Kernel Report

v5.2 ~ v.5.3

Byungchul Park

byungchul.park@lge.com

max.byungchul.park@gmail.com

5.2

+ A clone(2) flag CLONE_PIDFD

Kill 121 !

+ A clone(2) flag CLONE_PIDFD

+ A clone(2) flag CLONE_PIDFD

121

+ A clone(2) flag CLONE_PIDFD

+ A clone(2) flag CLONE_PIDFD

+ A clone(2) flag CLONE_PIDFD

Kill 121 ?!

Background **PID reuse**

+ A clone(2) flag CLONE_PIDFD

Kill 121 !

+ A clone(2) flag CLONE_PIDFD

Kill 121 !

File Descriptor !

open(2) ~ close(2)

Background pidfd_send_signal(2)

A system call newly added in v5.1

+ A clone(2) flag CLONE_PIDFD

clone(…, CLONE_PIDFD, …, &pidfd);

pidfd_send_signal(pidfd);

close(pidfd);

+ PSI notification

+ PSI notification

CPU

Memory

IO

+ PSI notification

CPU

Memory

IO

+ PSI notification

CPU

Memory

IO

Background **PSI**

Pressure Stall Information

CPU

Memory

IO

+ PSI notification

CPU

Memory

IO

+ PSI notification

CPU

Memory

IO

+ PSI notification

fds.fd = open("/proc/pressure/memory", flags);

write(fds.fd, "some 150000 1000000", len);

poll(&fds, 1, -1);

! BFQ improved

Background **IO scheduler**

Background **BFQ**
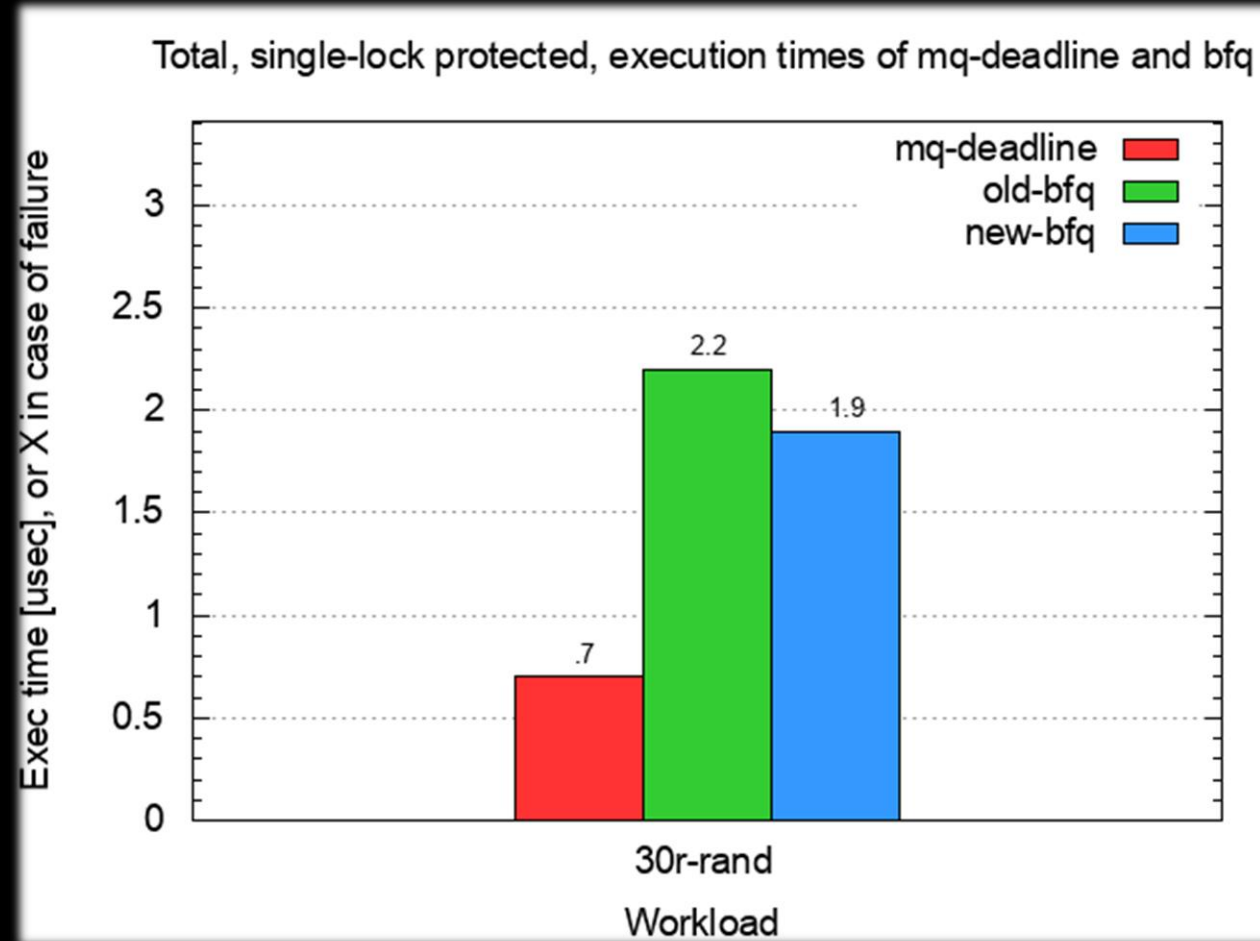
Budget Fair Queueing

Background BFQ

Budget Fair Queueing

! BFQ improved

! BFQ improved

! BFQ improved

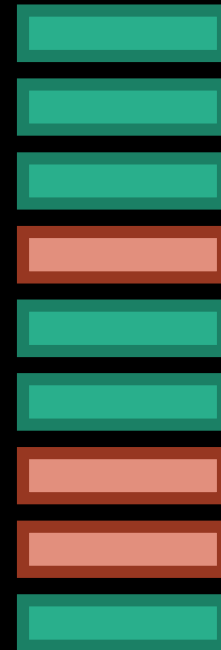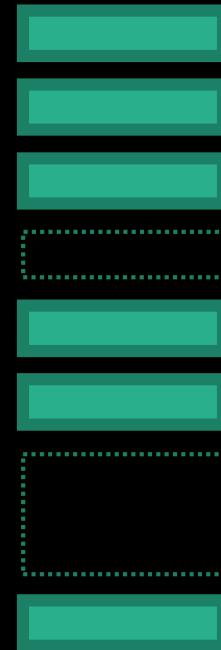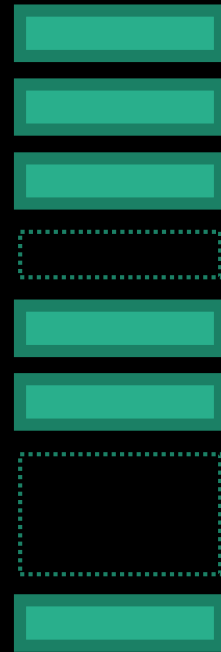Total, single-lock protected, execution times of mq-deadline and bfq

