The Status of the Preempt-RT Patch
Embedded Linux Conference Europe 2017

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October 24, 2017
Overview

The patchqueue

Summary
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2 The patchqueue

3 Summary
What is PREEMPT-RT

- A patchset provided for certain kernels
- Provides realtime functionality
- Preempts softirq, spinlocks, IRQ-off regions
- “Is super deterministic, not super fast”
PREEMPT-RT

- Project was without funds for a few years
- LF announced RTL Collaborative Project in October 2015
- Documentation
  - https://rt.wiki.kernel.org
  - https://wiki.linuxfoundation.org/realtime/start
- Testing
  - https://ci-rt.linutronix.de
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v3.18

all  upstream  RT only

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AT91, SWAIT in TIP
Timer wheel rework TIP

v4.6
all upstream RT only

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v4.13

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Queue cleanup

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The focus during development

- v4.4 to v4.9 RT was mostly quiet
- Focus on upstream and CPU hotplug
- A few attempts were made in v4.9, finally in v4.11
- The strategy changed a few times within RT
What RT version gets released

- Starting with v4.4 every other version
- Once Greg–KH decides to make a different LTS, we follow that
- So we got RT for v4.8 and v4.9
- we continue every other version until Greg–KH ...
- ...v4.13 and v4.14
What RT versions are maintained

- Basically every supported upstream kernel
- Steven Rostedt maintains most of them
- Julia Cartwright maintains the v4.1 tree
- "Features" are hardly backported, mostly fixes
Major pieces

- Page fault disable by s/390
- timer wheel rework, made NO_HZ_FULL work
- CPU hotplug rework, started around v4.1
- hrtimer rework (pending).
- Tom Zanussi’s ”tracing: Inter-event (e.g. latency) support“ (pending).
Tiny pieces

- FUTEX rework. Closes PI-deboost problems, unbreaks SCHED_DEADLINE
- RW-Semaphore rework (unbreaks the radeon driver)
- RW-Lock rework. Helps CPU hotplug
- Fix for a bug exploited by GDB
- A lot driver and subsystem across tree.
Outstanding pieces

- MM bits. Shorter atomic sections in buddy / SLUB
- migrate disable
- local lock
- network bits
- printk, serial drivers
- signal delivery
- bit spinlocks / list_bl
- RCU
Outstanding pieces

- simple wait queues
- dcache try loops and cpu_chill()
- workqueue locking
- crypto, FPU sections
- sleeping spinlocks
- softirq bits
- various driver patches
Required patches vs nice to have

- **Required features**
  - Sleeping spin locks

- **Nice to have**
  - lazy preempt support

- **Should have but...**
  - preempt disabling handling, WARN_ON
Thank you for your attention

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