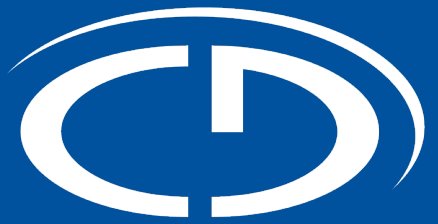
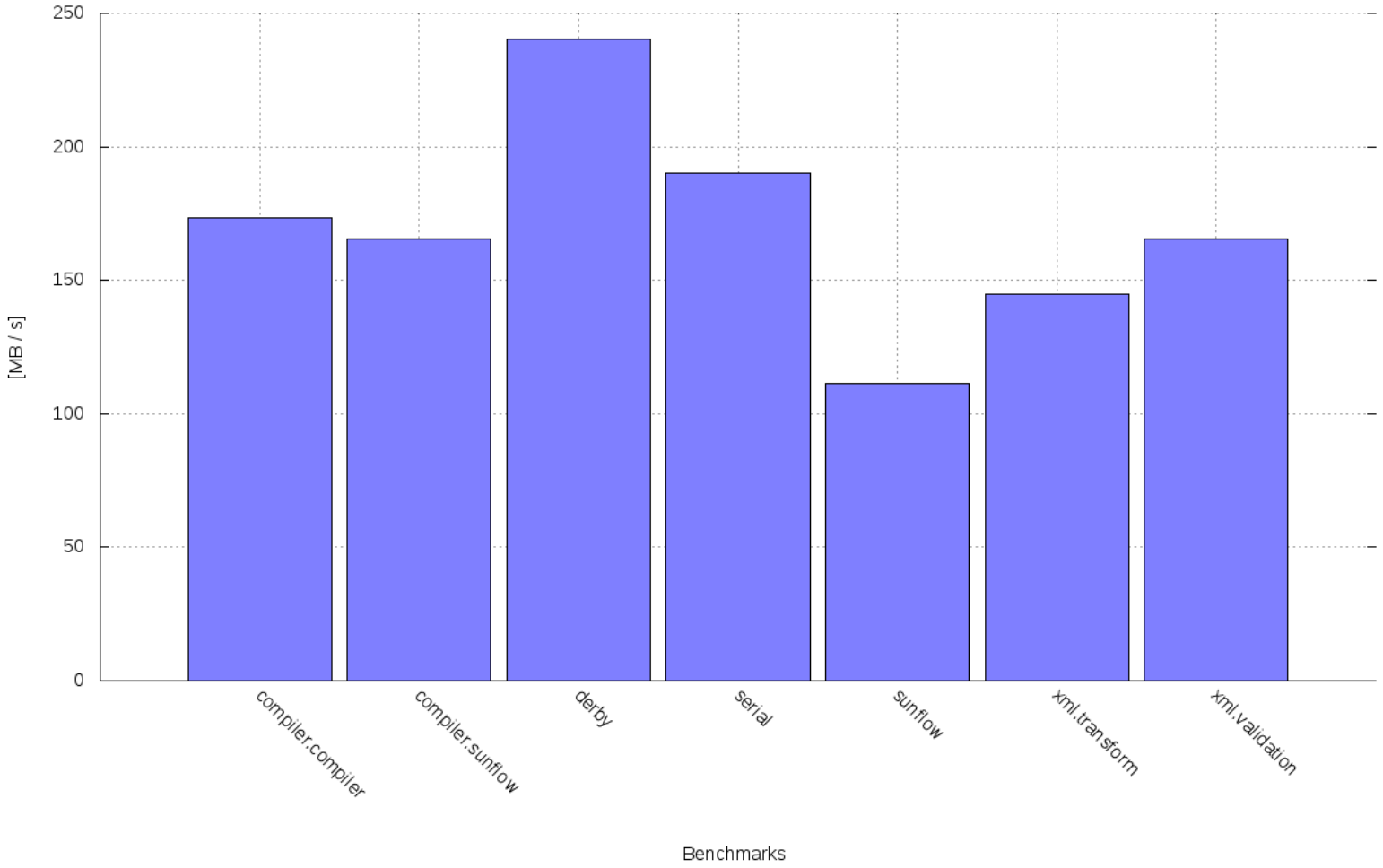