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO

5.3

+ pidfd_open(2)

+ pidfd_open(2)

```
pidfd = pidfd_open(pid);

check_if_pidfd_is_right_one(pidfd);

pidfd_send_signal(pidfd);

close(pidfd);
```

+ Clamping in scheduler
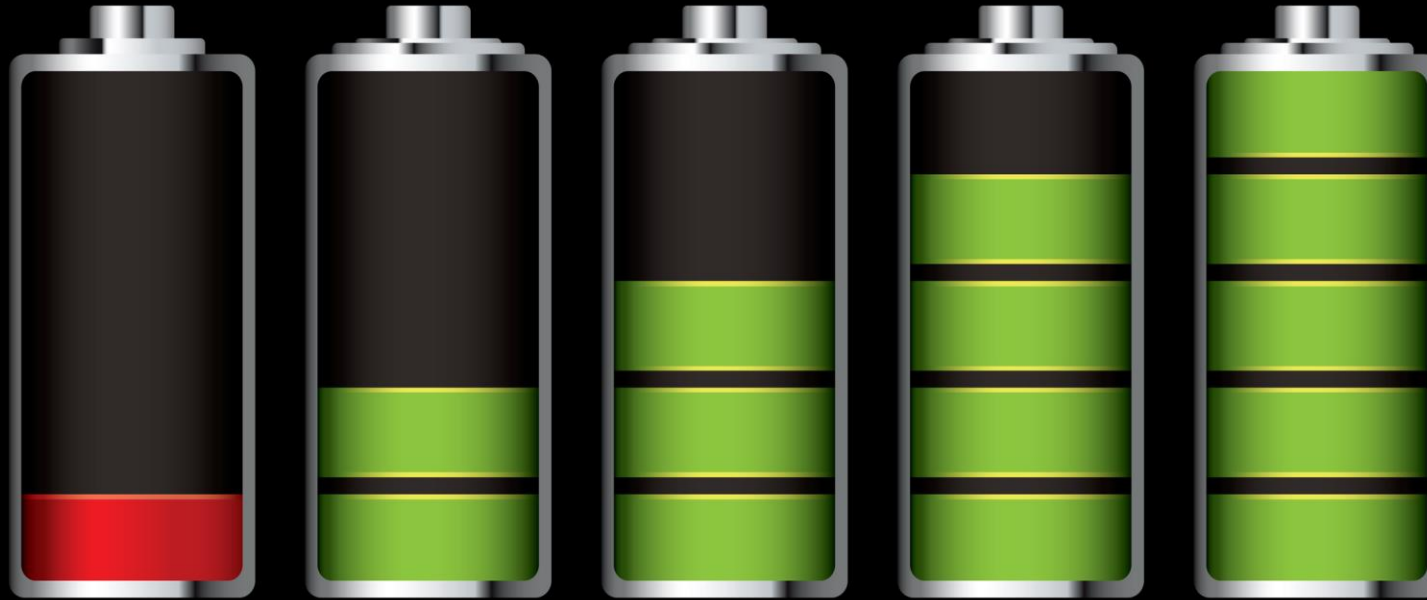
Background EAS

Energy Aware Scheduling
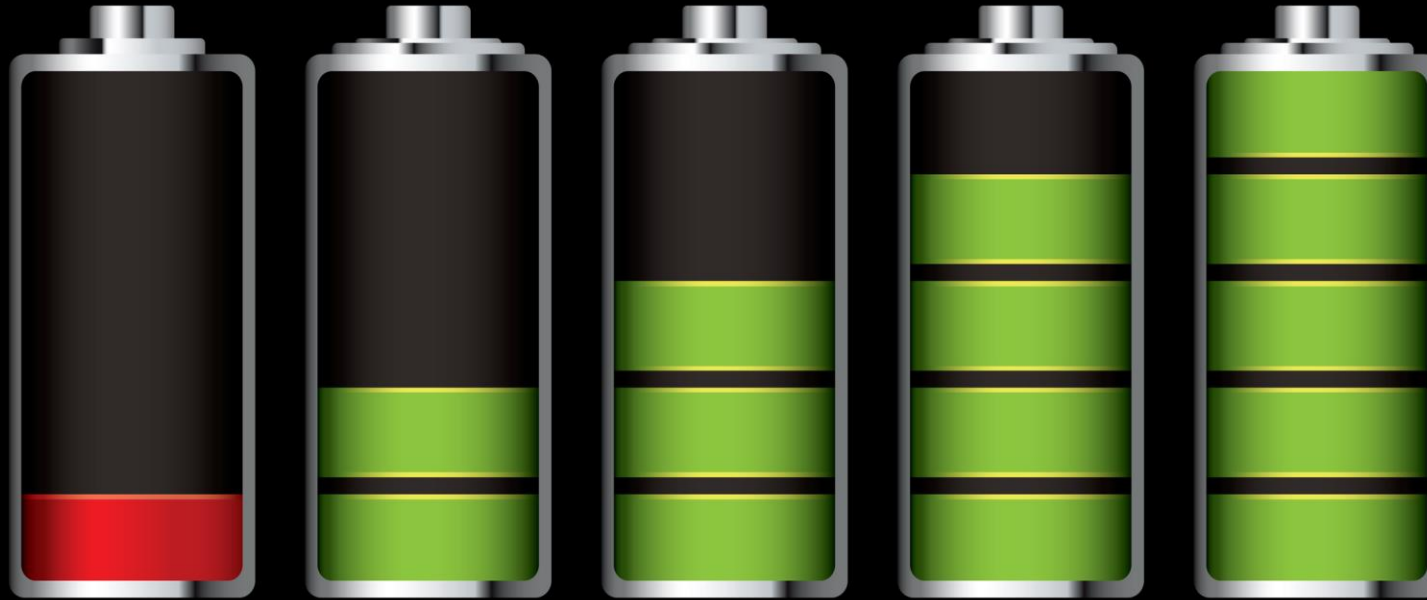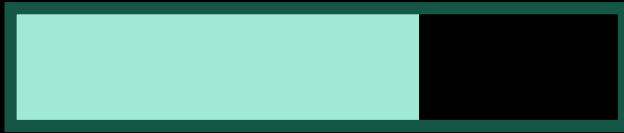
Background EAS

