

Getting More Out Of System Suspend In Linux*

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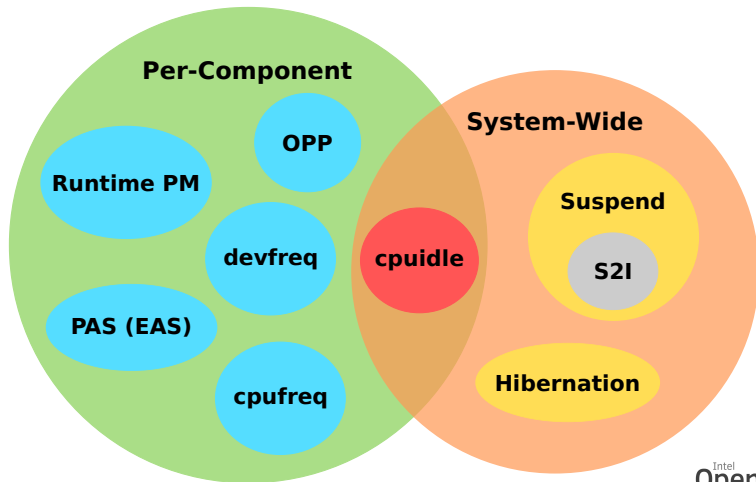
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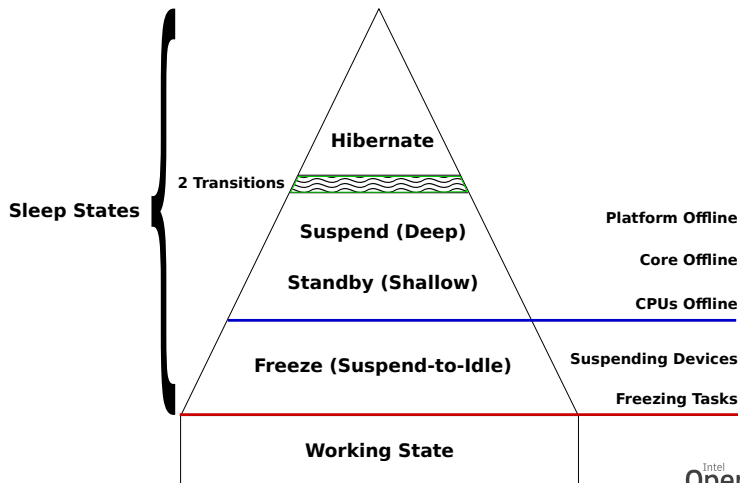
Outline

- 1 Introduction
 - Power Management Frameworks in Linux
 - System-Wide Power Management
- 2 Full Suspend And Suspend-to-Idle
 - General Idea
 - Full Suspend With Platform/HW Support
 - How Different Suspend-to-Idle Has To Be
- 3 Beyond Suspend-to-Idle
 - System Suspend Profiling
 - Reducing Resume Latency
 - PM Callback Reuse Problem
- 4 Resources

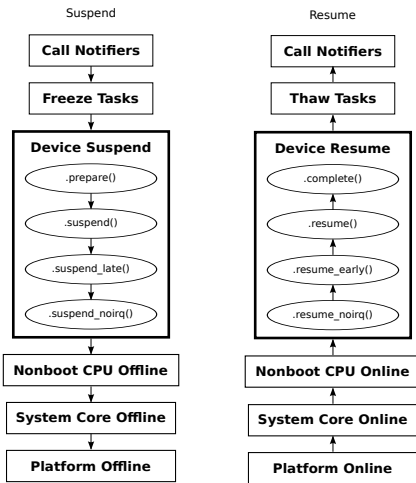
Overview Of Power Management In Linux



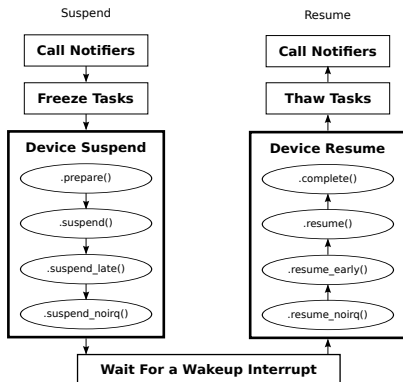
System-Wide PM Overview



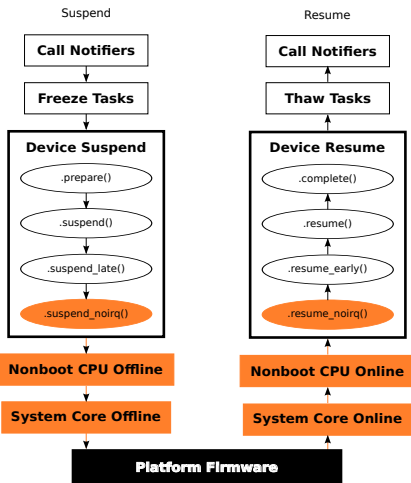
Full System Suspend (With Platform Support)