Continuous Monitoring

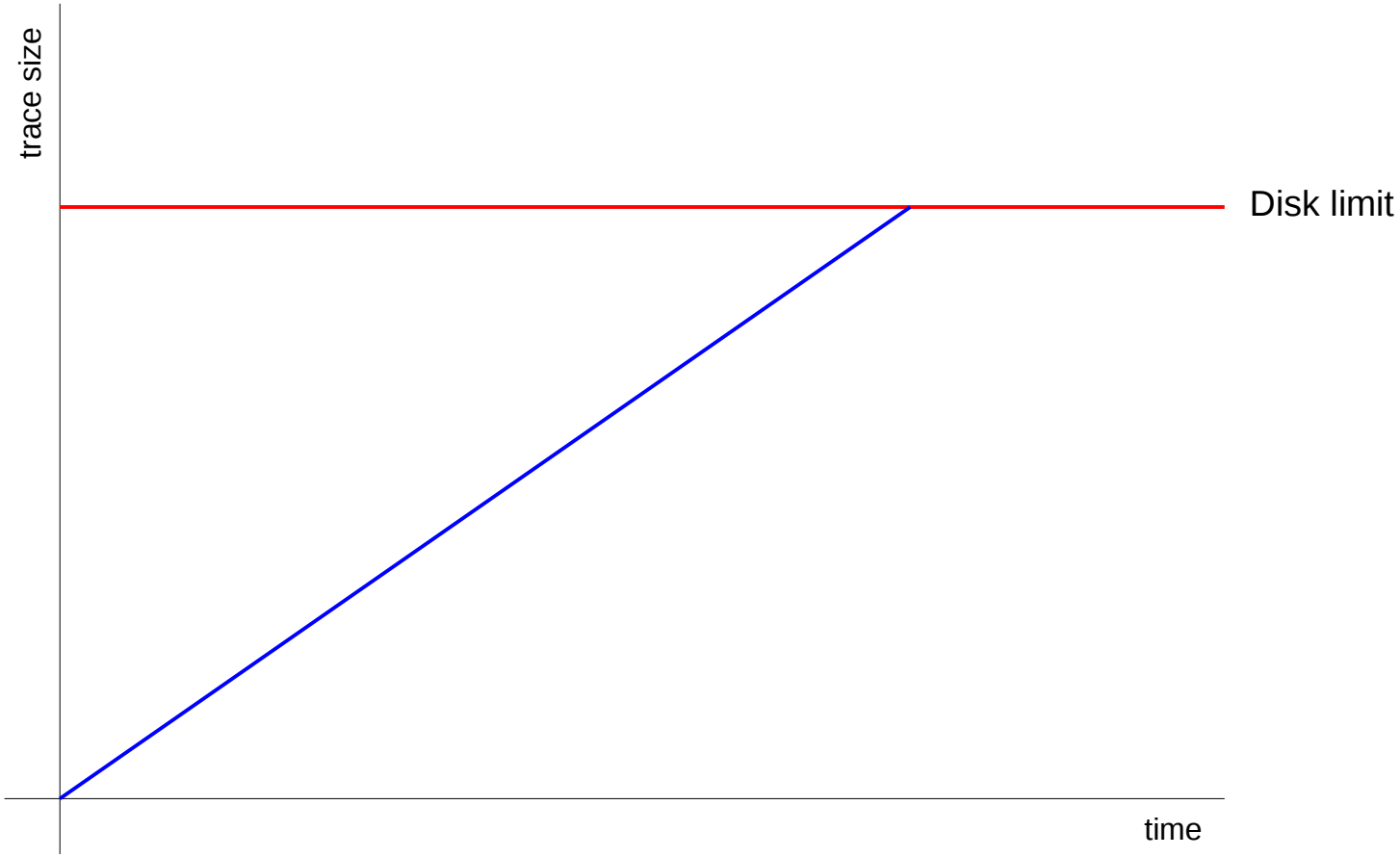
Verena Bitto
Philipp Lengauer

2016-03-13

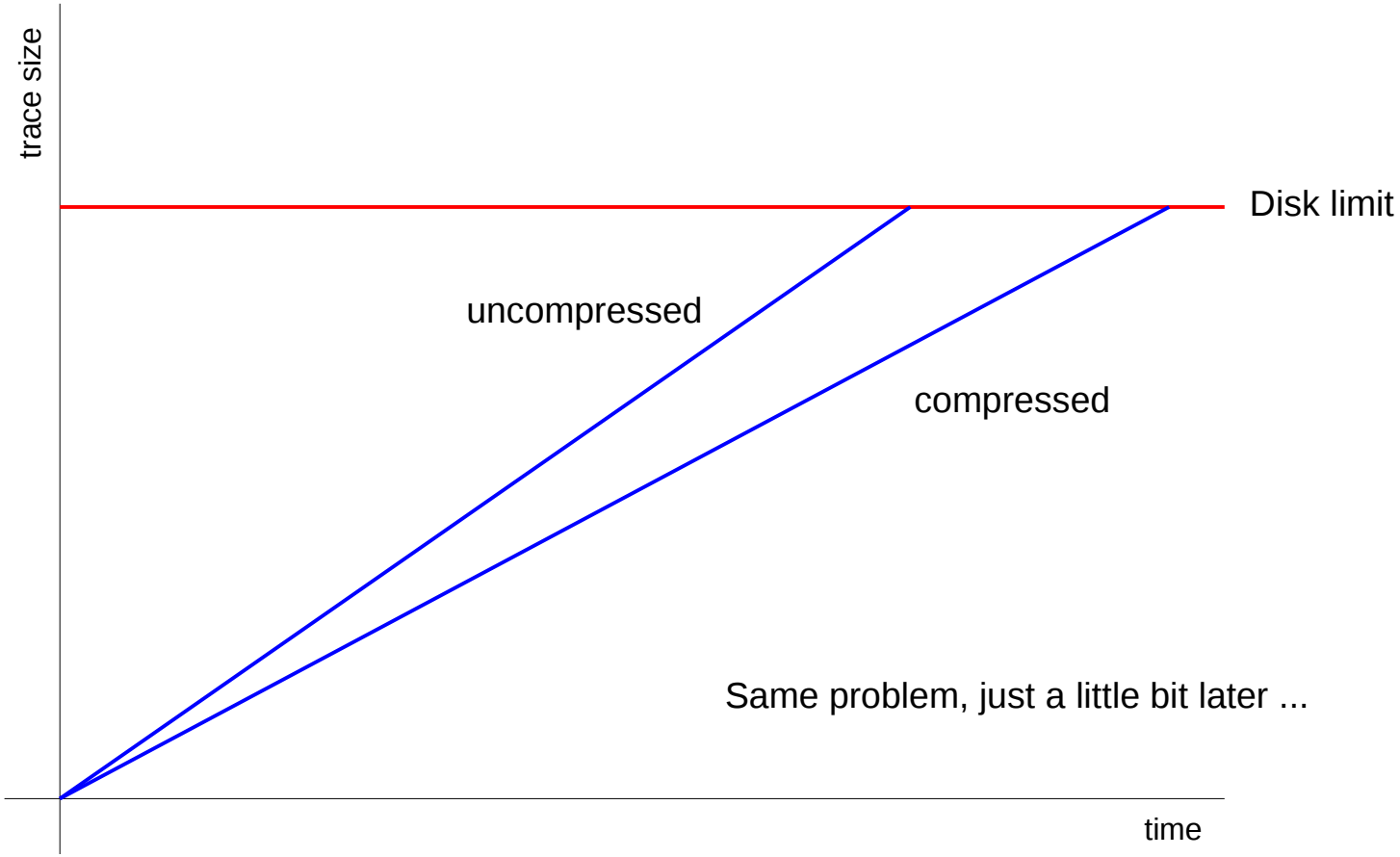
Trace Growth



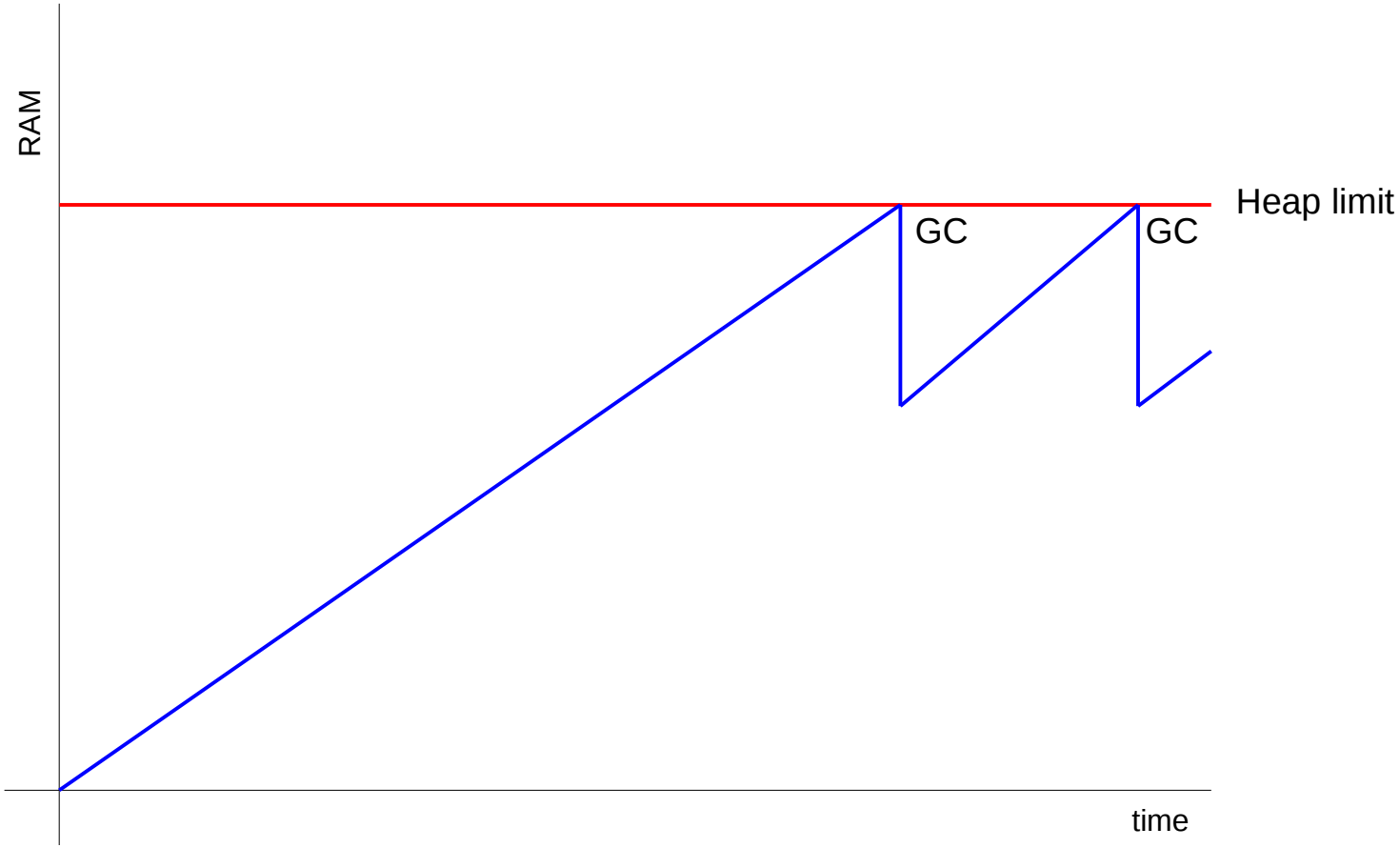