Background **EAS**
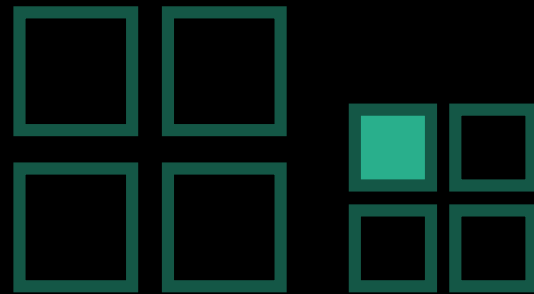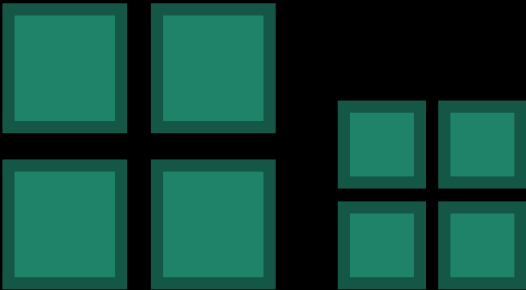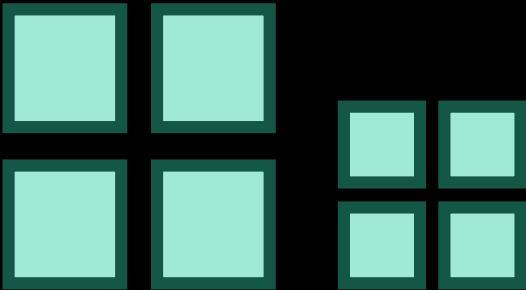
Background EAS

