

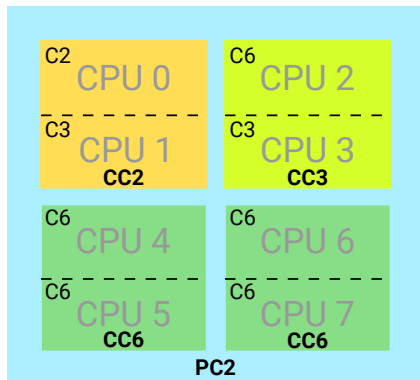
# CPU Idle Loop Ordering Problem

Rafael J. Wysocki, Thomas Ilsche

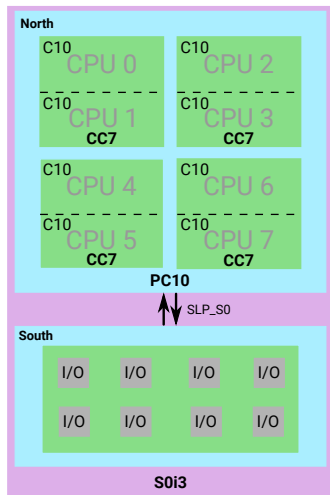
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April 17, 2018

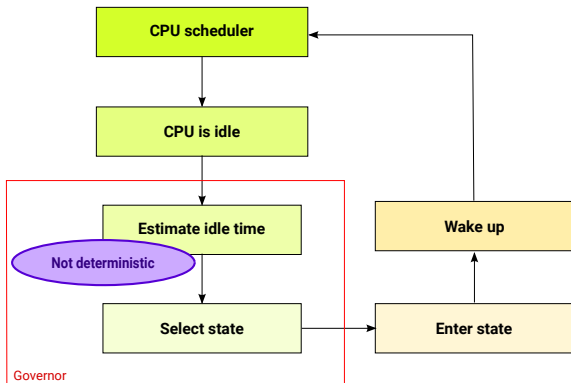
# Hierarchy of Idle States



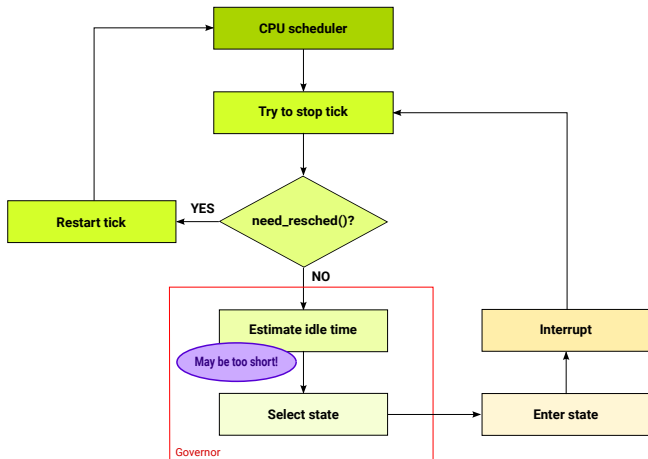
# Platform-wide (SoC-wide) Idle States



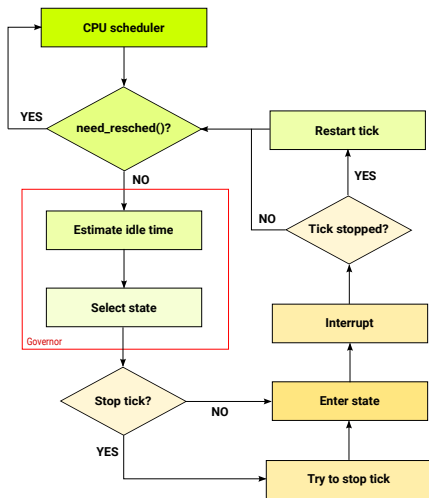
# High-level CPU Idle Control Flow



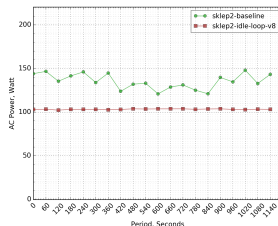
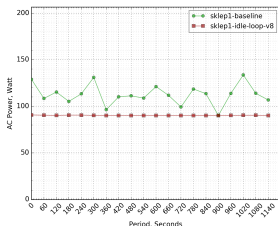
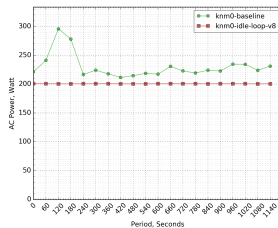
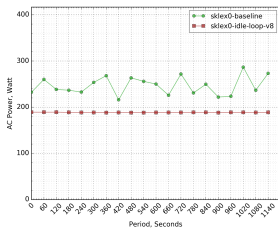
# Idle Loop Design Issue



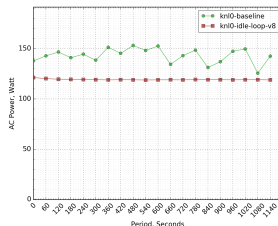
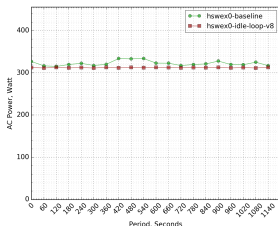
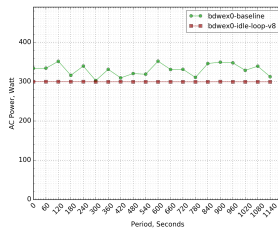
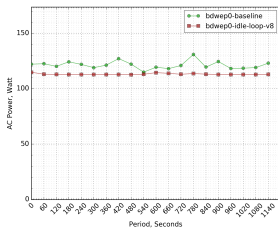
# Redesigned Idle Loop