Trace Size vs Disk Limit



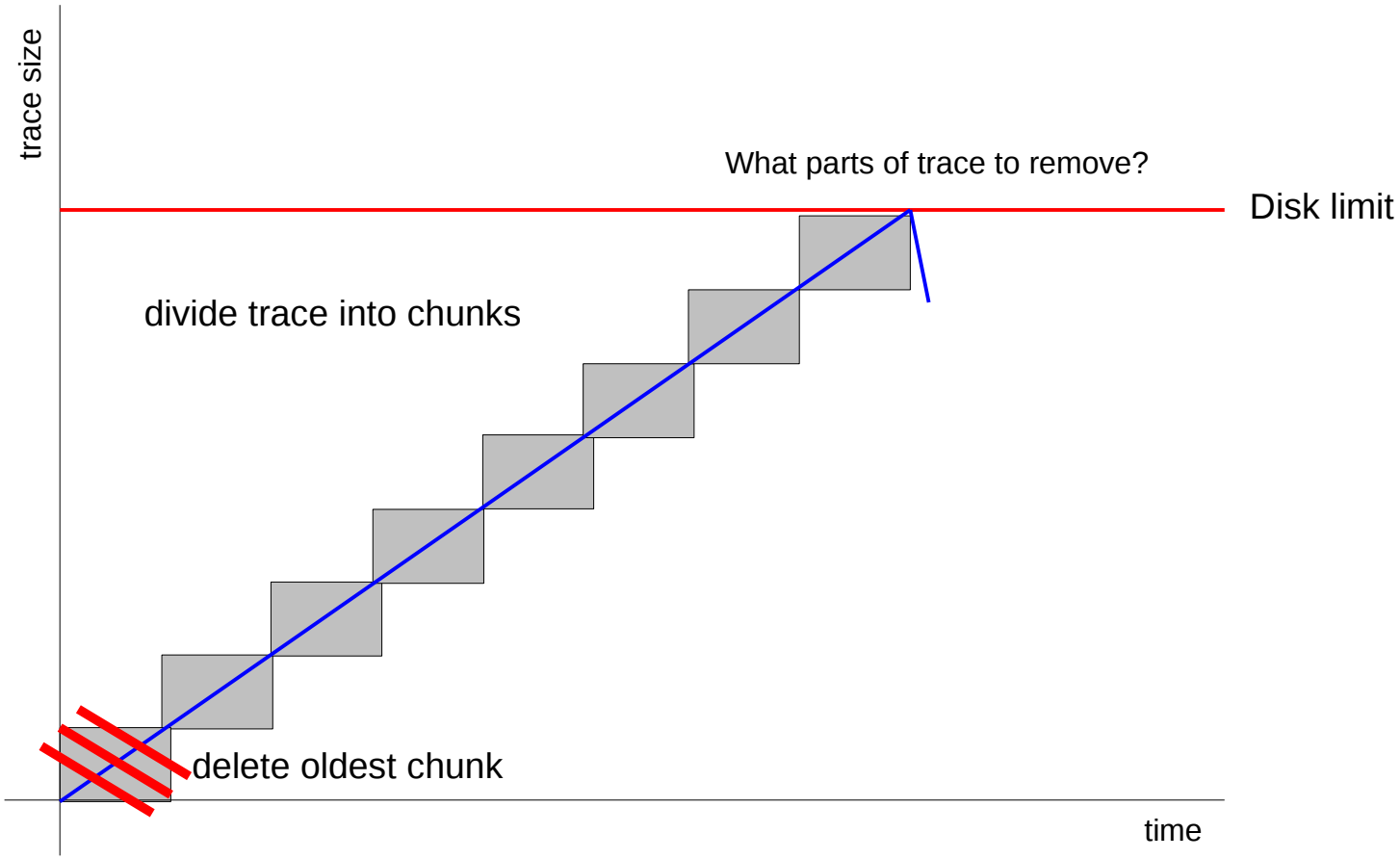
Compression



Similar Problem: Objects vs Heap Size

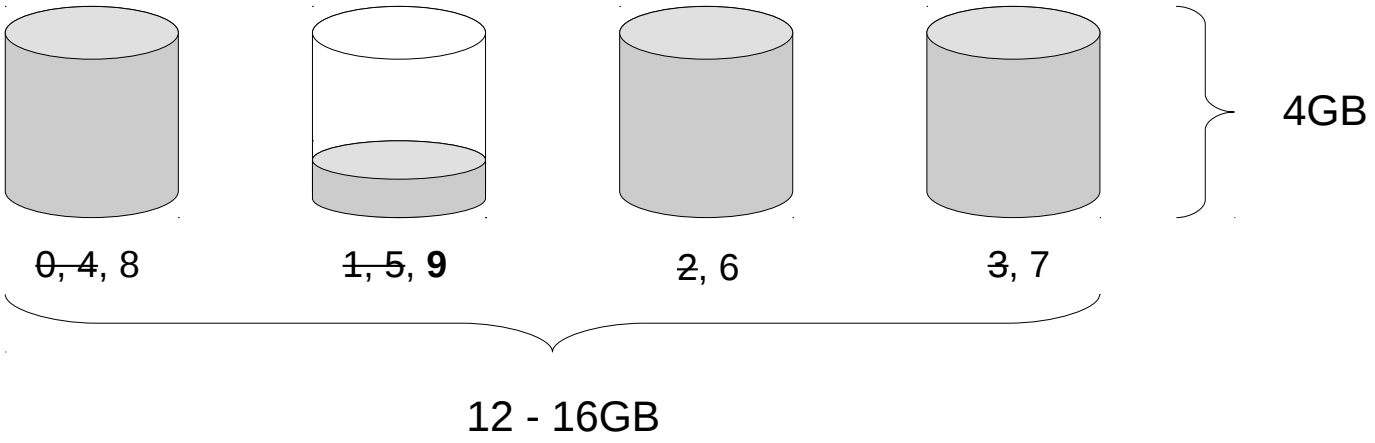


Rethink Trace Size vs Disk Limit



Rotation