Background **Frequency control**

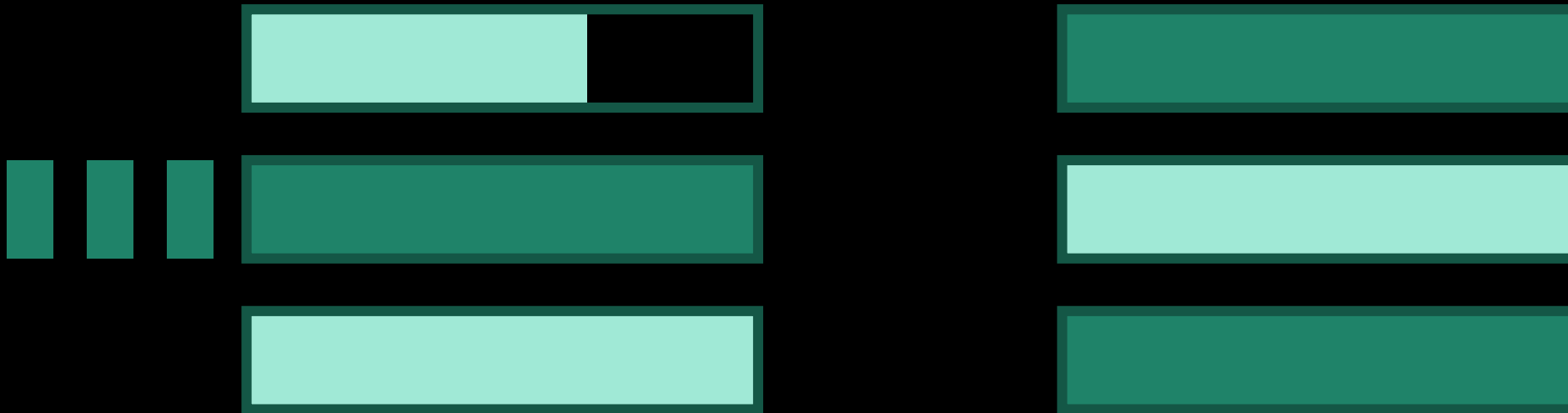# Background Frequency control

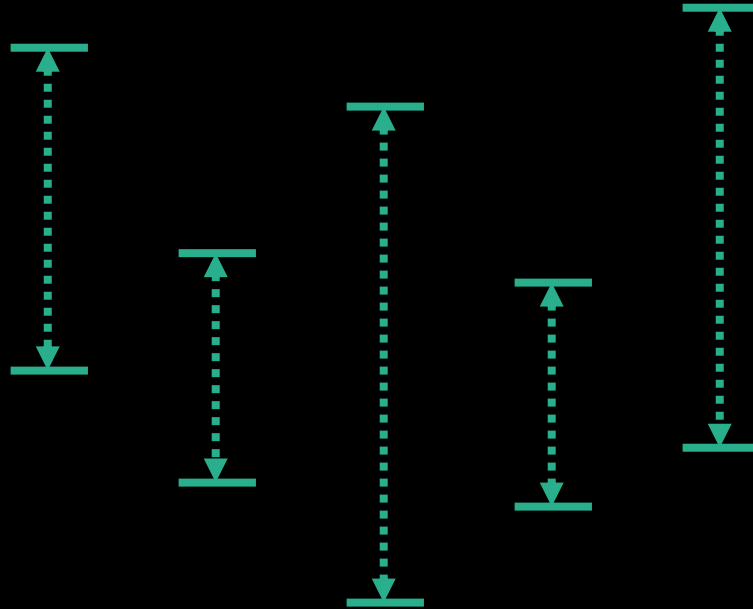# Background Frequency control
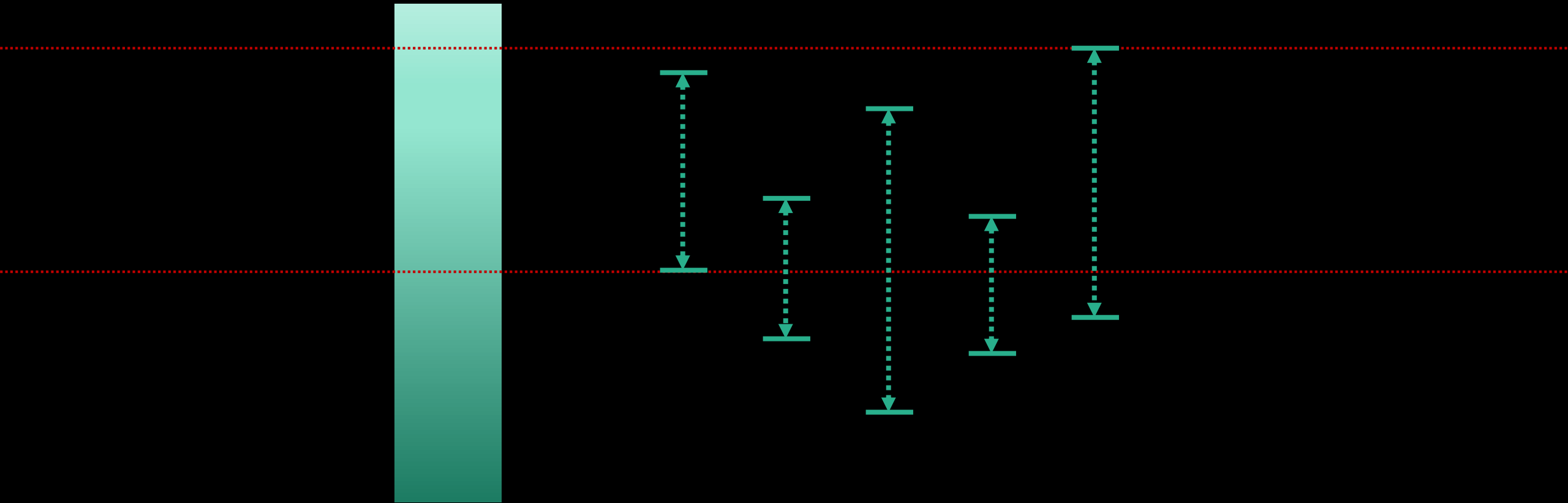
Background Frequency control
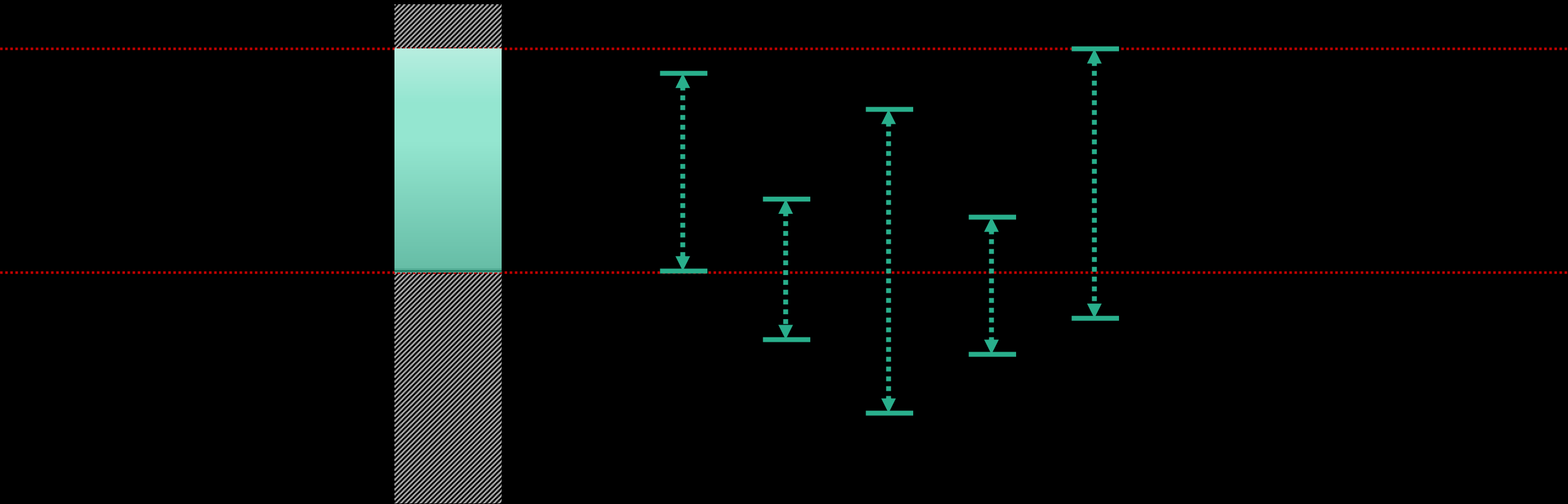
+ Clamping in scheduler
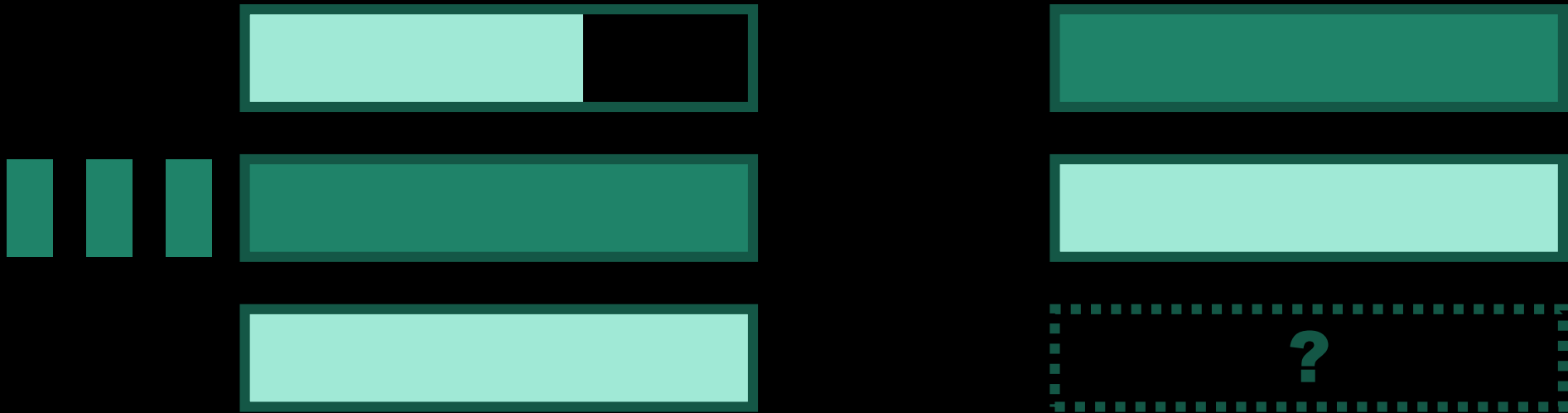
+ Clamping in scheduler

