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Identifying Sources of OS Noise

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This topic focuses on identifying sources of operating system "noise", primarily for polling mode latency-sensitive applications on Linux. What do we mean by operating system noise? We mean things external to an application that can affect execution of the application in a negative way, usually meaning a delay in execution causing missed deadlines. The intent here is to identify the most common noise generators and stimulate discussion on techniques for mitigating them.

Noise is not a new topic for Linux and especially the Linux PREEMPT_RT community, but over the years the performance parameters have changed. Instead of a single system being deployed to run a single real-time application with max latency thresholds of 100 microseconds, we now see one system with hundreds of cores deployed to service a mix of realtime and non-realtime applications. Some of the realtime application thresholds are in the low-double digit microsecond range. As tolerances decrease, the acceptable ceiling for noise must also decrease. A delay of 15 µs might have been acceptable when the max latency was 100 µs, but when max latency is 20 µs, 15 µs is entirely unacceptable. We need to come up with ways to wall-off these low-latency applications and protect them from sources of noise.

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