Kernel Report
v5.2 ~ v.5.3

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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 !

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

+ PSI notification

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

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

poll(&fds, 1, -1);

! BFQ improved

! BFQ improved

IO

Background IO scheduler

Background **BFQ**

Budget Fair Queueing

Background BFQ

Budget Fair Queueing

! BFQ improved
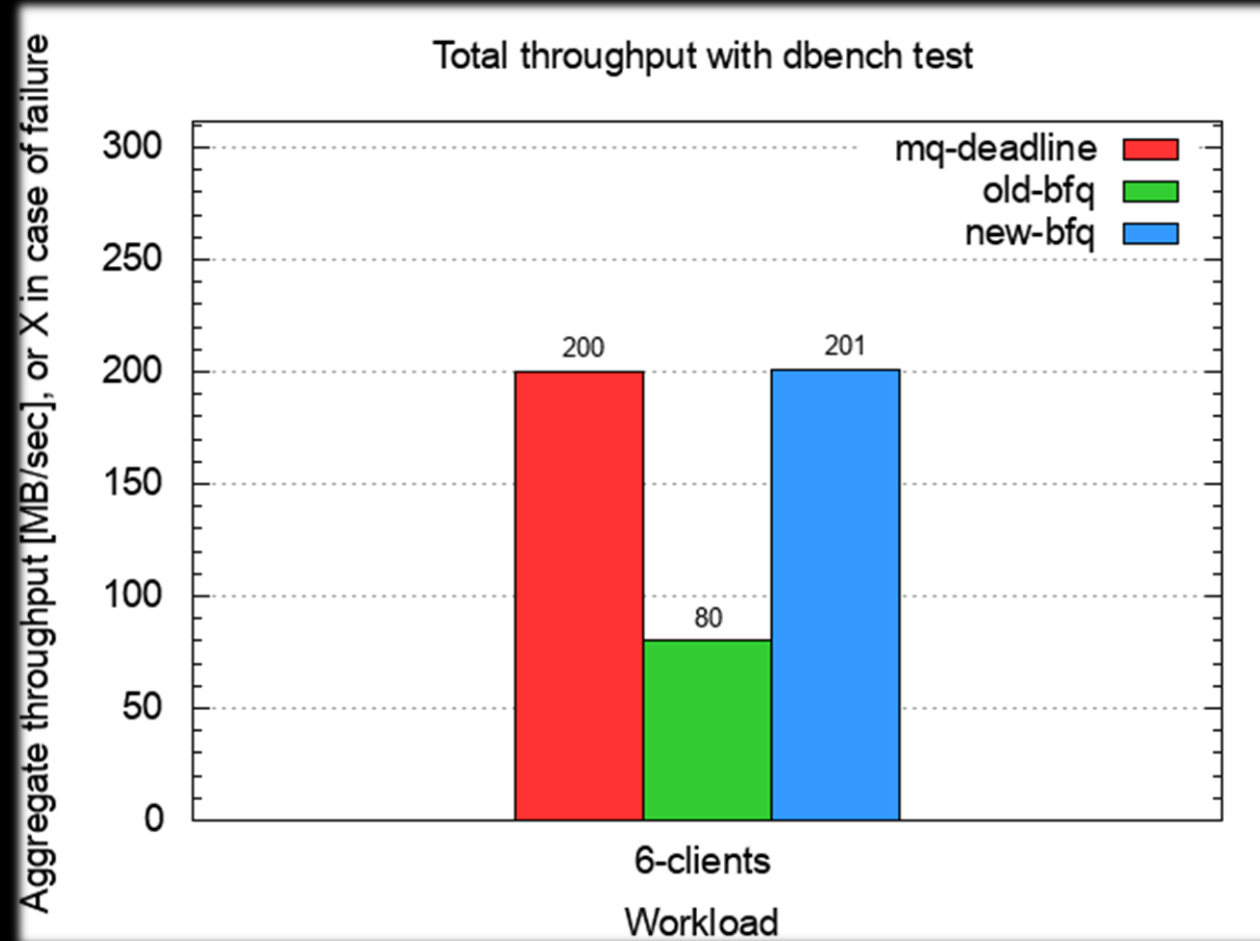
! BFQ improved
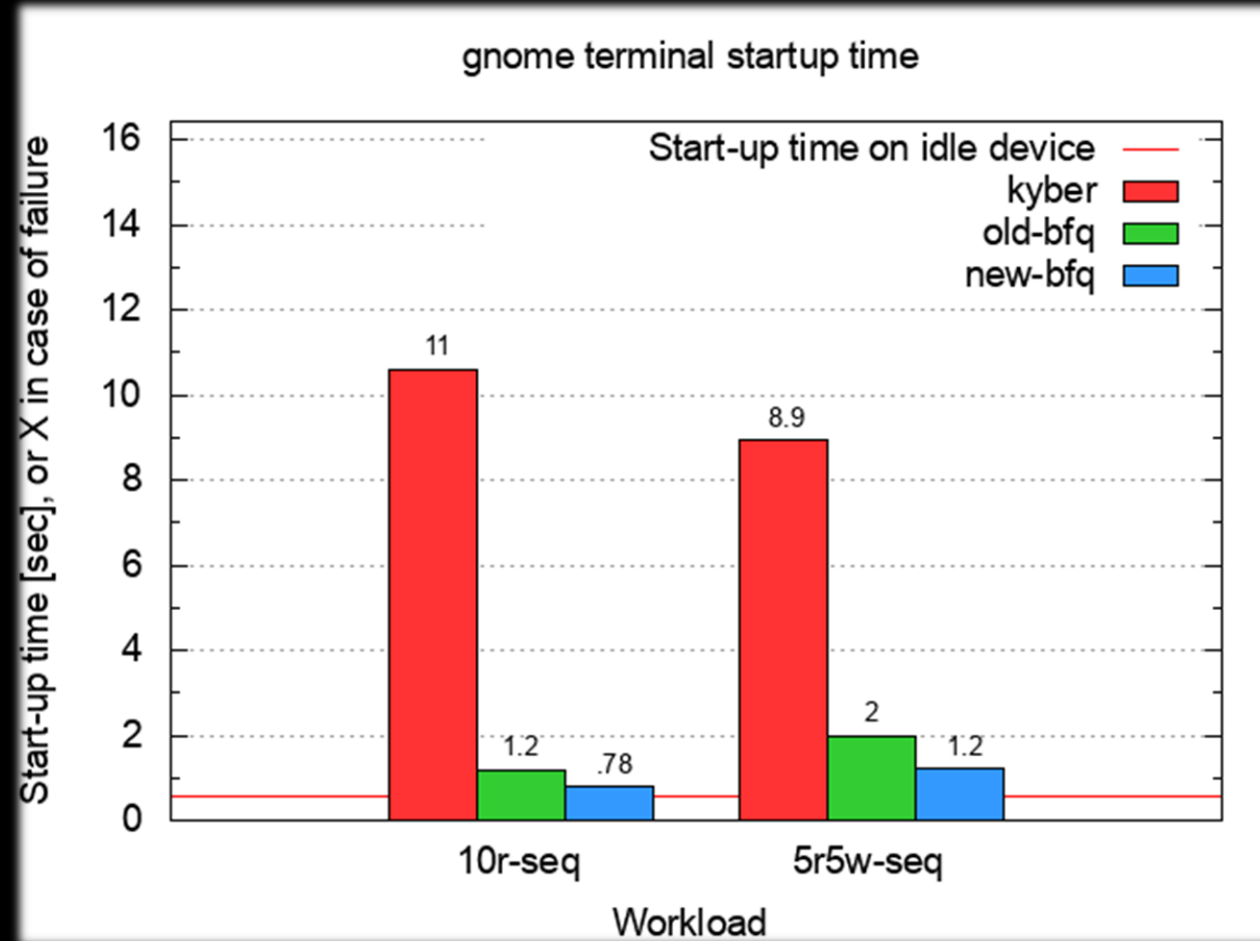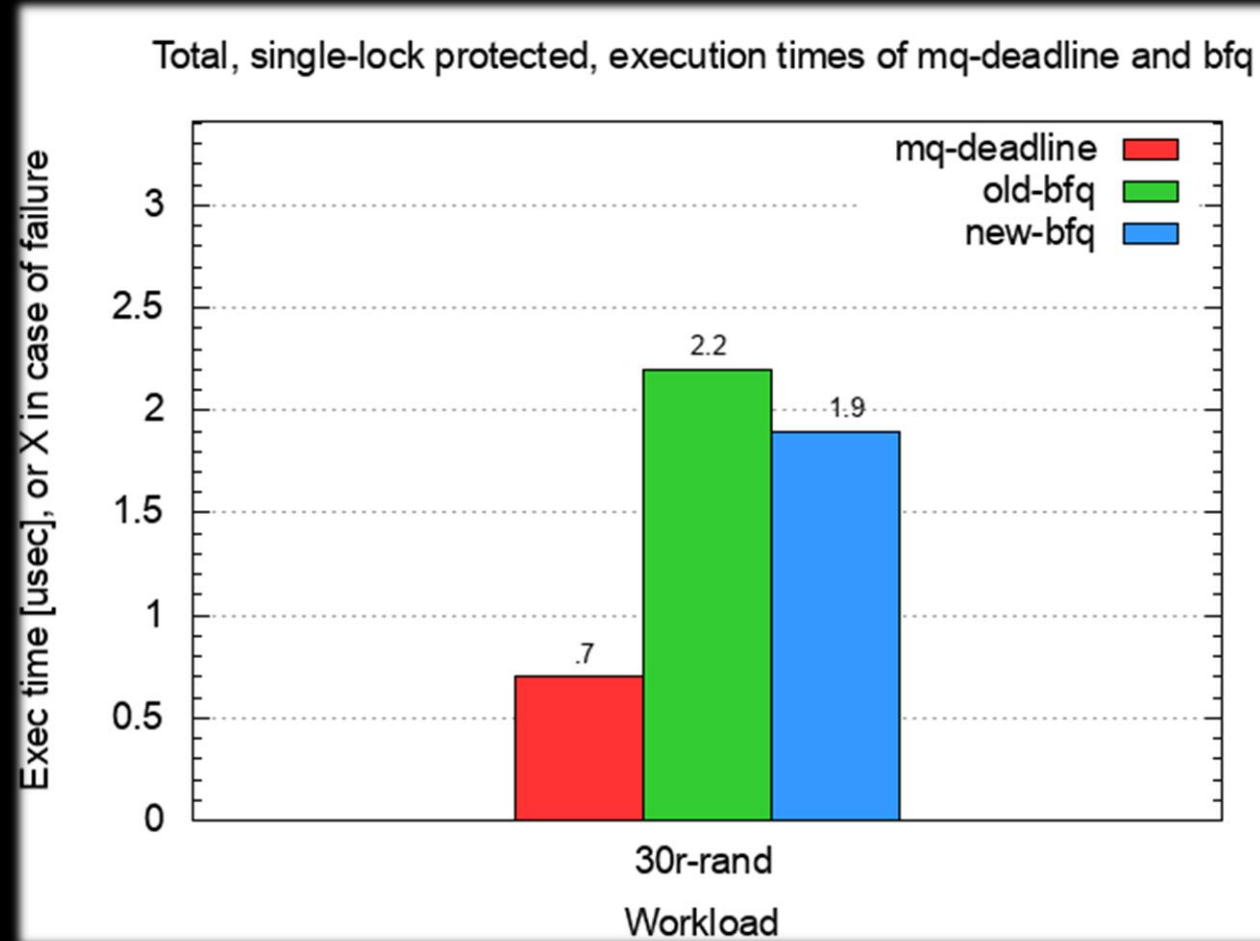
gnome terminal startup time