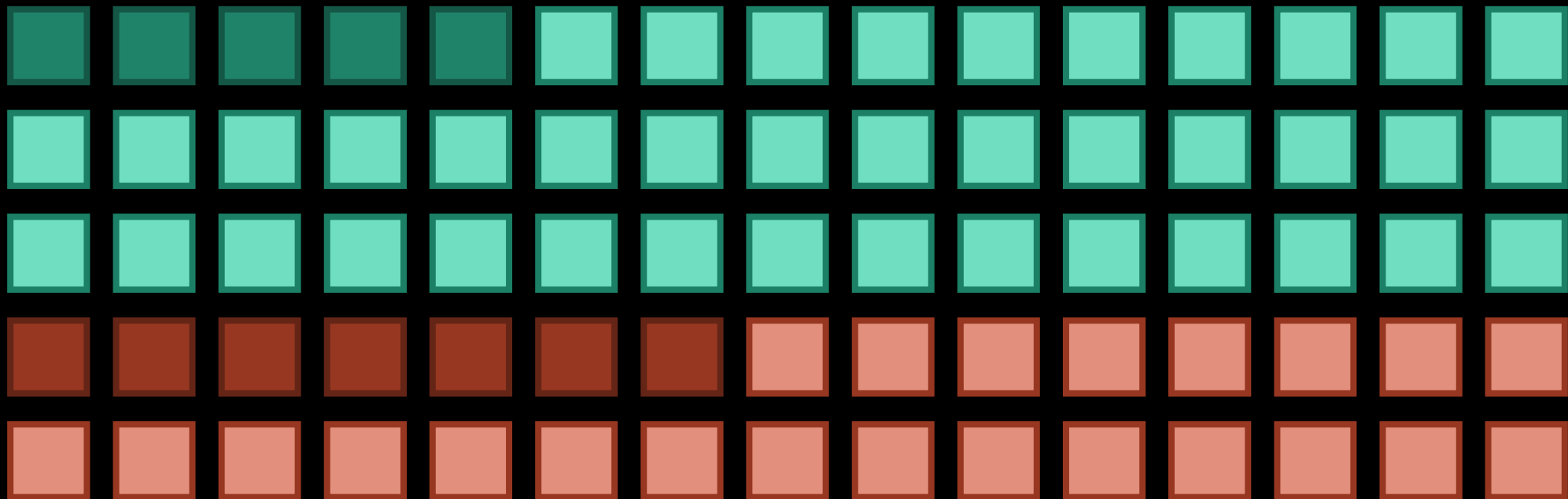# + Clamping in scheduler

+ Clamping in scheduler

+ Clamping in scheduler

+ Clamping in scheduler

1. A system call, sched_setattr()

2. Two cgroup knobs, util.{min, max}

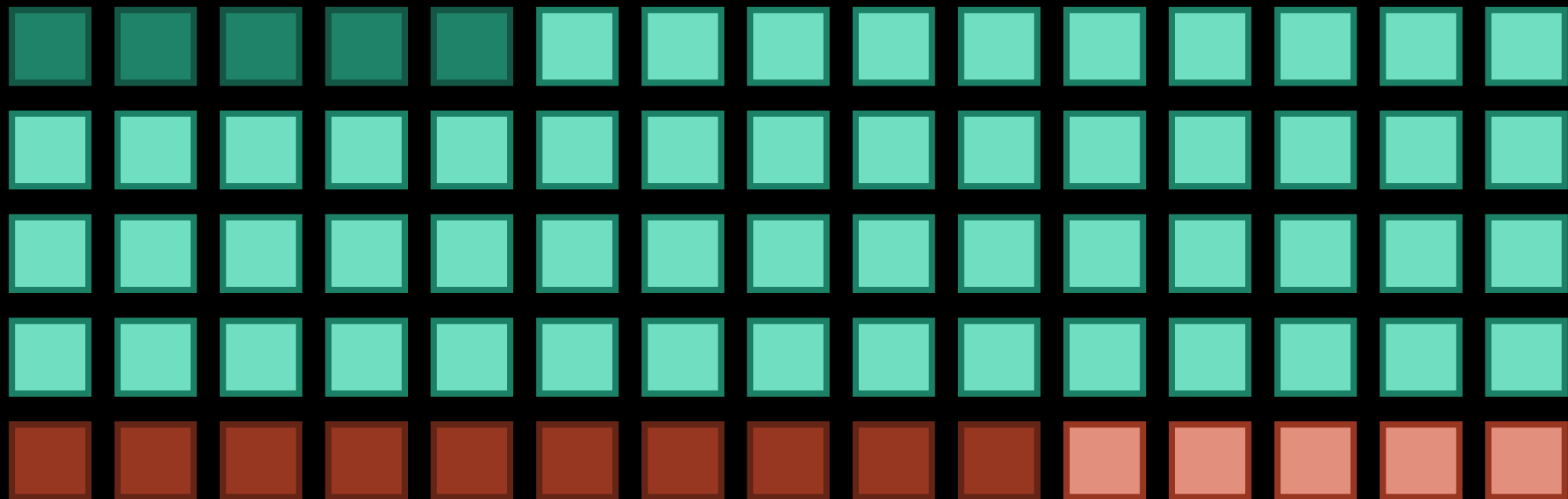3. Two sysctl knobs, sched_uclamp_util_{min, max}
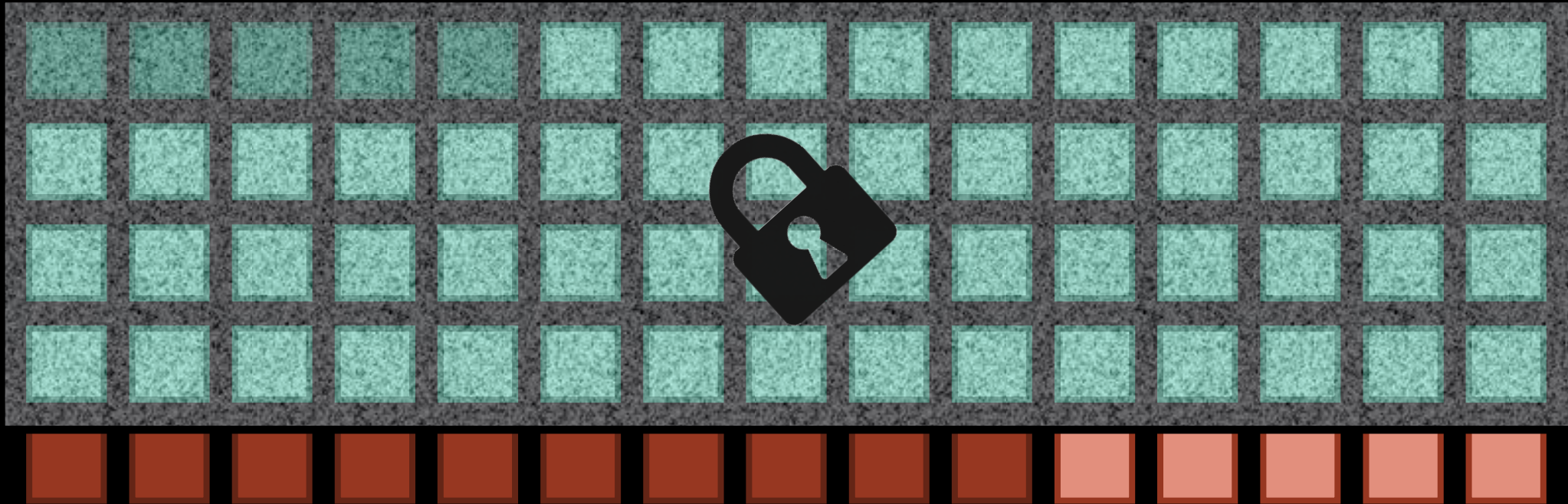
! Scan anons on file re-faults

