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Make LL/SC arch has a strict forward guarantee

Tuesday, 13 September 2022 13:00 (30 minutes)

For the architecture that uses load-link/store-conditional to implement atomic semantics, ll/sc can effectively reduce the complexity and cost of embedded processors and is very attractive for products with up to two cores in a single cluster. However, compared with the AMO architecture, it may not have enough forward guarantee, causing the risk of livelock. Therefore, CPUs based on the ll/sc architecture such as csky, openrisc, riscv, and loongarch haven't met the requirements of using qspinlock in NUMA scenarios. In this presentation, we will introduce how to make ll/sc have strict forward guarantees, solve the mixed-size atomic & dcas problem incidentally, and discuss the hardware solution's advantages and disadvantages. I hope this presentation will help ll/sc architecture solve NUMA series issues in Linux.

I agree to abide by the anti-harassment policy

Yes

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