! BFQ improved

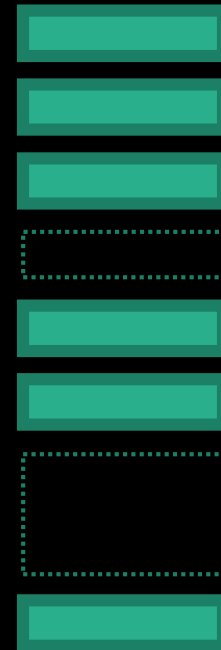Total, single-lock protected, execution times of mq-deadline and bfq

# ! 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
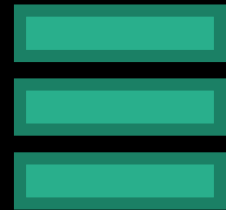
Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

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IO
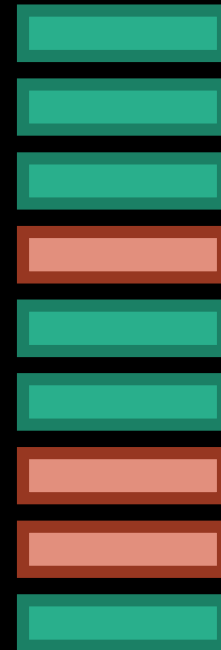
! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

merge

IO

merge

! BFQ improved

Tune service injection

Increase idling for weight-raised queues

Not merge queues on flash with queueing

Protect newly-created queues

IO
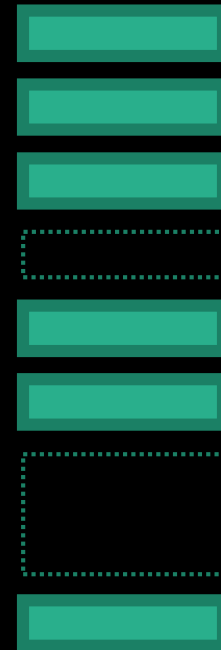
5.3

+ 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
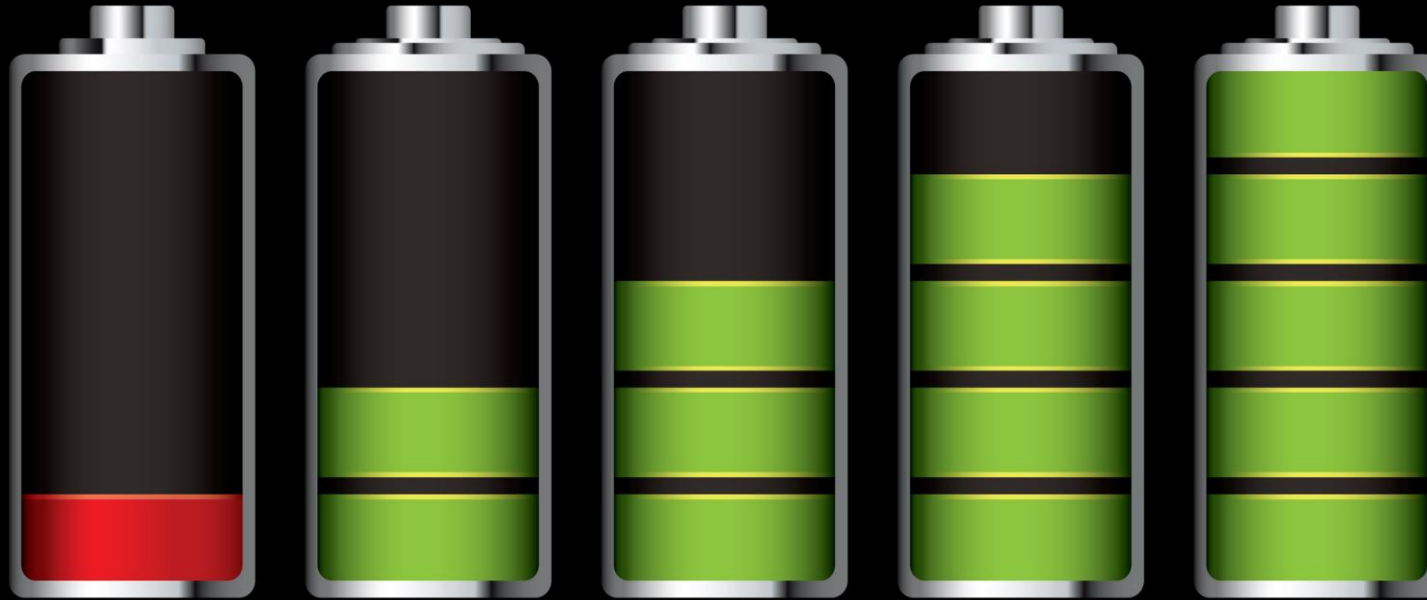
Background **EAS**