Background **LRU**

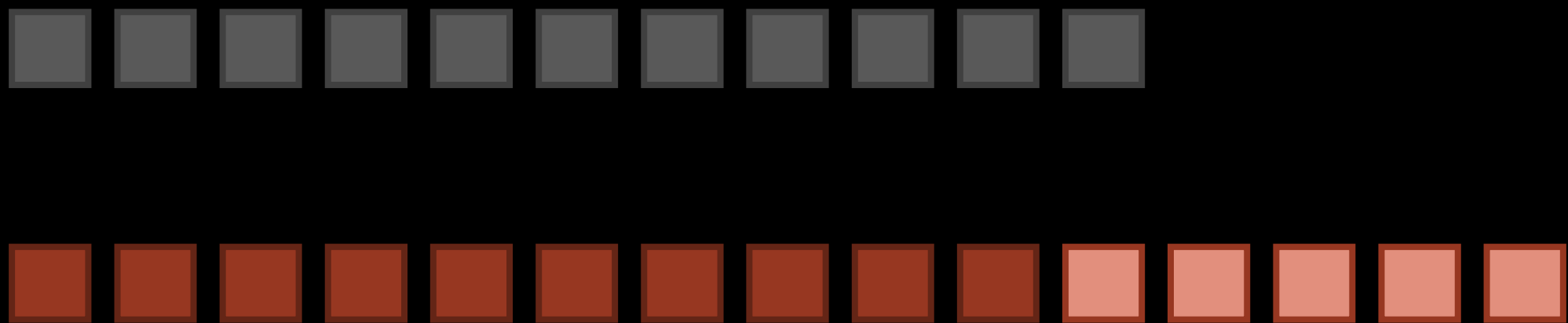# Background Heuristic on LRU

Background Heuristic on LRU

Background Heuristic on LRU

Background **Re-fault**

Background Re-fault