Split trace into n files, overwrite oldest file first.



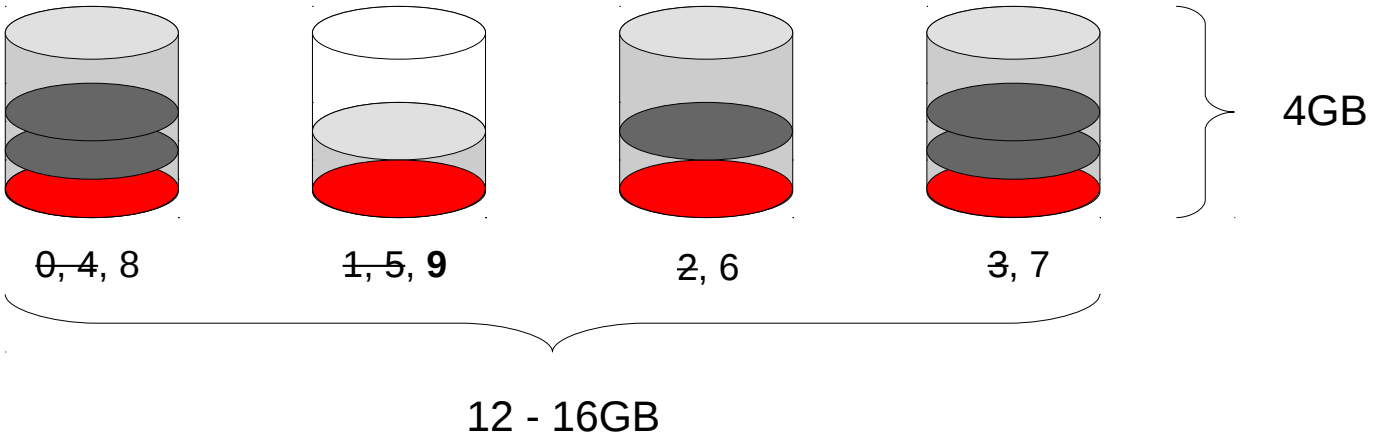
Every trace file may be eventually be the oldest.

What is the state of the heap at the beginning of the oldest file?