Energy Aware Scheduling
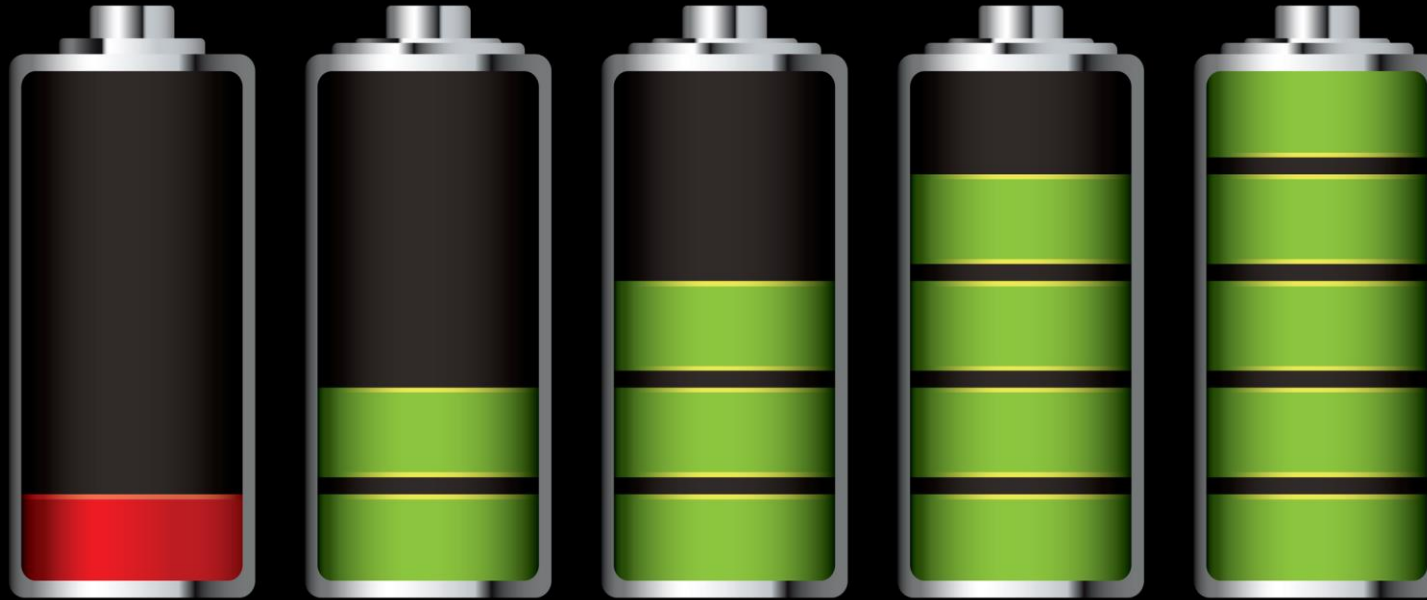
Background EAS
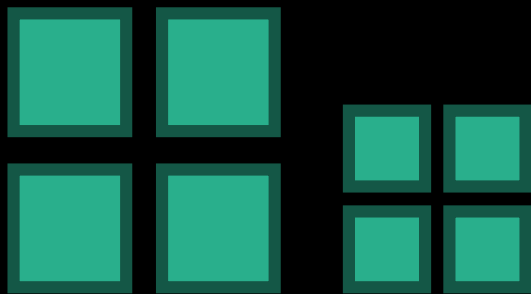
Background **EAS**
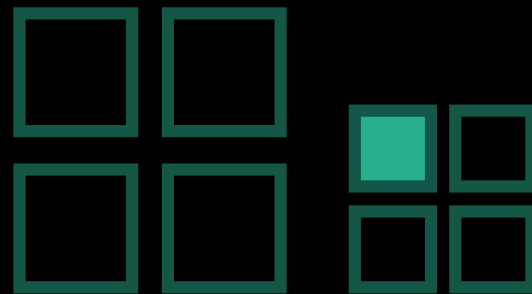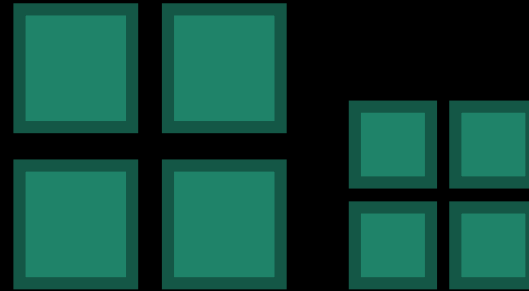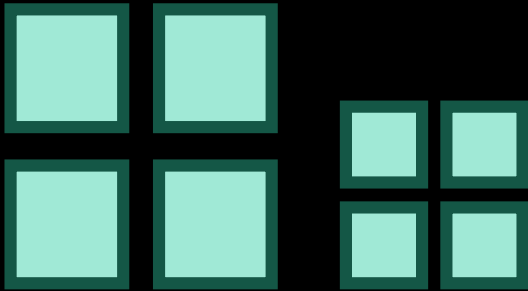
Background **EAS**

Background Frequency control
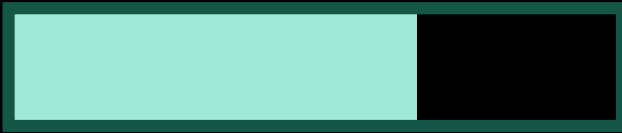
Background Frequency control