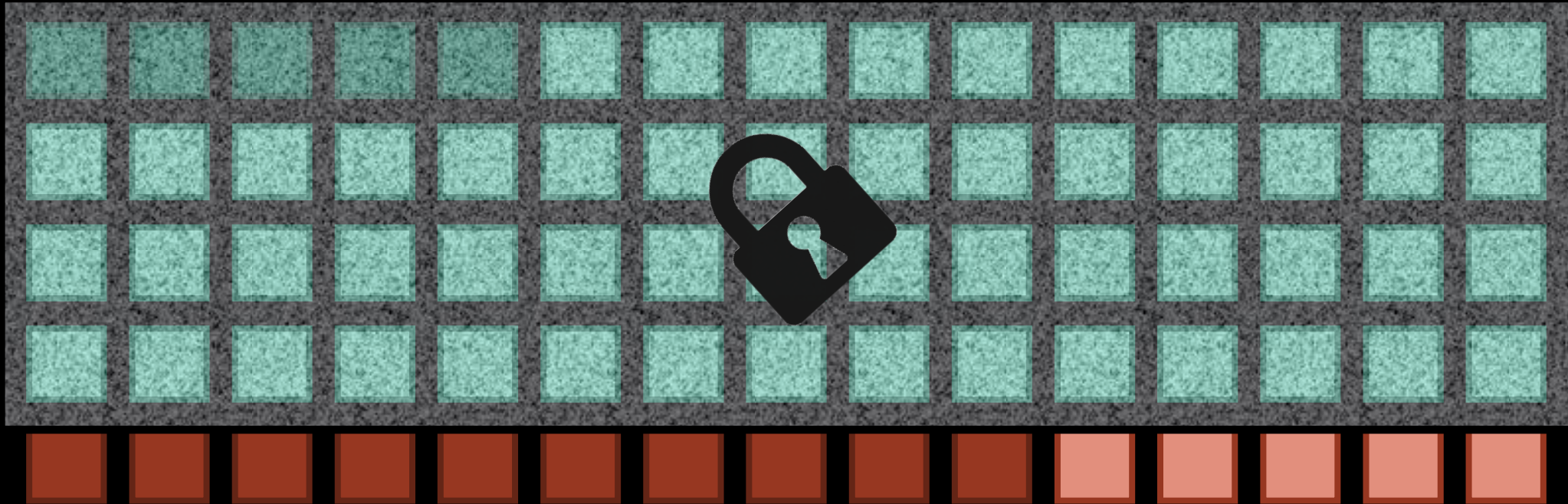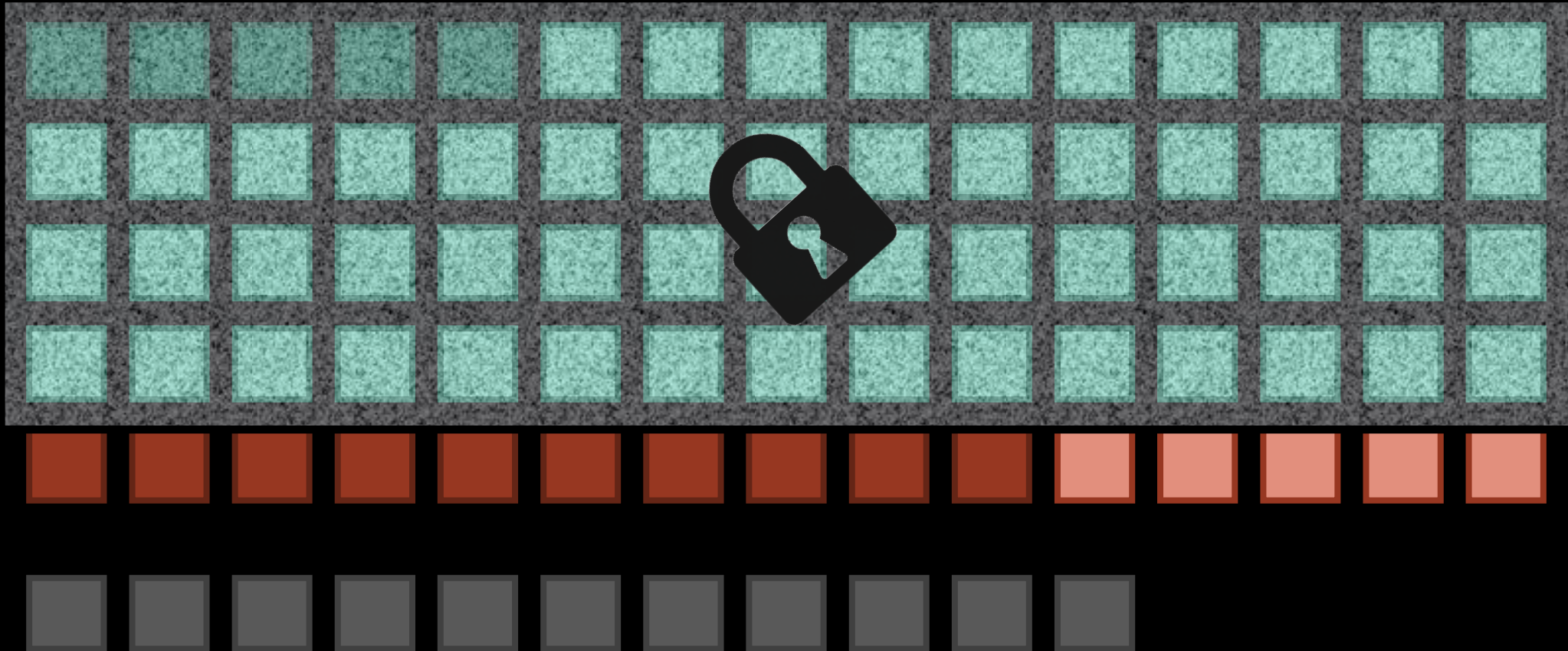# Background **Re-fault**
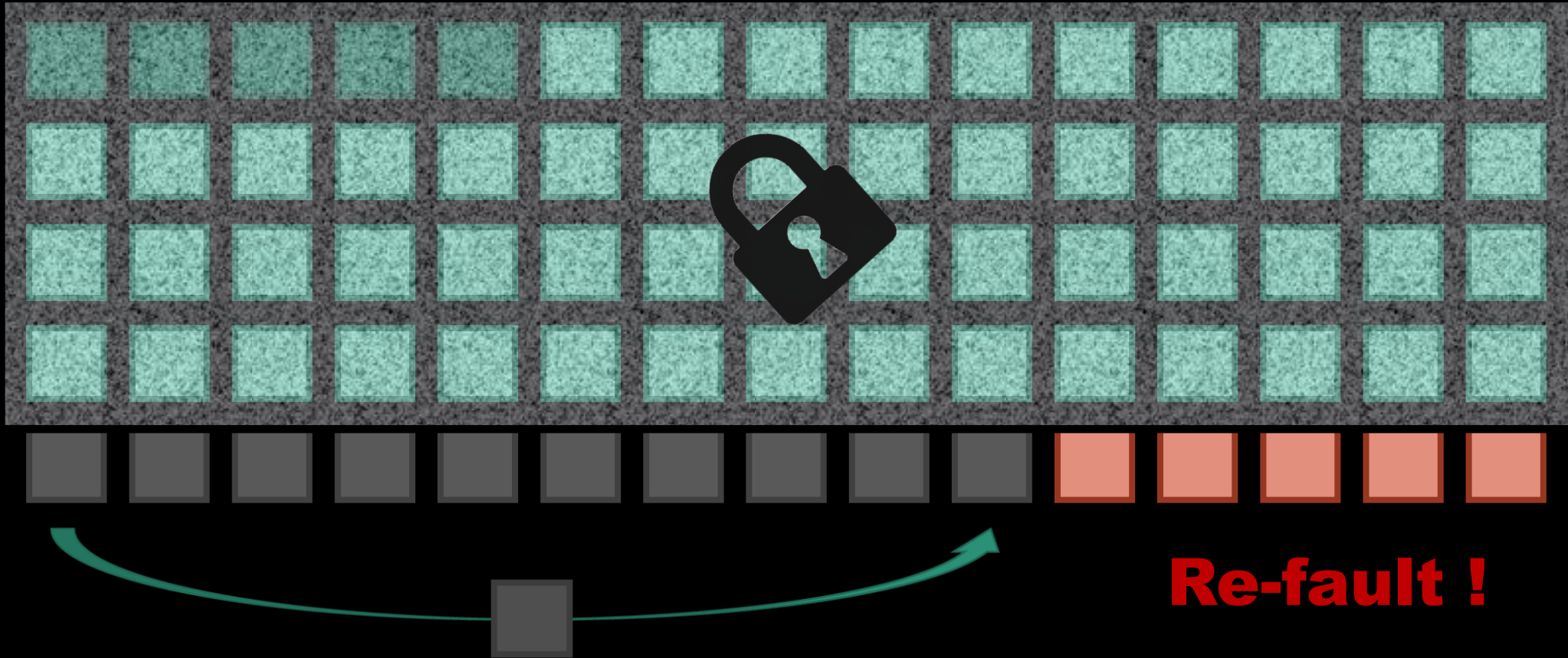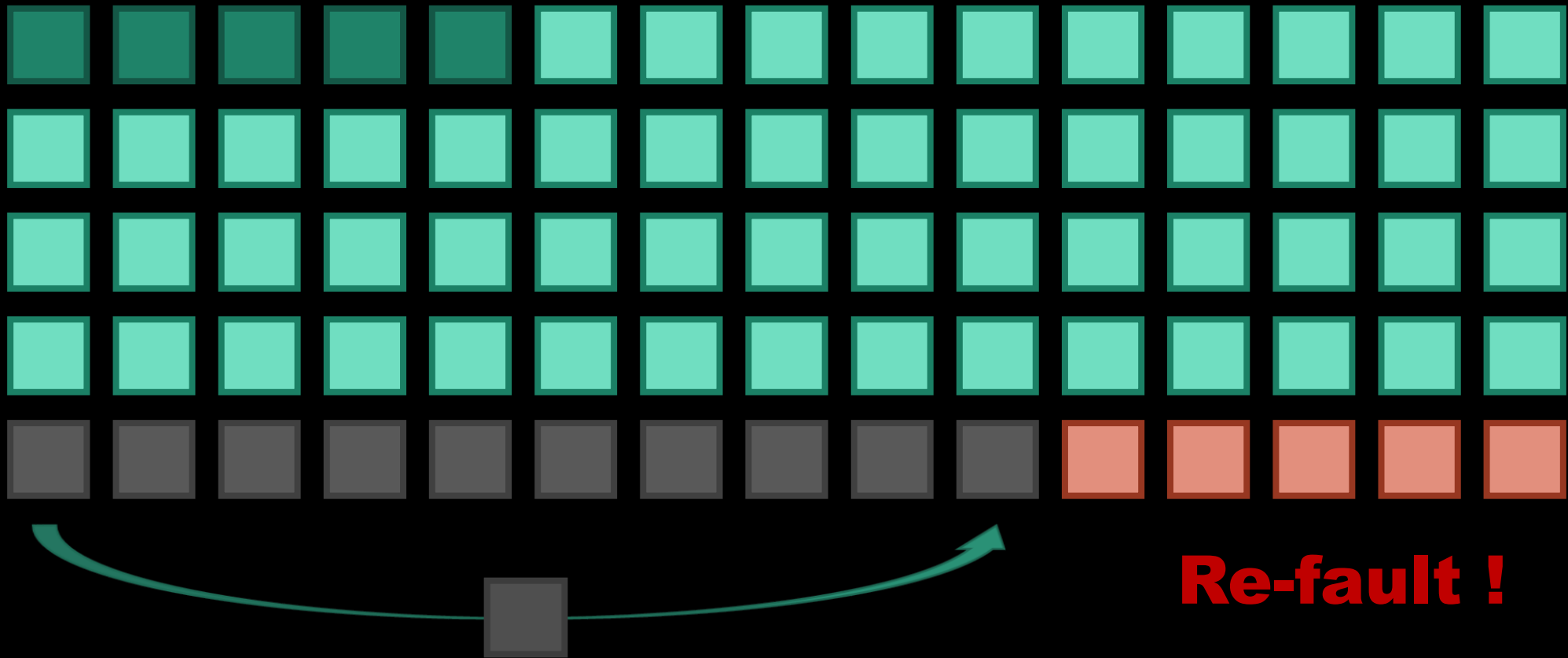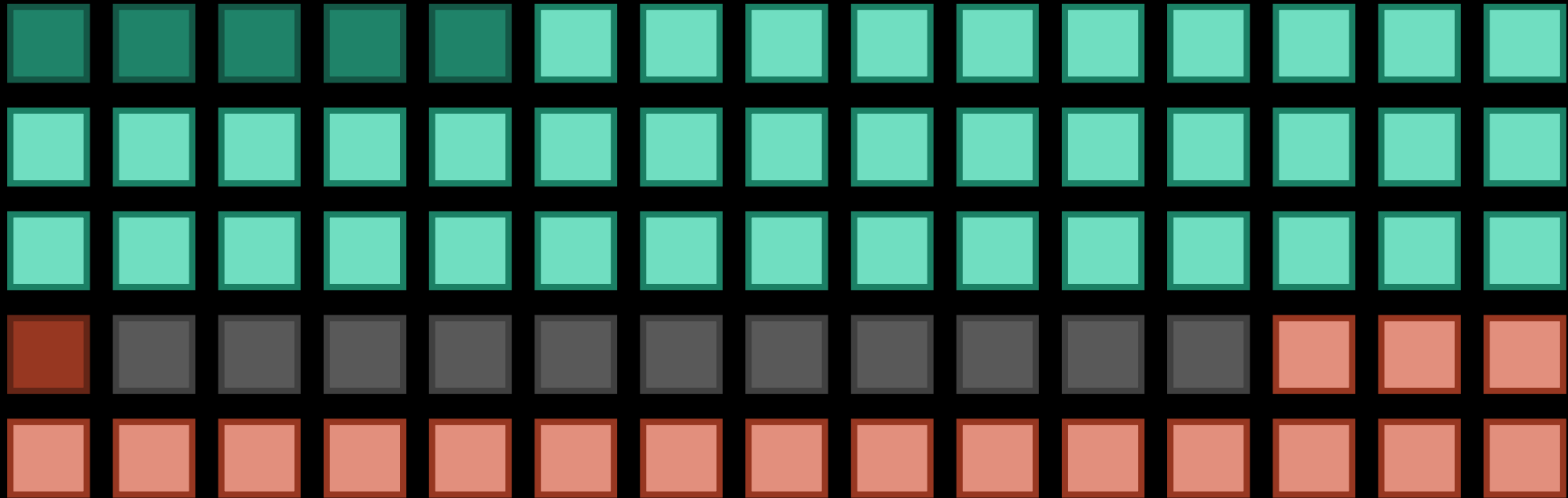
! Scan anons on file re-faults