Need-to-know

Synchronization Points

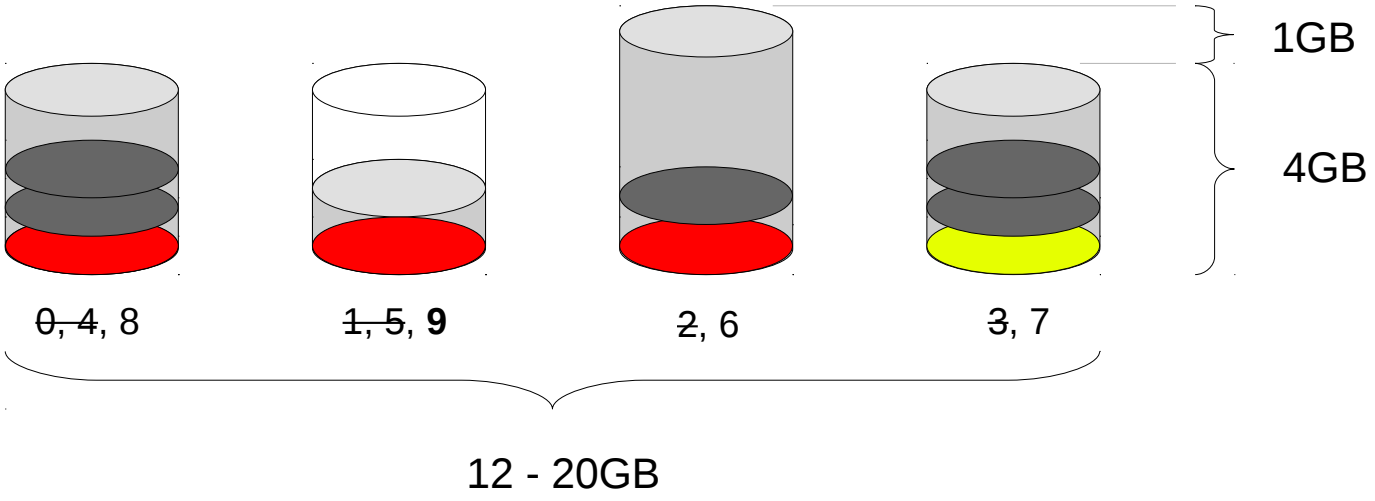
Use GCs as synchronization points



What if no GC occurs at the right point?

Trace Size Deviation

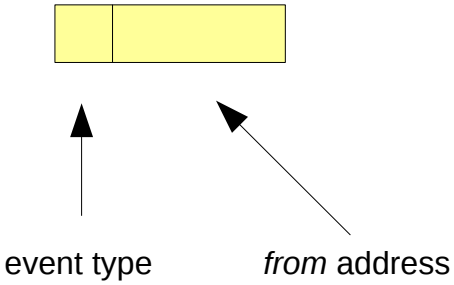
Trigger “**Emergency GCs**” after max deviation is reached.



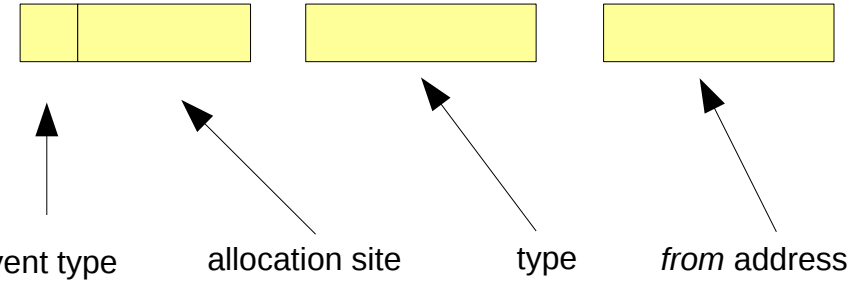

```
MaxSize=16GB Deviation=25%


file count = 100% / Deviation
target file size = MaxSize * Deviation
max file size = file size + file size * Deviation
```