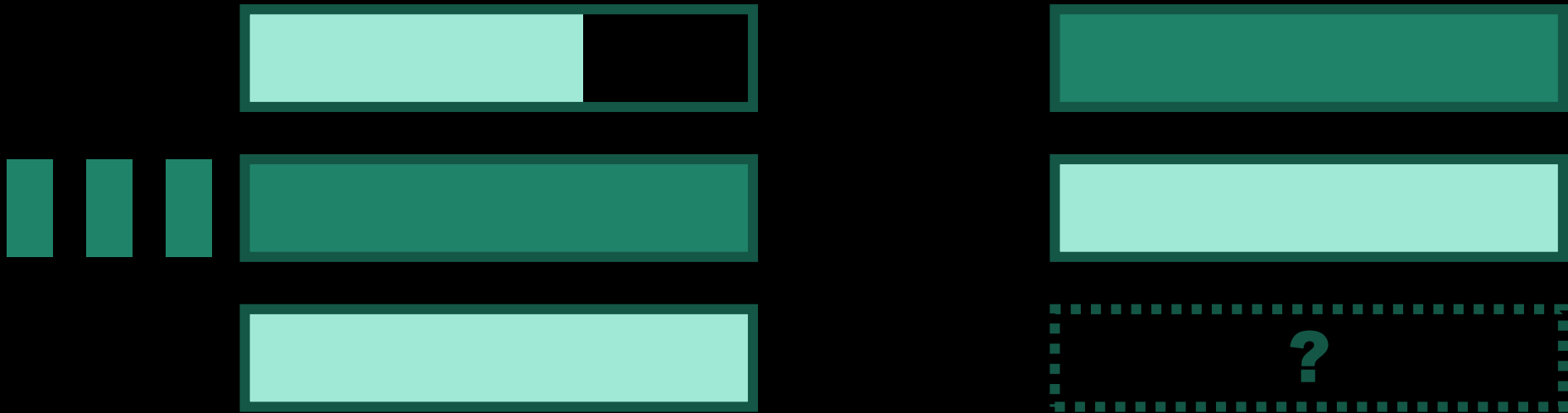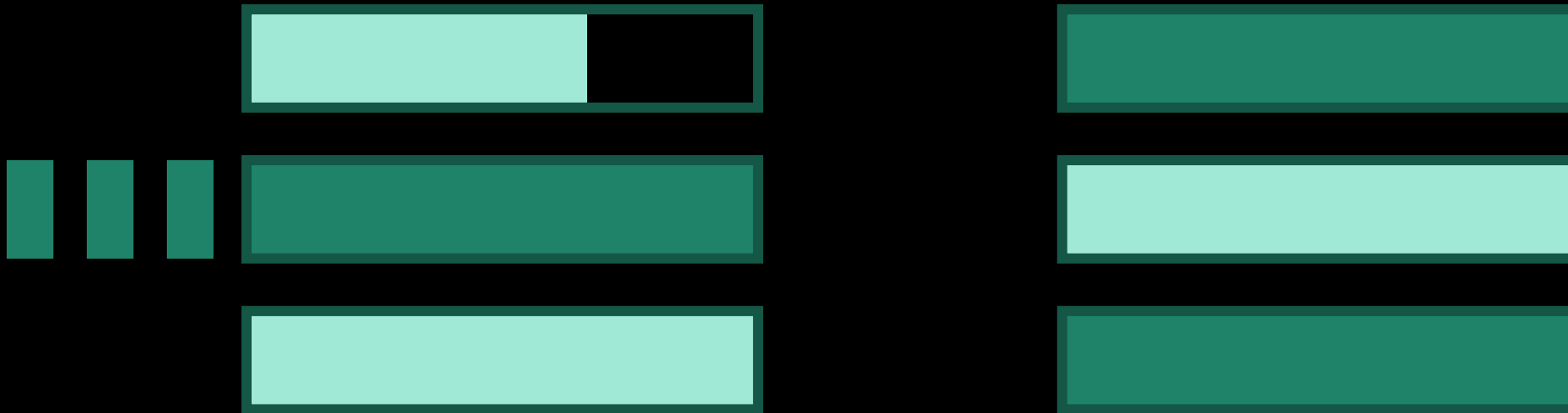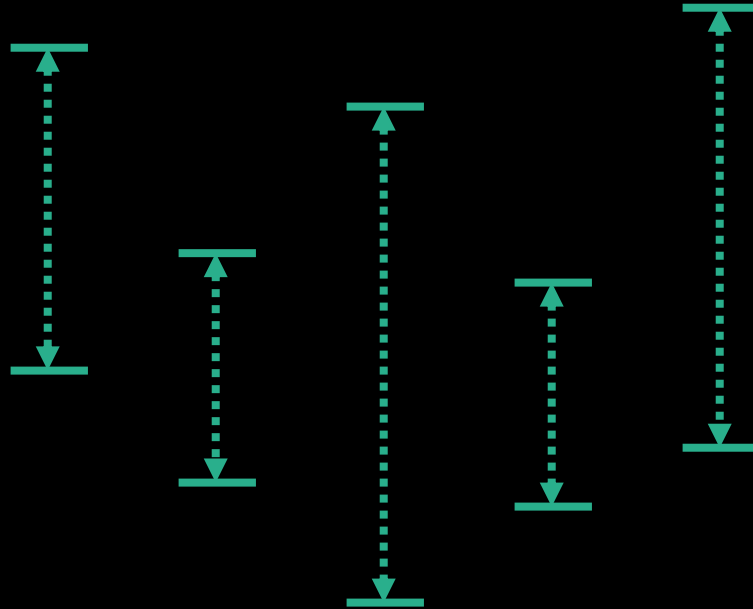# Background Frequency control

Background Frequency control

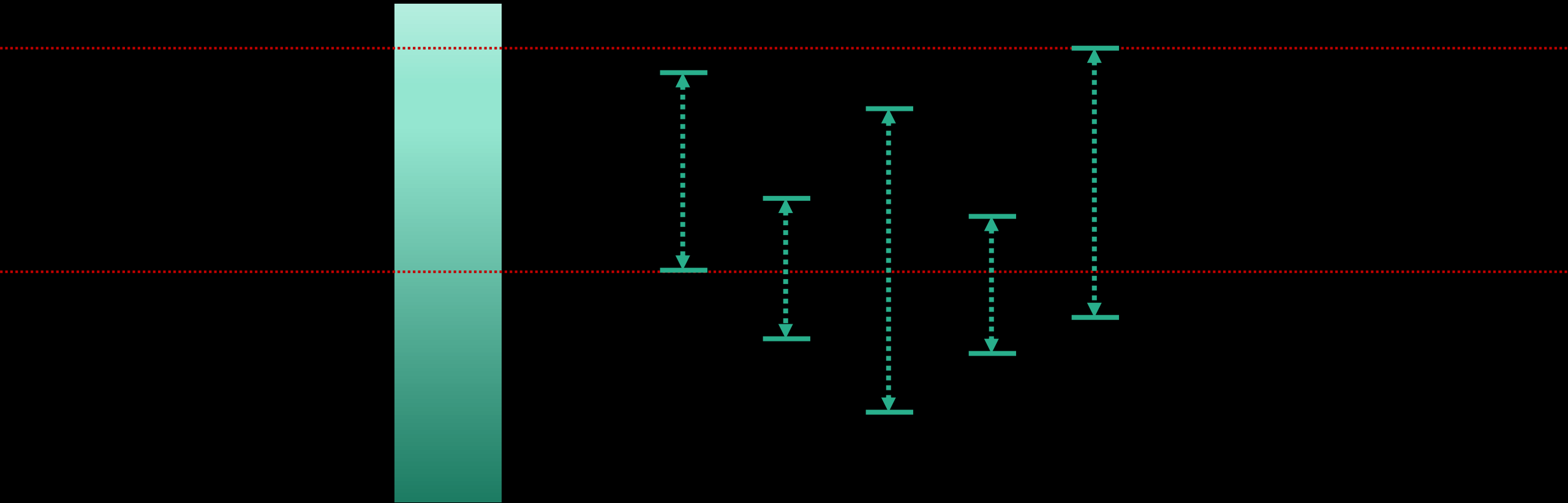# Background **Frequency control**
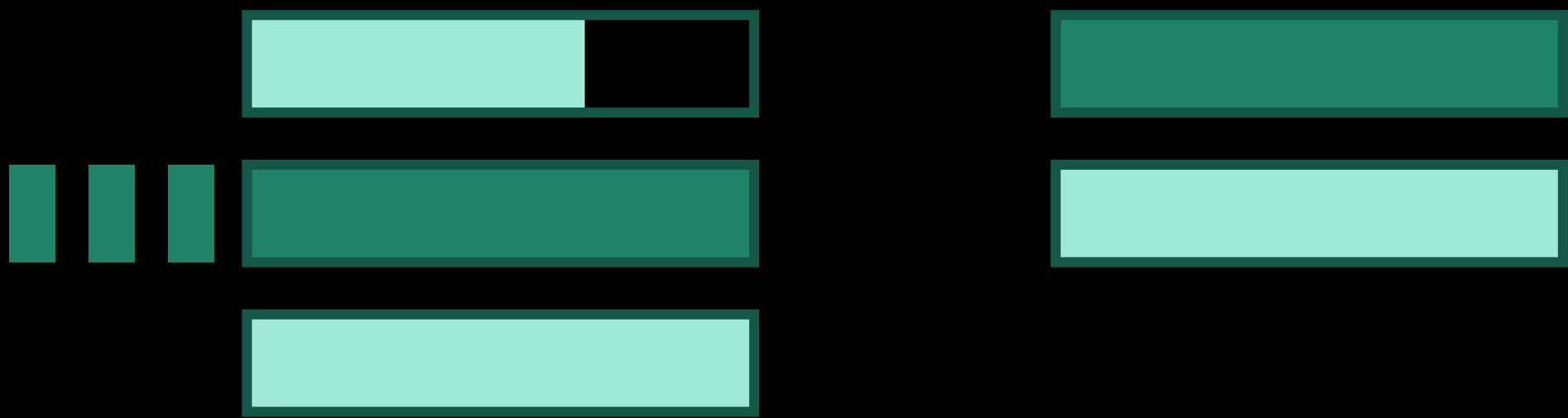
Background **Frequency control**
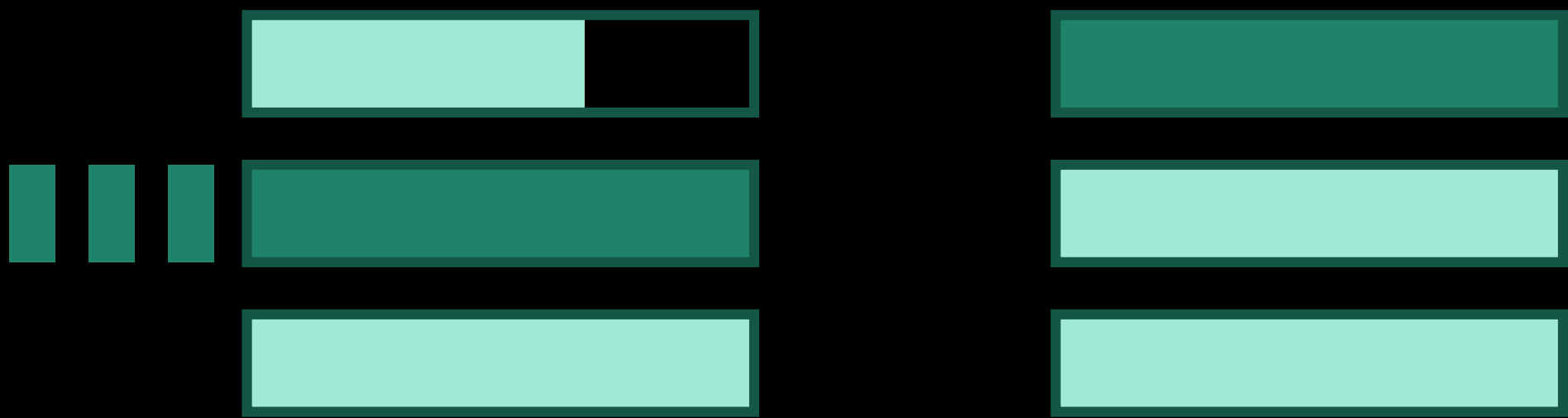
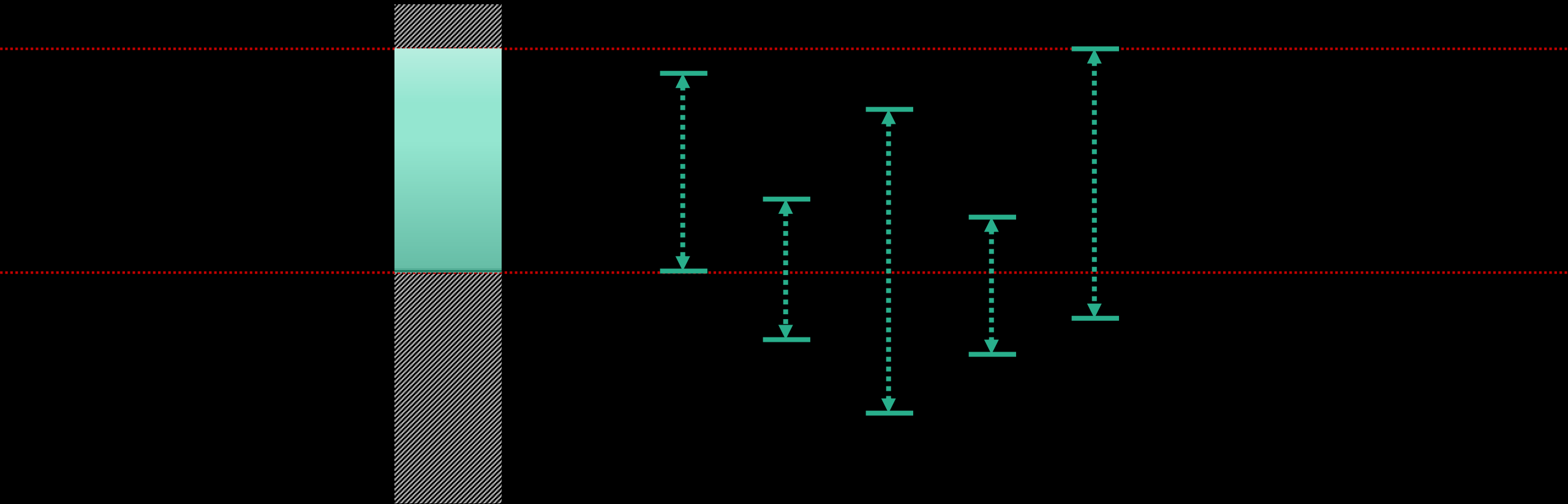# + Clamping in scheduler

