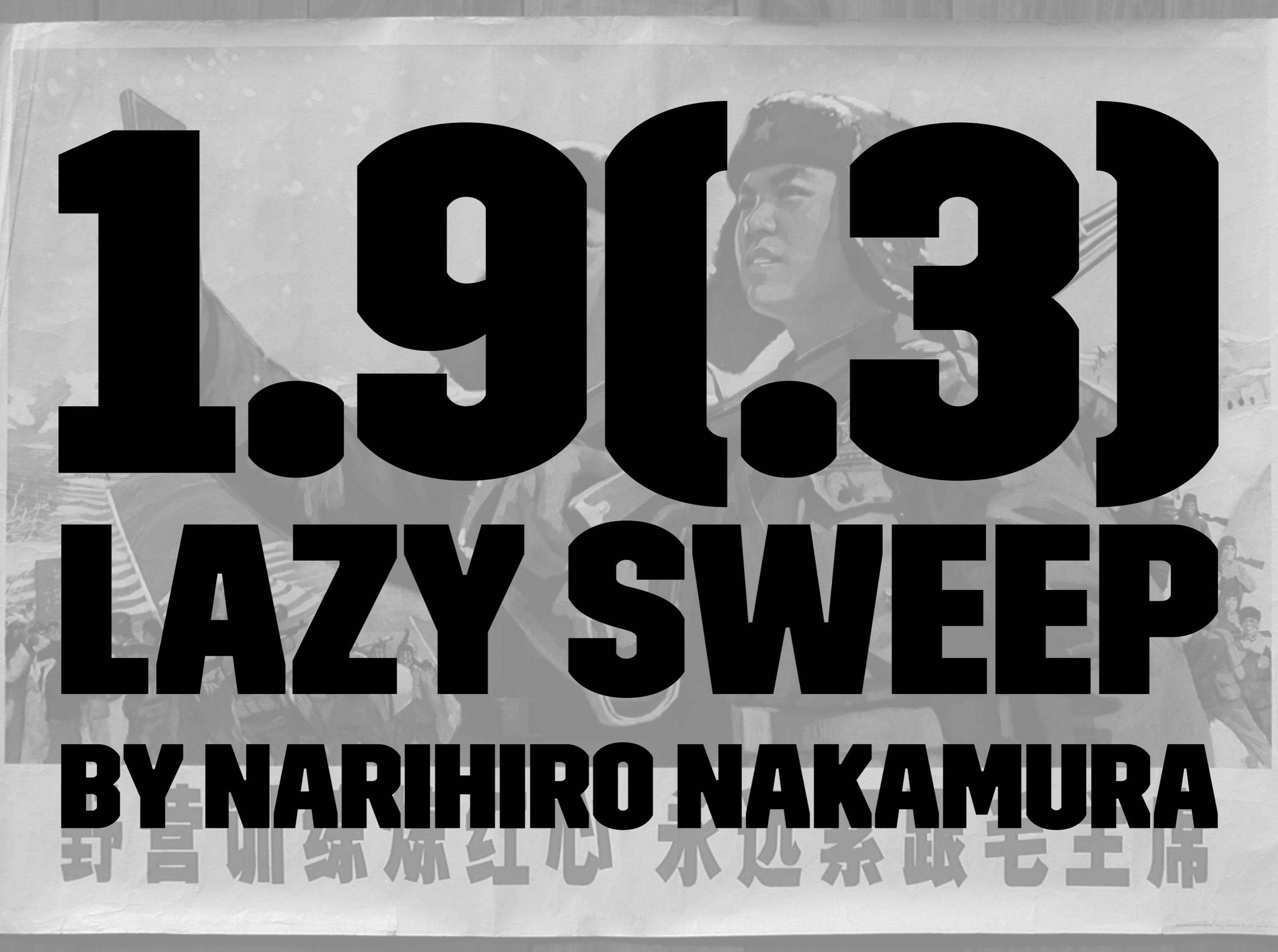
RAJAY

1991

**FORKING
WEBSERVERS**

**SHARED VS
PRIVATE MEMORY**

TOUCHING RVa1ue



1993

LAZY SWEEP

BY NARIHIRO NAKAMURA

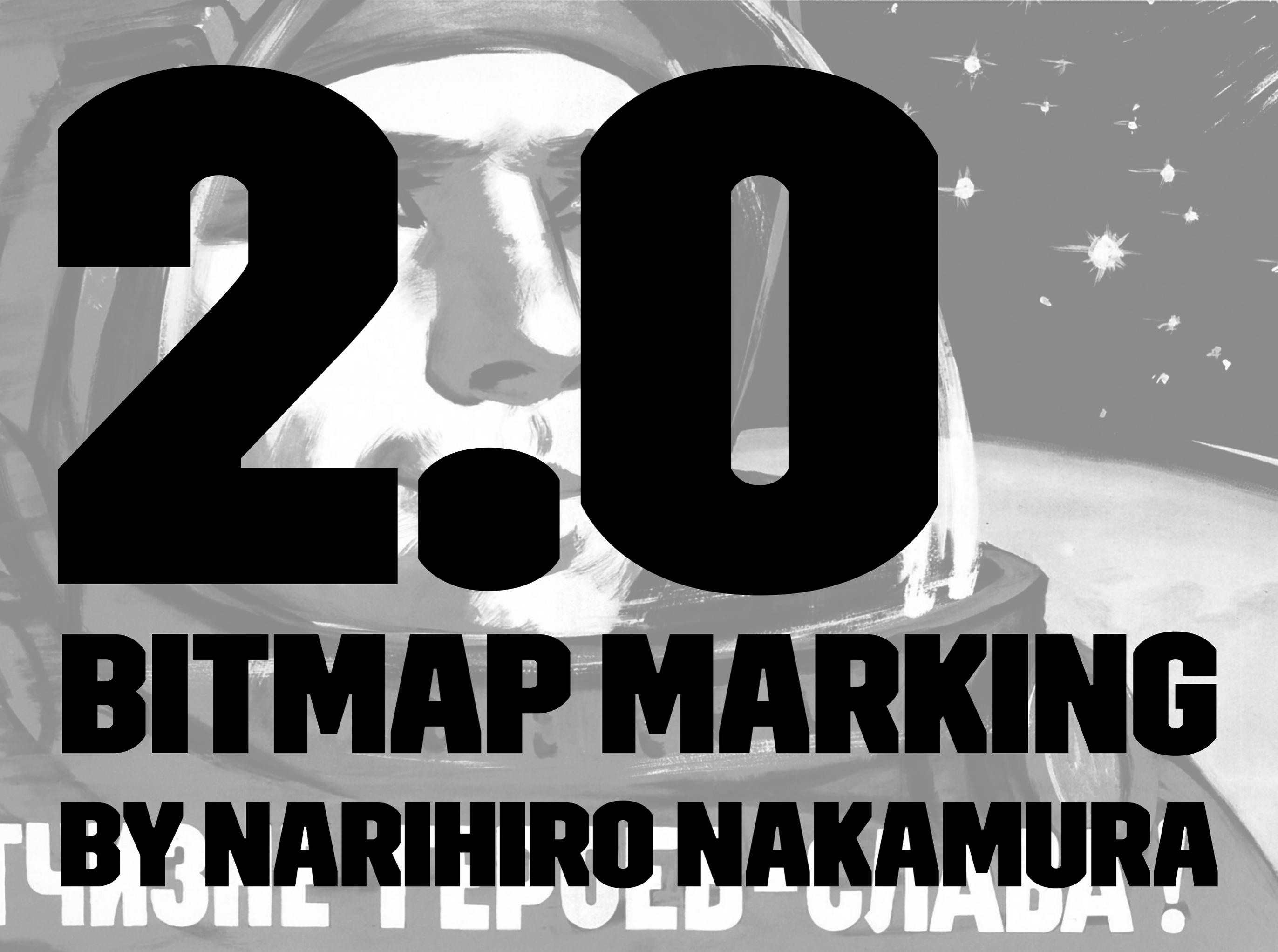
封昌训练所红心 亦达系越七土席

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

**SWEEP UNTIL
FREE OBJECT IS FOUND**

**DECREASE
WORST-CASE TIMES**

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



200

BITMAP MARKING

BY NARIHIRO NAKAMURA

**KEEP THE MARK BIT
SOMEWHERE ELSE!**

THE BITMAP
SMALLER, EFFICIENT

COPY ON WRITE FRIENDLY

WAY!