Synchronization GC

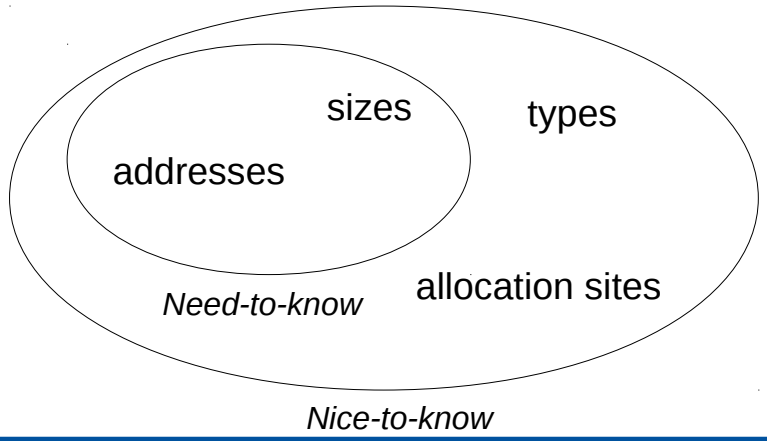
Optimized move event



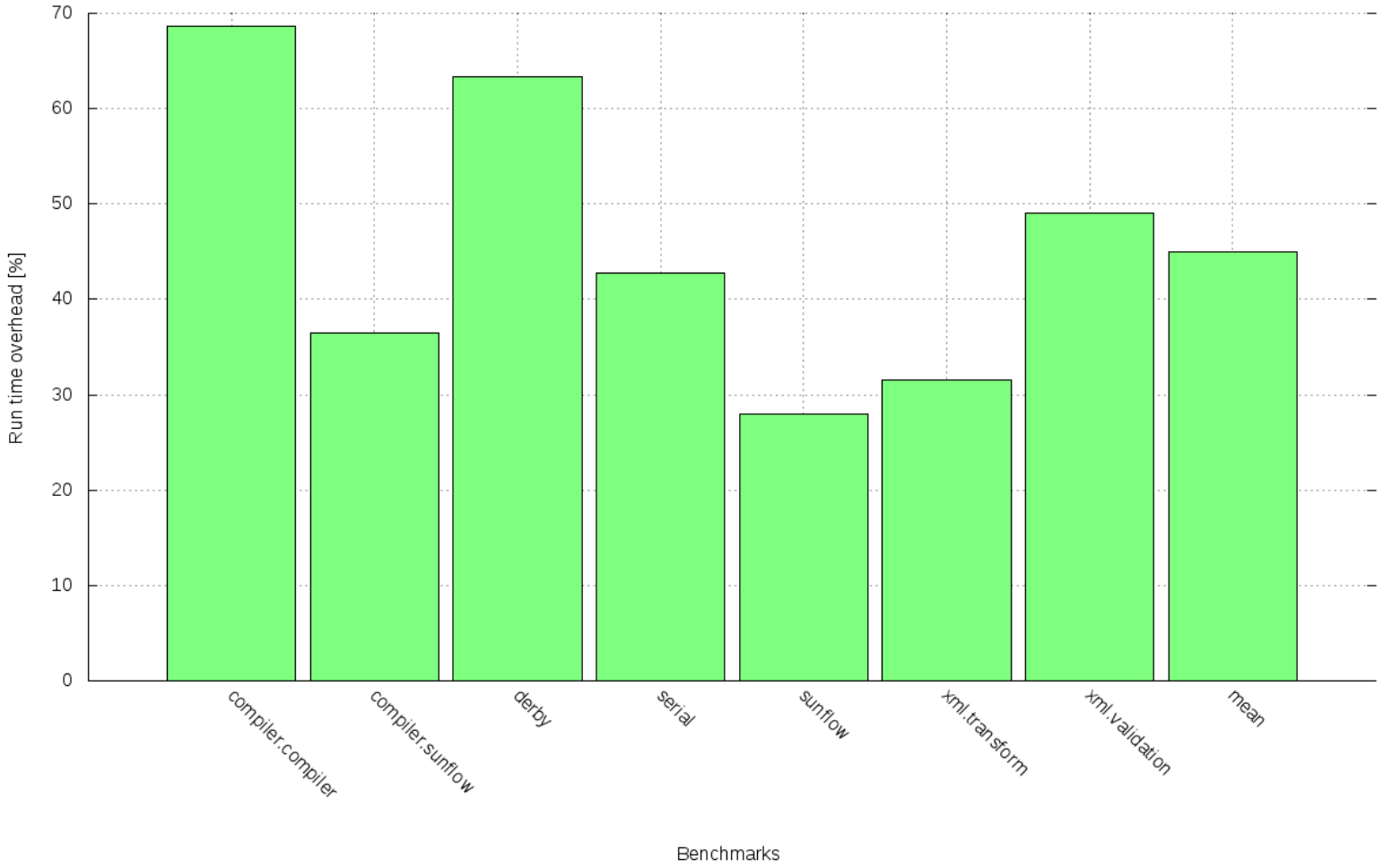
Optimized move sync event



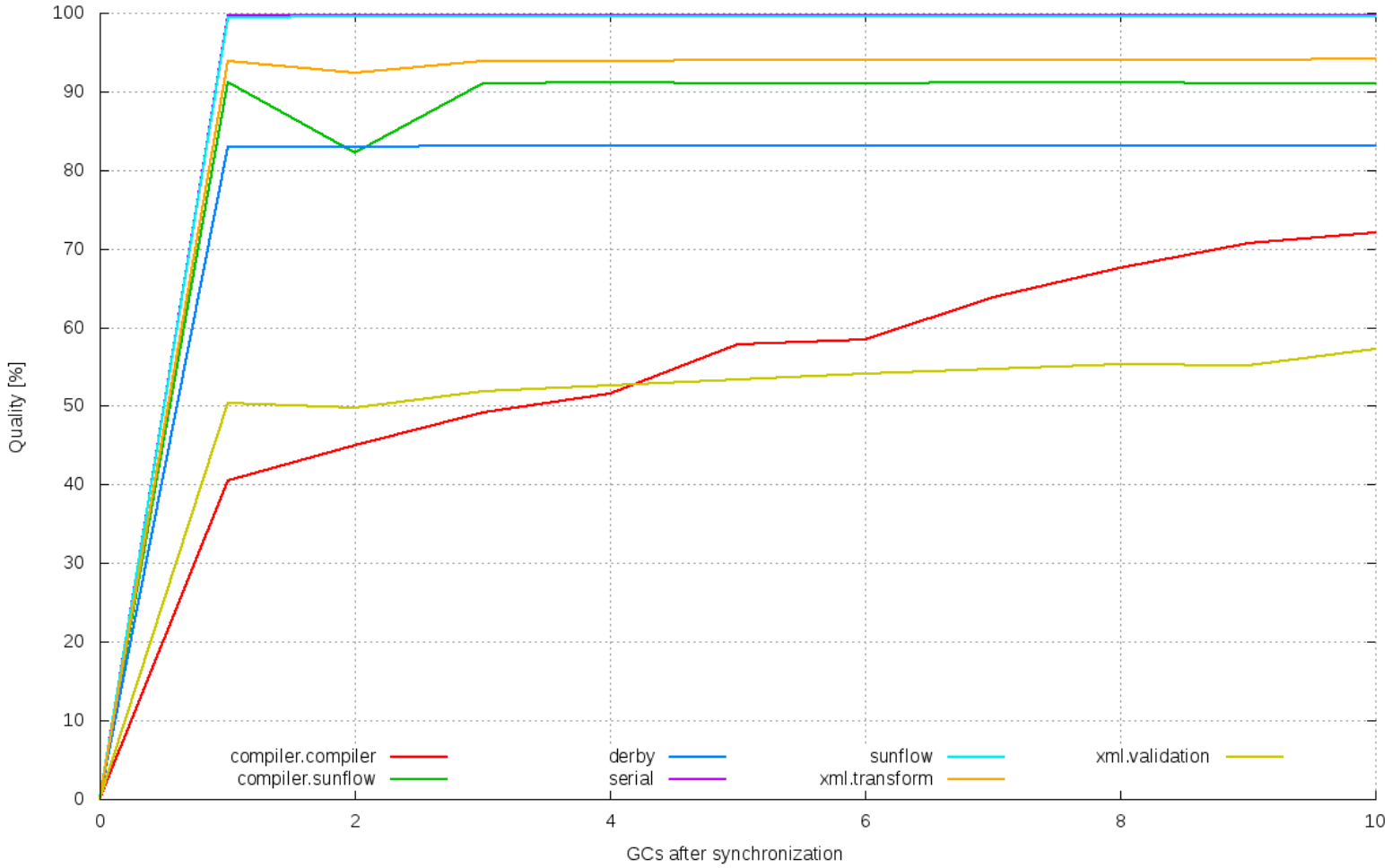
Replace all *move* events with *move sync* events.