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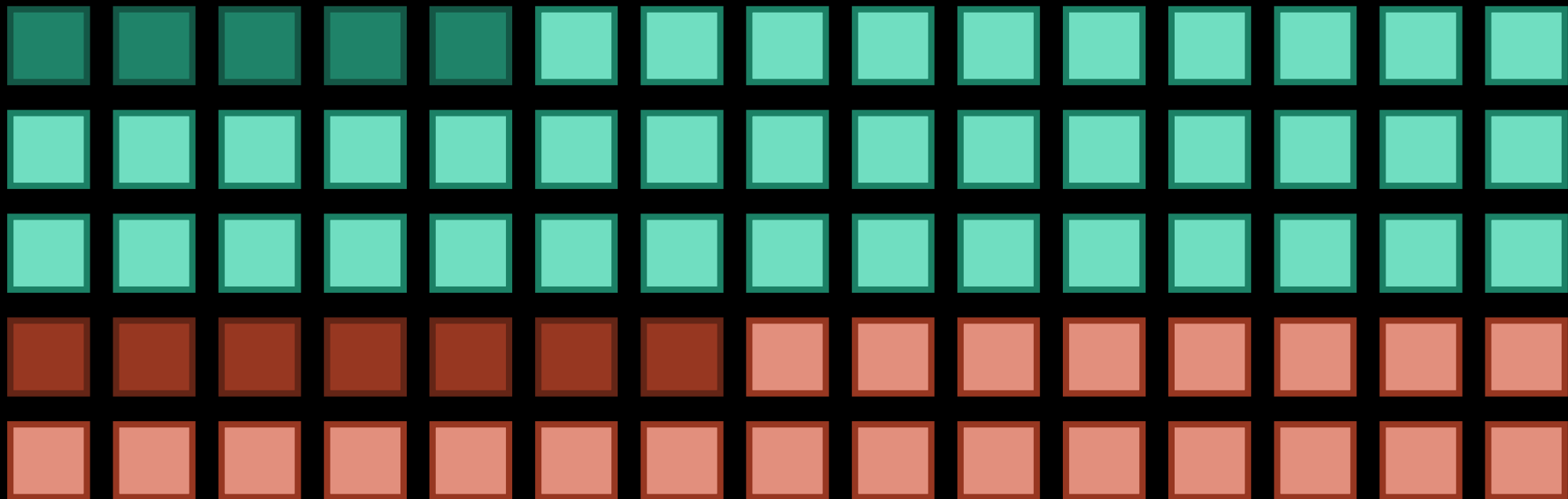# + Clamping in scheduler