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



2011

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

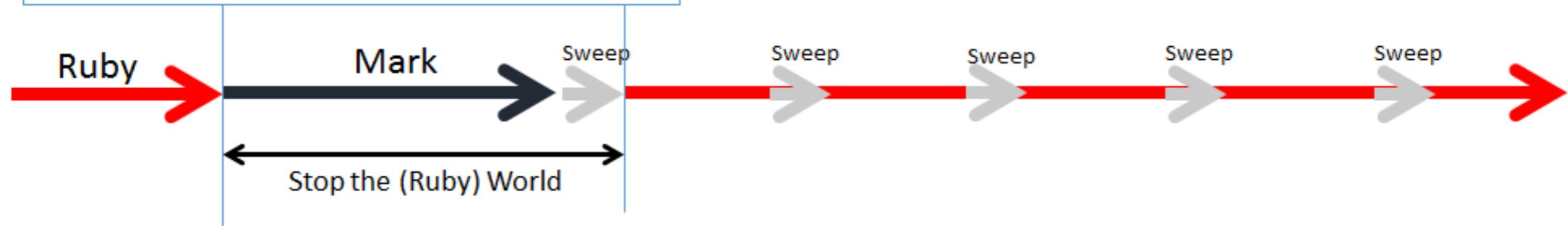
SUNNY/SHADY OBJECTS

WB PROTECTED/UNPROTECTED

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

REMEMBERED SET

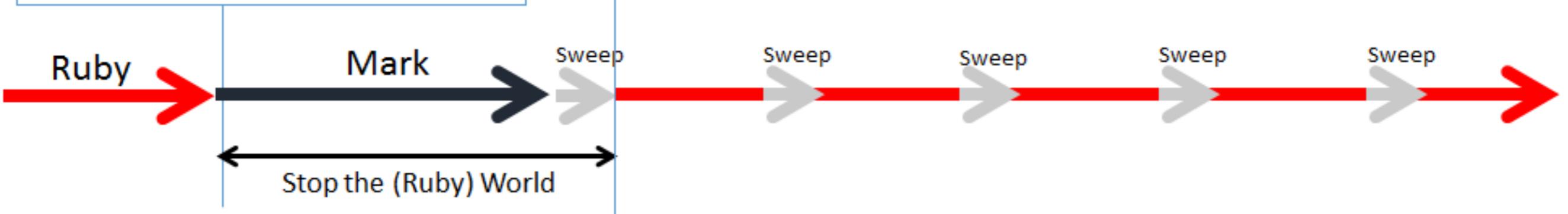
2.0.0 GC (M&S w/lazy sweep)



w/RGenGC (Minor GC)



w/RGenGC (Major GC)



2022

INCREMENTAL GC

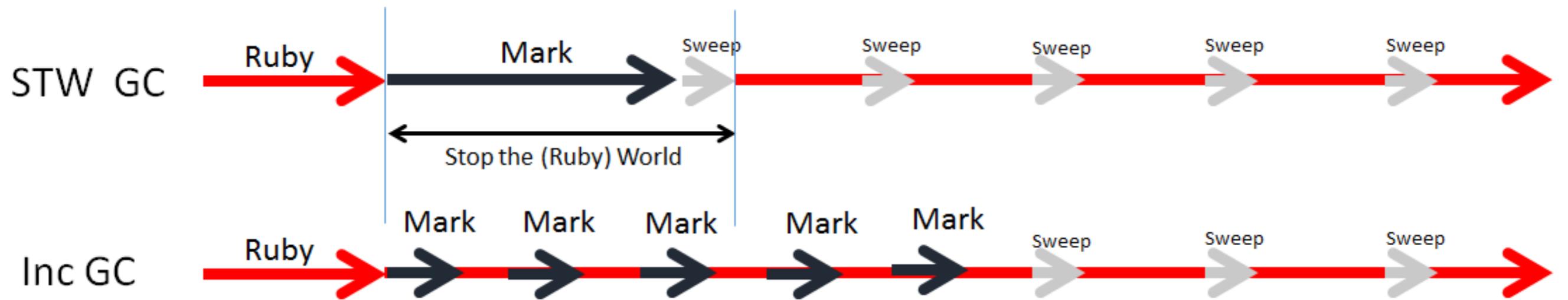
BY KOICHI SASADA

1941

Malharan

БОЛЬШЕ БО
МЛА-
ОРУЖИЯ!





"INTERLEAVE" MAJOR GC

TOTAL GC TIME REMAINS SAME

OOBGGC

NOT REALLY REQUIRED

**BLACK OBJECTS CAN
NOW REFER TO WHITE**

WRITE BARRIER
TRACKS NEW OBJECTS

GG.STAT

SYMBOL GC

403

**NEW WRITE
BARRIER**



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

DIDN'T WORK?



2044

**MORE LITTLE
CHANGES**

ЕЩЕ ТЕРПОЕВ



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 Berkopec (@nateberkopec)

 Tweet  34 points on reddit  13

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!