# Idle Power (Intel OTC Server Power Lab)

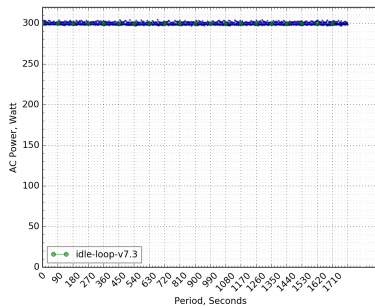
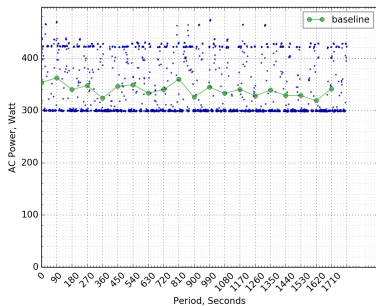


# Idle Power (Intel OTC Server Power Lab) Continued

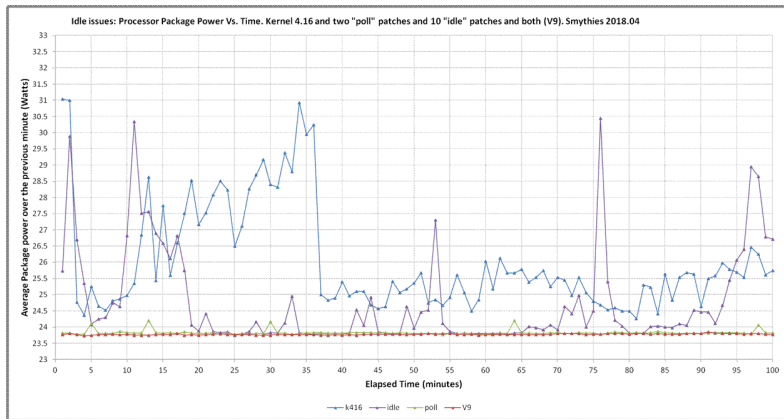




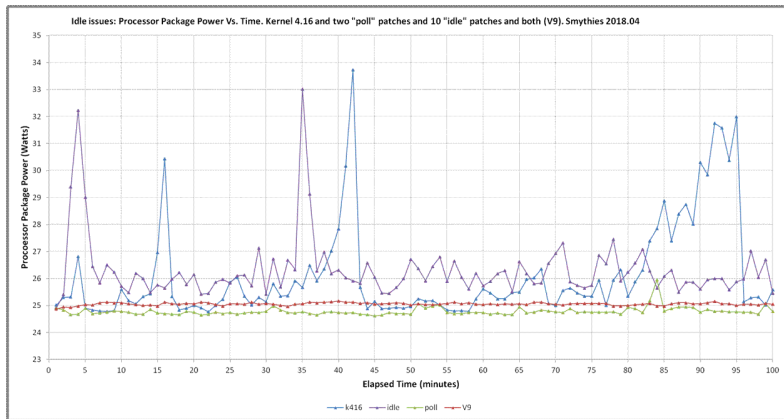
# Idle Power (Intel OTC Server Power Lab) Continued



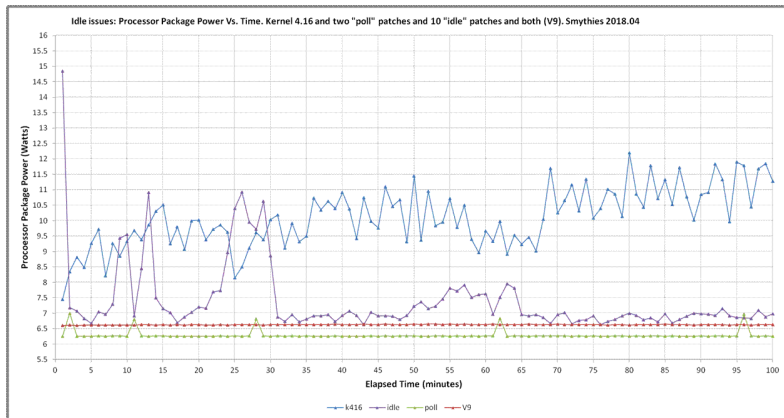
# 100% Load on One CPU (Doug Smythies)



# One-Core Pipe Test (Doug Smythies)



# 1281 Hz Work/Sleep Test (Doug Smythies)



# Questions / Discussion



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# References



Linux Kernel Bug 199227, *Idle loop ordering issue* ([https://bugzilla.kernel.org/show\\_bug.cgi?id=199227](https://bugzilla.kernel.org/show_bug.cgi?id=199227)).



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R. J. Wysocki, *Power Management Challenges in Linux* ([https://www.linuxplumbersconf.org/2017/ocw//system/presentations/4652/original/linux\\_pm\\_challenges.pdf](https://www.linuxplumbersconf.org/2017/ocw//system/presentations/4652/original/linux_pm_challenges.pdf)).



R. J. Wysocki, *PM Infrastructure in the Linux Kernel – Current Status and Future* ([https://events.linuxfoundation.org/sites/events/files/slides/kernel\\_PM\\_infra\\_0.pdf](https://events.linuxfoundation.org/sites/events/files/slides/kernel_PM_infra_0.pdf)).



J. Corbet, *The cpuidle subsystem* (<http://lwn.net/Articles/384146/>).

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