+ Clamping in scheduler

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+ Clamping in scheduler

1. A system call, sched_setattr()

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

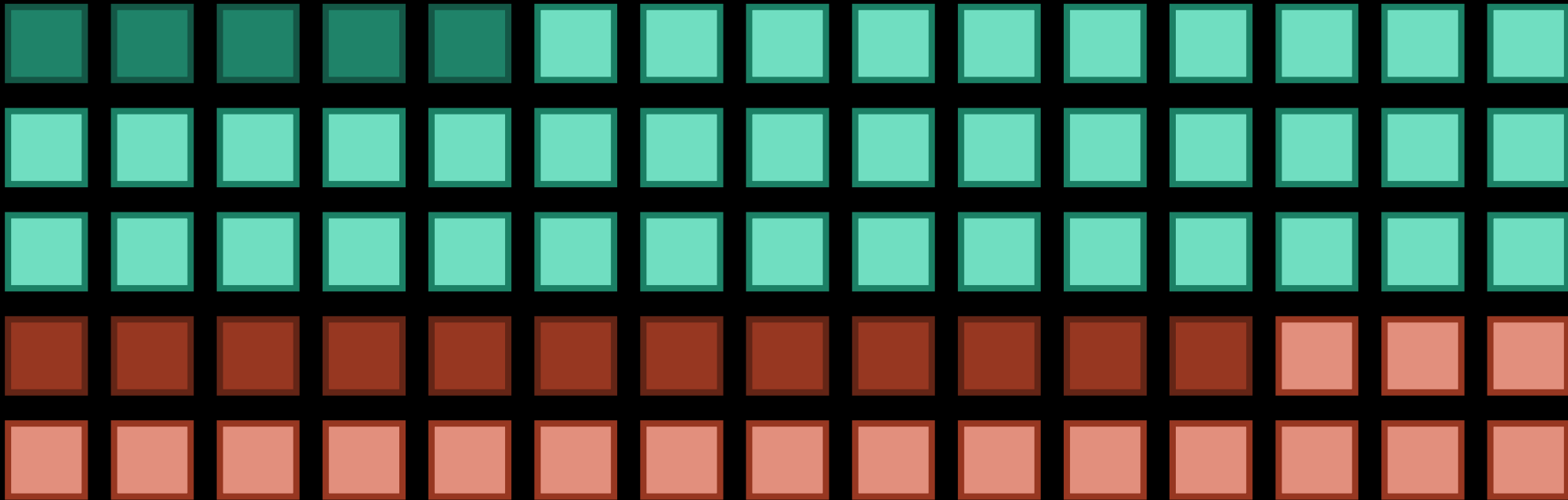3. Two sysctl knobs, sched_uclamp_util_{min, max}

! Scan anons on file re-faults

Background LRU

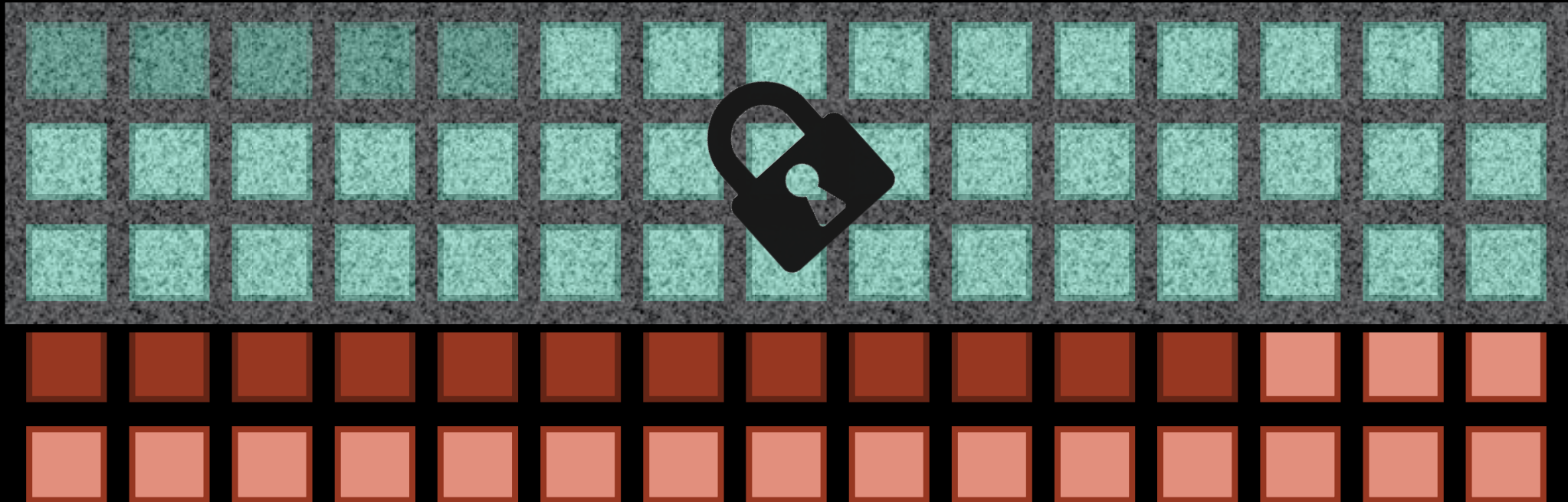# Background Heuristic on LRU

Background Heuristic on LRU
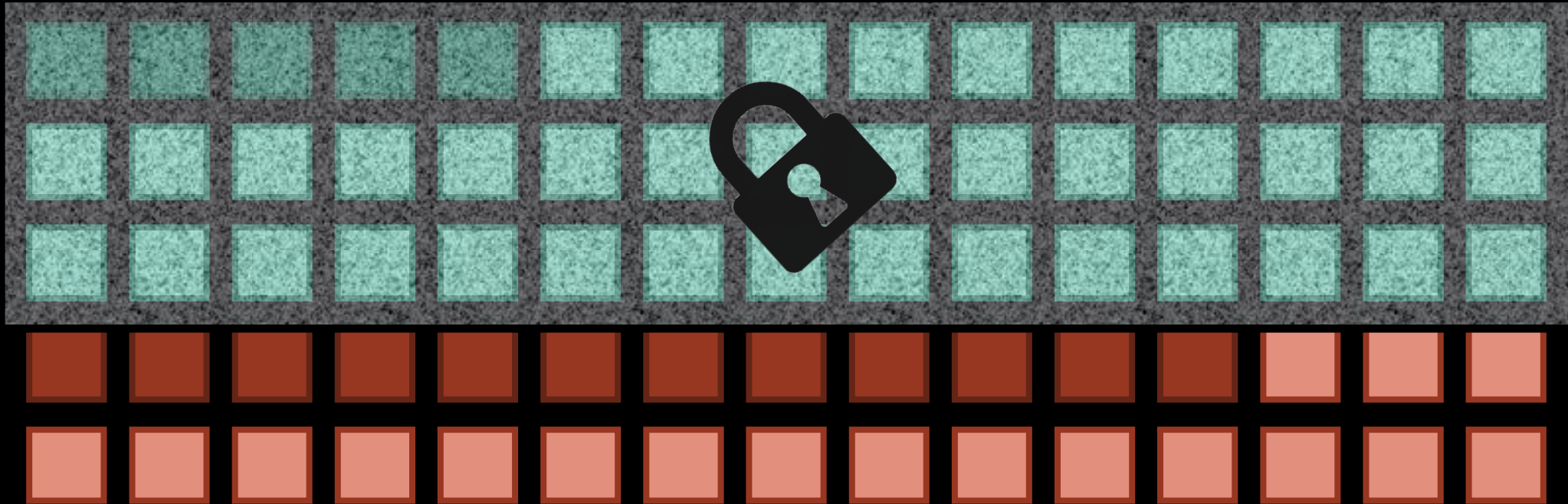
Background Heuristic on LRU