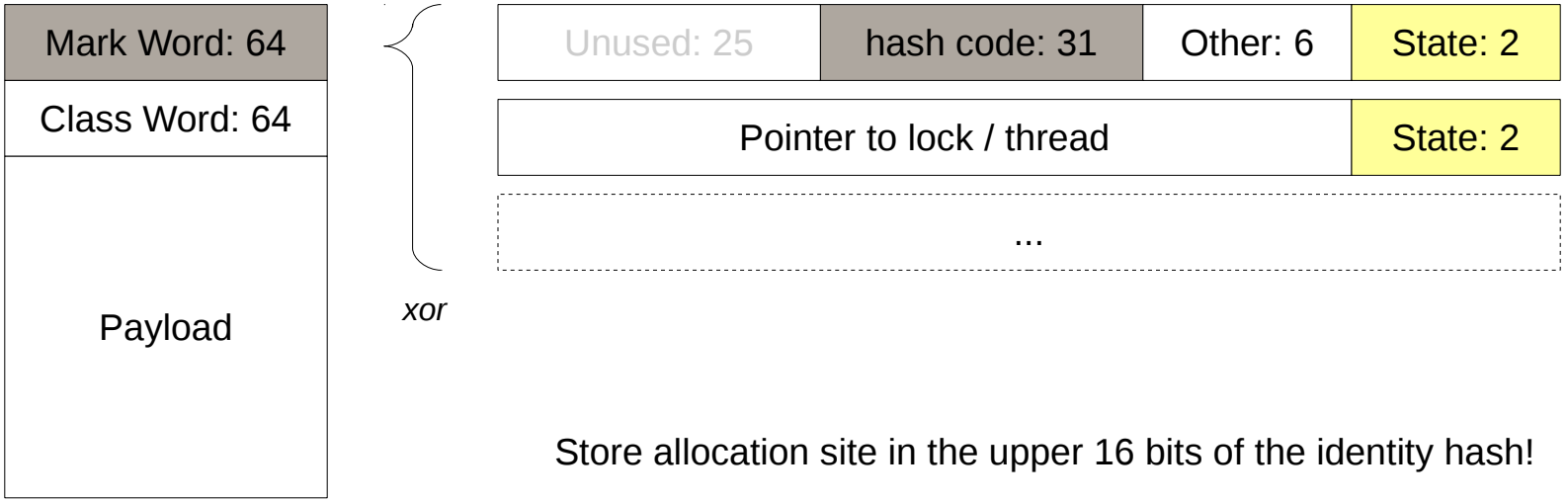
Overhead Rotation



Quality

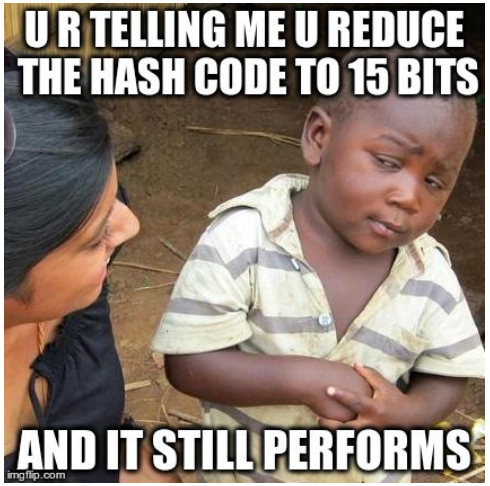

Quality [%]
GCs after synchronization
0
10
20
30
40
50
60
70
80
90
100
0
2
4
6
8
10
compiler.compiler
compiler.sunflow
derby
serial
sunflow
xml.transform
xml.validation

Restoring Allocation Sites



Store allocation site in the upper 16 bits of the identity hash!

- Must generate hash code eagerly for every (!) object.
- Reduces entropy of the hash to **0.0015%**.