! Scan anons on file re-faults

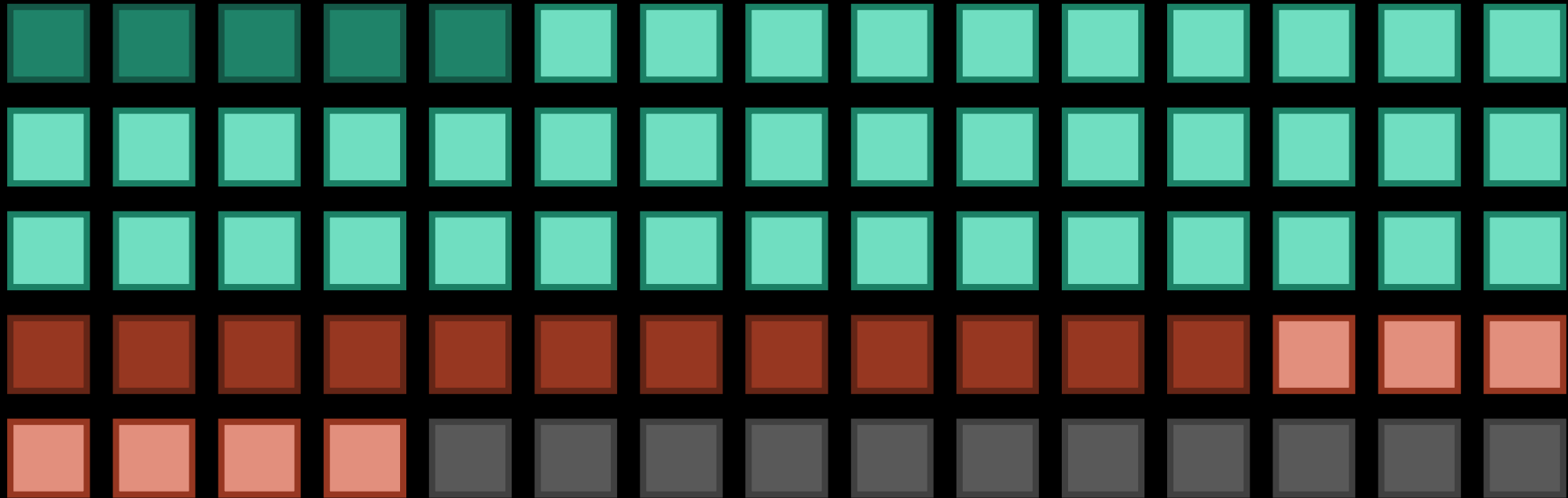! Scan anons on file re-faults

Re-fault !

! Scan anons on file re-faults

Re-fault !

! Scan anons on file re-faults

! Scan anons on file re-faults

Q & A