linaro™

Arm Solutions at Lightspeed

Scheduler and Userspace

Vincent Guittot

CoreCollective Linux Fundamentals

April 21, 2026

Introduction

- There is a gap between application and scheduler expectations
- Application wants a generic interface
  - No Scheduler details
  - No Topology details
- Applications coexistence
  - What is important
  - What should run in priority

Userspace Interface

- LPC: user assisted scheduling talks
  - schedqos

- No API or library to linked with App
  - Per Application description file
  - Thread’s name
  - Based on netlink
  - Fast version iteration

- Lib can come later

Userspace Interface

- Tagging threads
  - QOS_USER_INTERACTIVE
  - QOS_USER_INITIATED
  - QOS_UTILITY
  - QOS_BACKGROUND
  - DEFAULT

Userspace Interface

- Mapping QOS to scheduler atttributes
  - Scheduling policy
  - Nice priority
  - EEVDF slice duration
  - Uclamp attribut
  - Others ...

Userspace Interface

- Group and windows management
  - Top app vs background app

Userspace Interface

- Default to low priority
  - Lower noise level
- Scheduling policy
  - BATCH
- EEVDF slice duration
  - 20ms
- Uclamp
  - Cap max capacity

Latency and fair task ordering

- OSPM talk
- Do not break fairness
- Enable short task to run 1st
  - Shorter slice implies shorter deadline

Latency and fair task ordering

- cyclictest and hackbench (default slice 2.8ms)
  - 90th Percentile 1109 us
  - 99th Percentile 4025 us
  - 99.9th Percentile 7538 us
  - Maximum 12607 us

- cyclictest (slice 8ms) and hackbench (slice 20ms)
  - + patches under review
  - 90th Percentile 62 us
  - 99th Percentile 73 us
  - 99.9th Percentile 633 us
  - Maximum 5628 us

1109
4025
7538
12607

Scheduling push balance

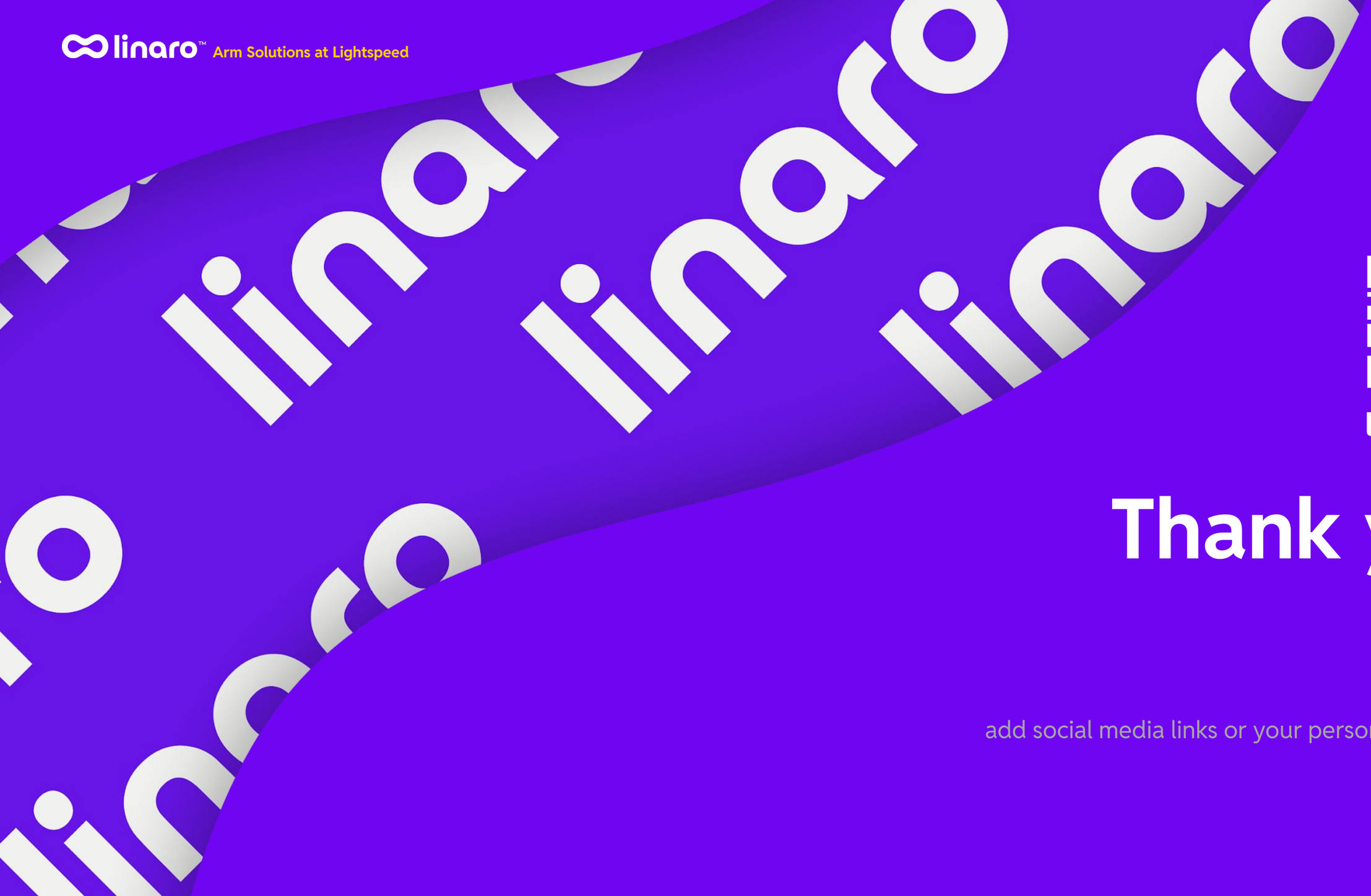
- LPC: Enabling Push call back in Fair class
  - push callback patch
- Improve fairness
  - Evaluate task placement more often
- Same algorithm everywhere
  - consistent decision
- per task vs per domain
  - periodic load balance is too big and too slow

Priority Inheritance

- Proxy execution
  - Extend priority inheritance to all scheduling classes
- Enforcing PI locks by default
  - LPC: Enforcing PI locks by default
  - Blocking and non blocking

How to participate

- Feedback
  - On the interface
  - On missing features
- Testing
  - Reporting issues
  - Reporting results
- Developping
  - Helping on features developments



linaro.org

Thank you

add social media links or your personal contacts