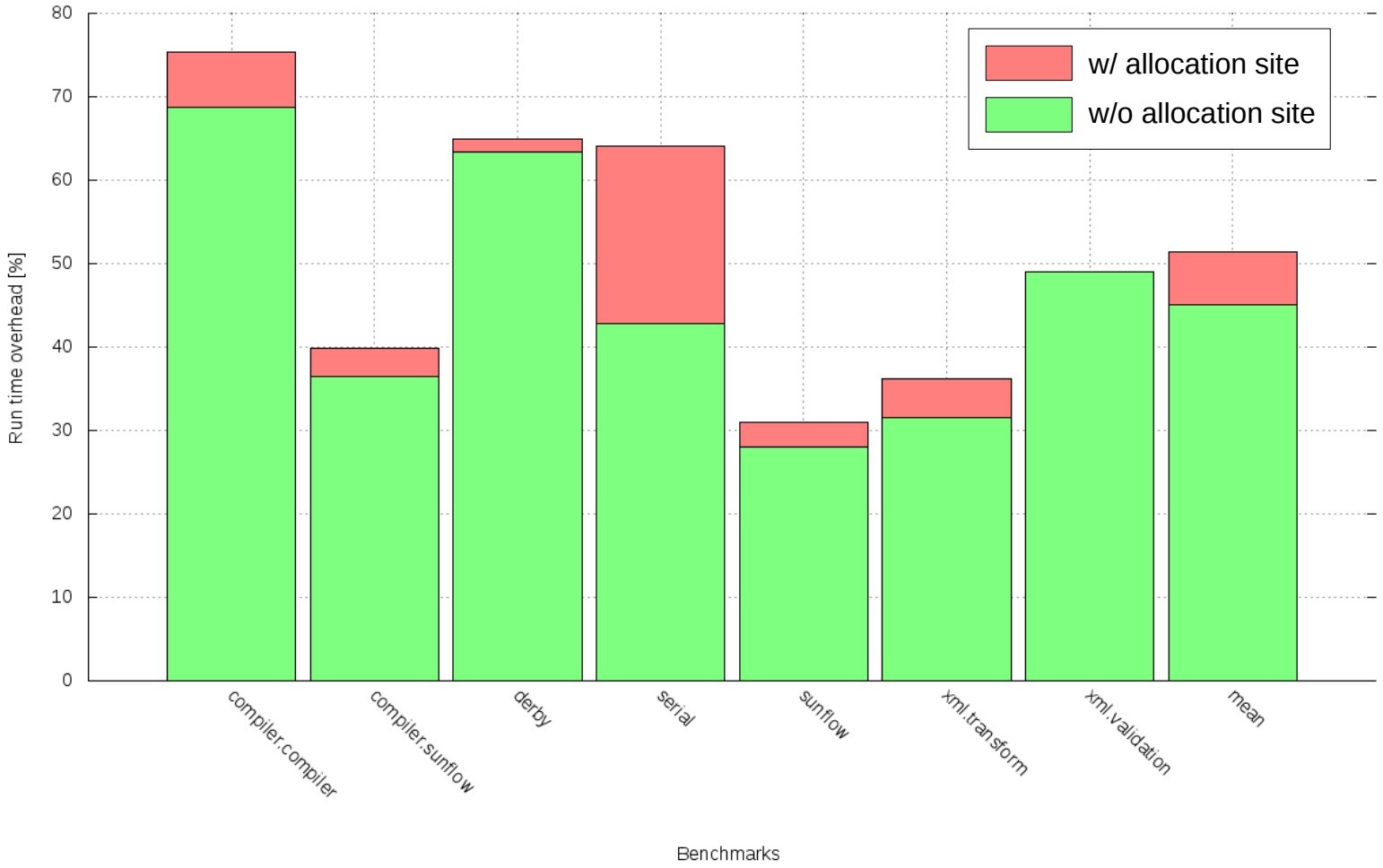


Artificial Worst Case

```
void main() {
    Set<Object> set = new HashSet<>();
    for(int i = 0; i < 1_000_000_000; i++) {
        set.put(create());
    }
    for(int i = 0; i < 1_000_000_000; i++) {
        set.contains(create());
    }
}

Object create() {
    // all objects have same allocation site
    return new Object();
}
```

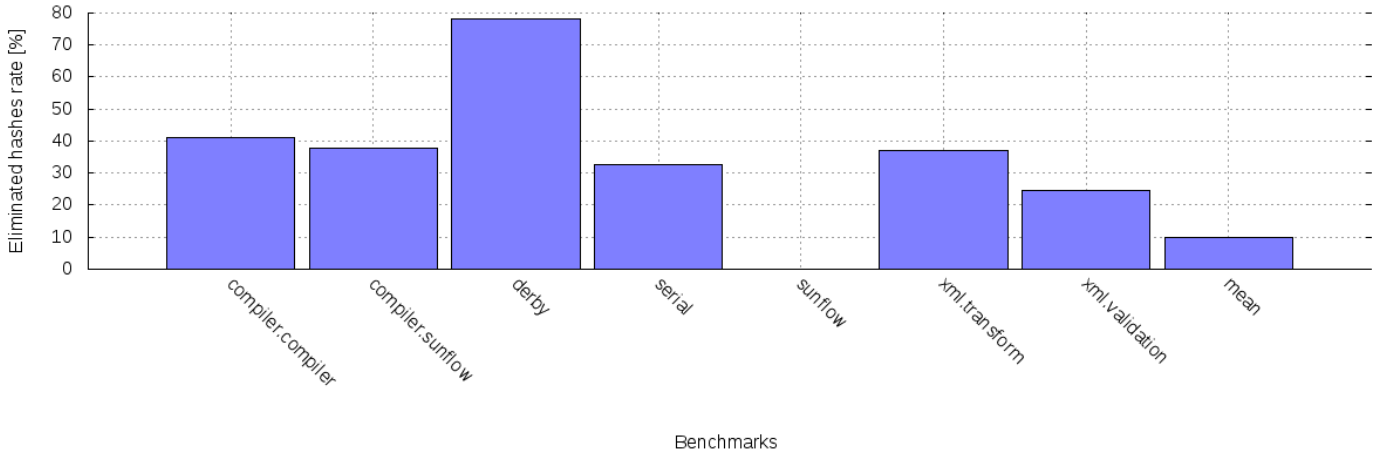
→ **run time +2191%**

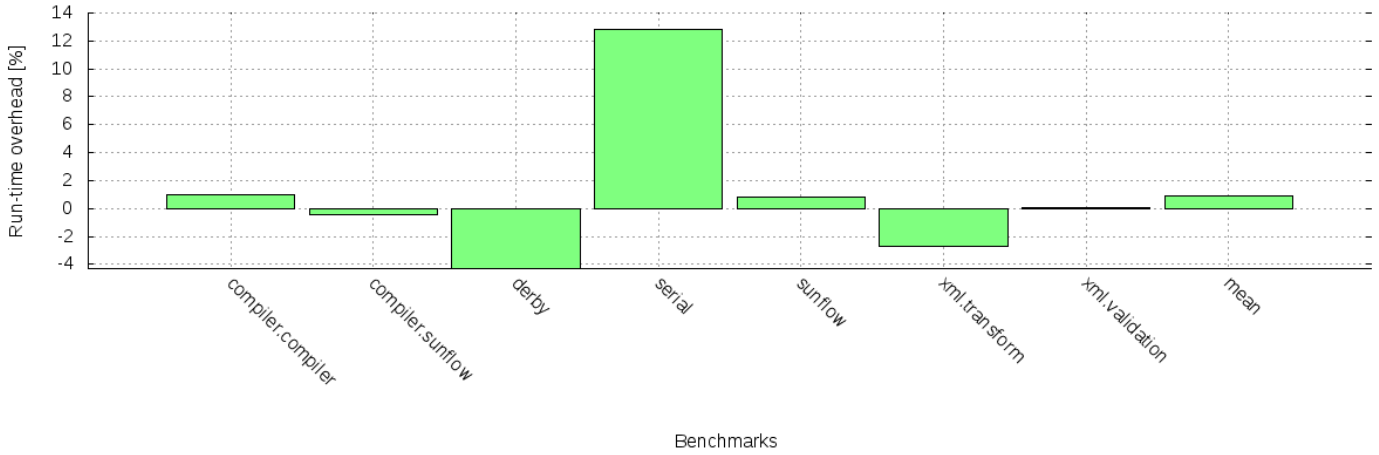
Overhead with Saving Allocation Sites



Reducing Hash Code Generation

Assumption: classes overwriting `hashcode()` will *most likely* never use the identity hash!





Q&A

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UNIVERSITÄT LINZ

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