Background **Re-fault**

Background **Re-fault**

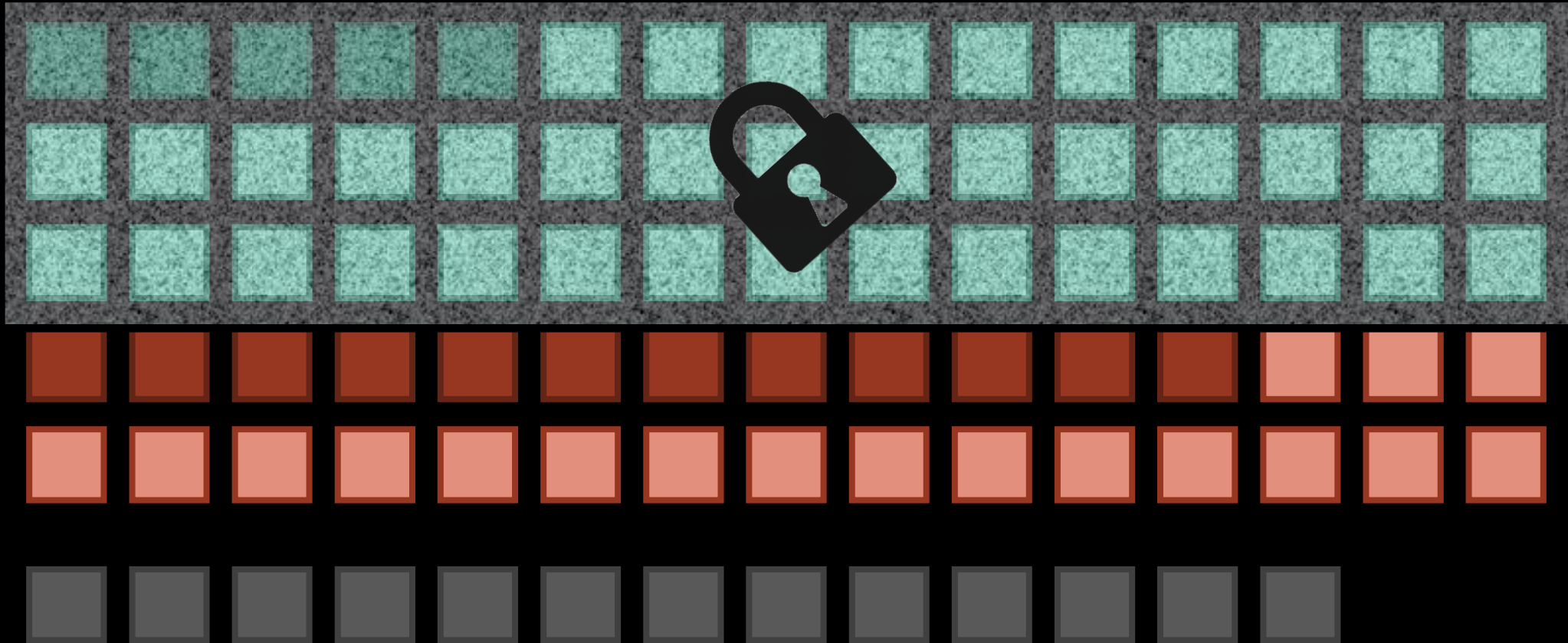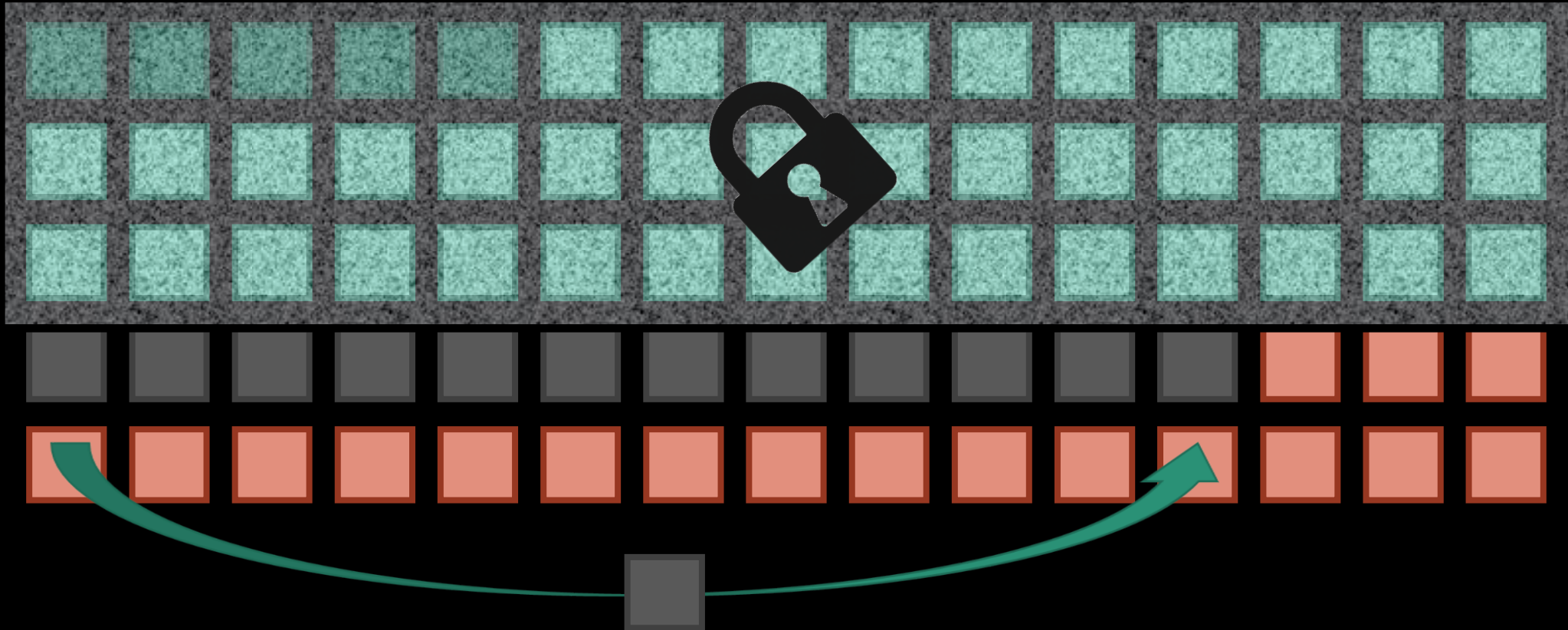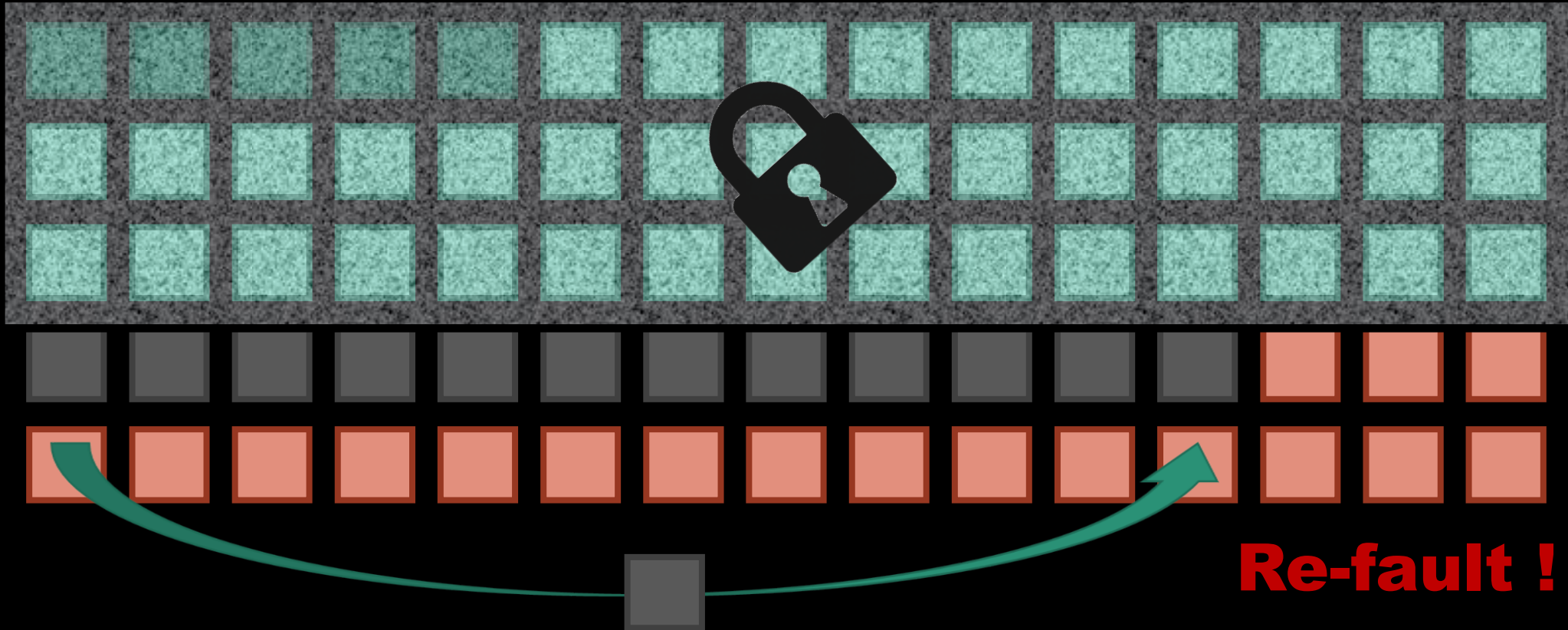# Background Re-fault

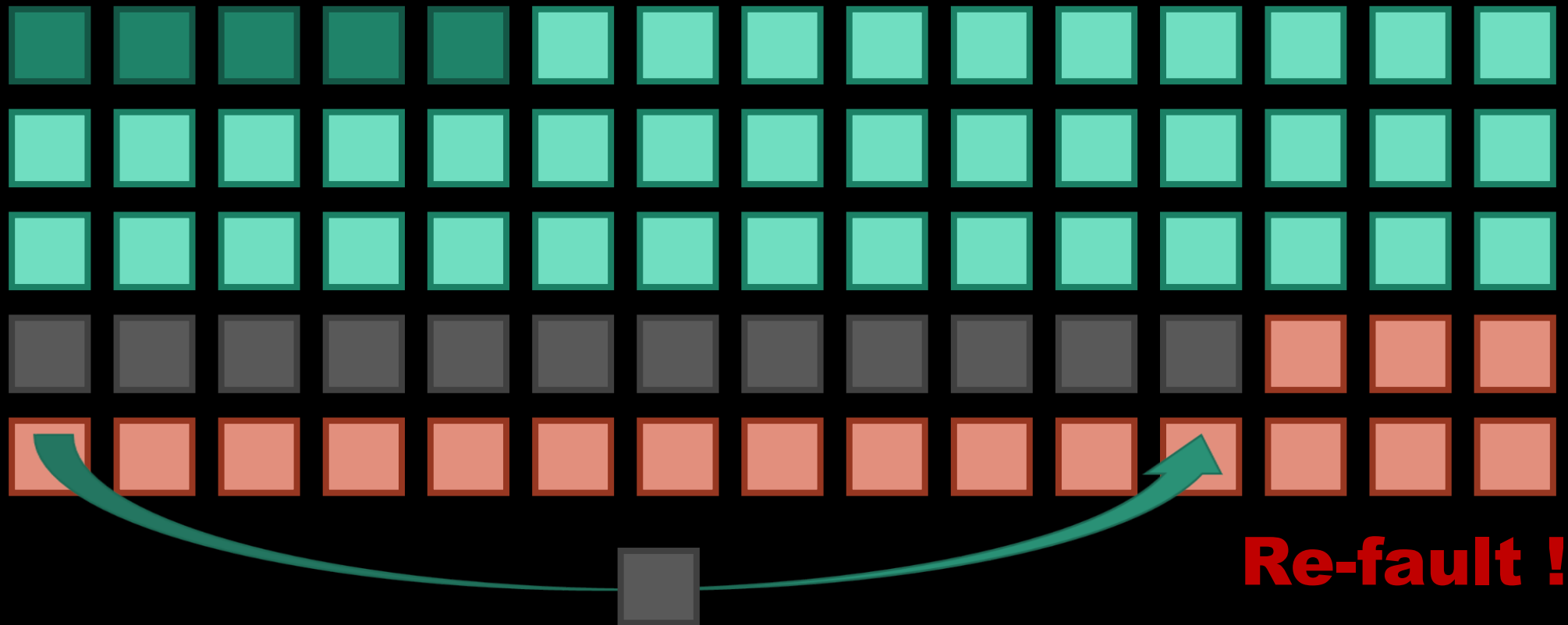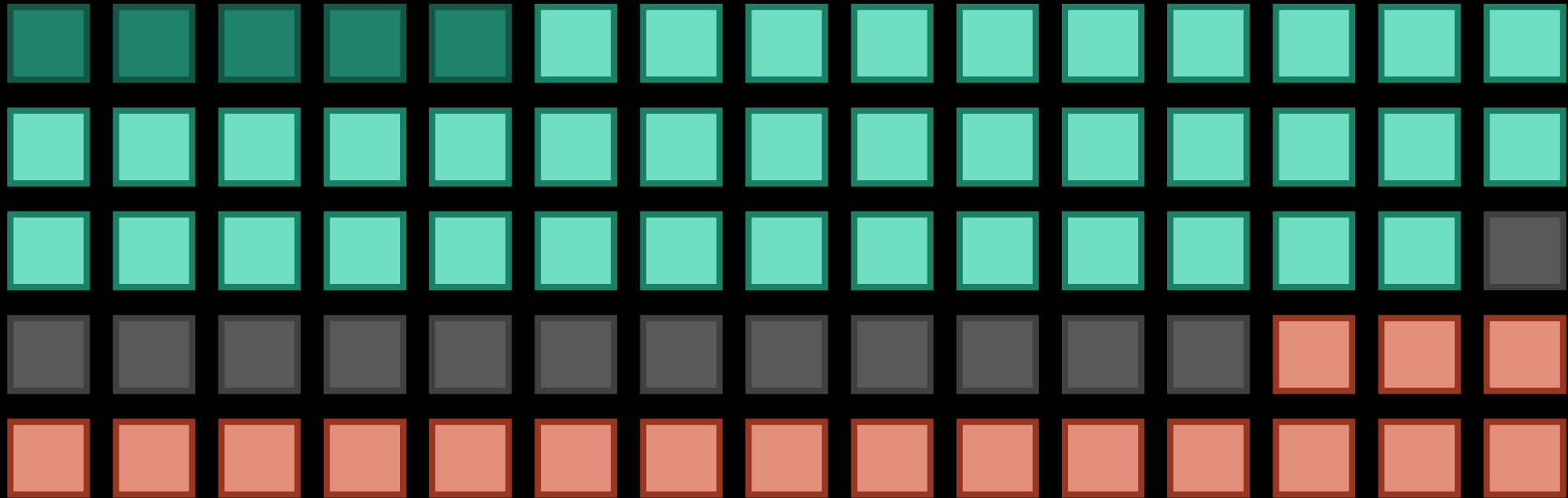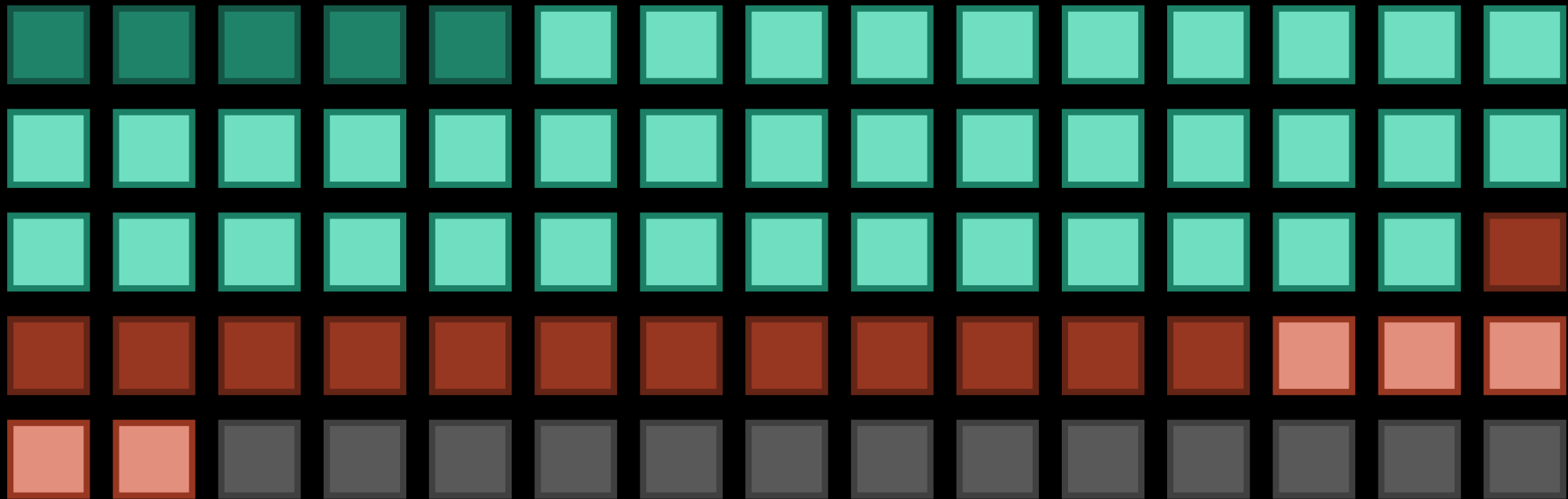! Scan anons on file re-faults

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Re-fault !

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Re-fault !

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Q & A