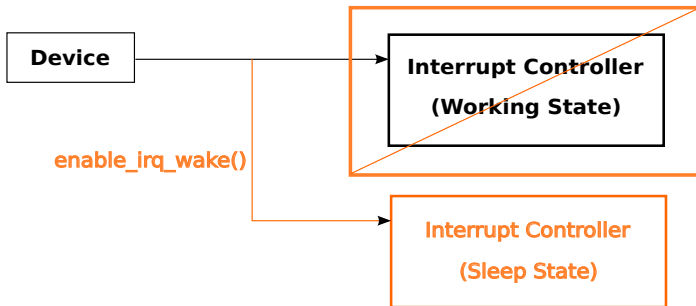
Suspend-to-Idle (S2I)



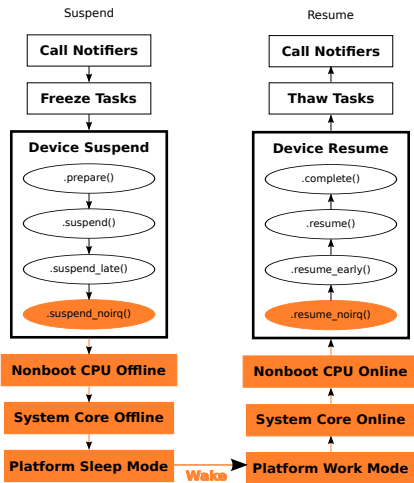
Full System Suspend On x86 PC



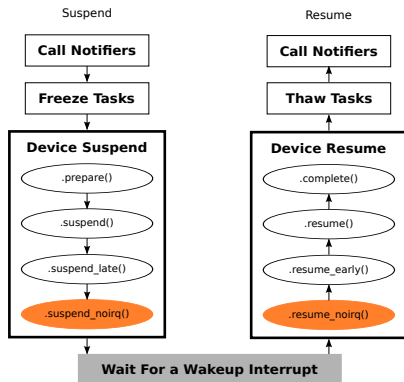
Hardware Support For Full Suspend (Example)



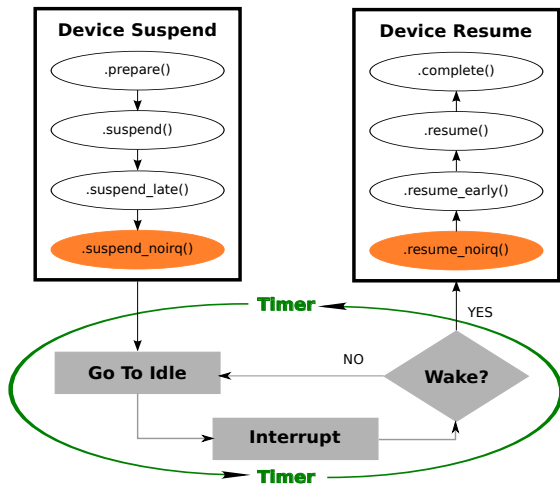
Full Suspend On Platforms With Hardware Support



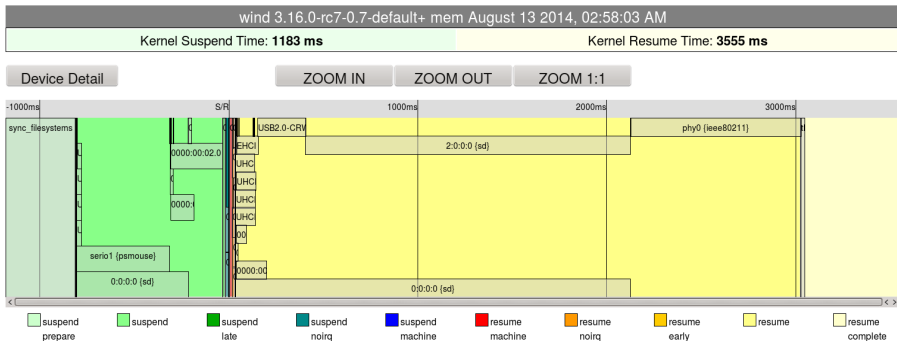
Objective: Keep Full Suspend And S2I Similar



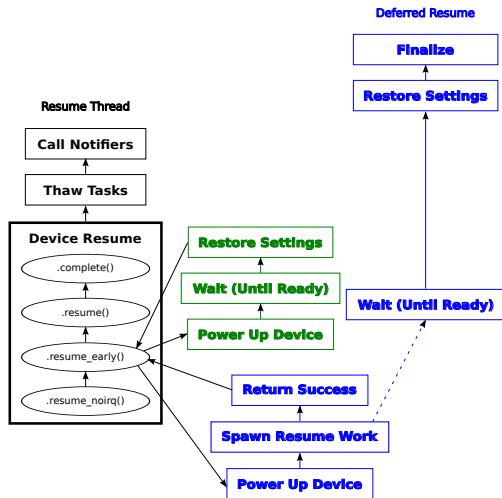
Suspend-to-Idle And Kernel Timers



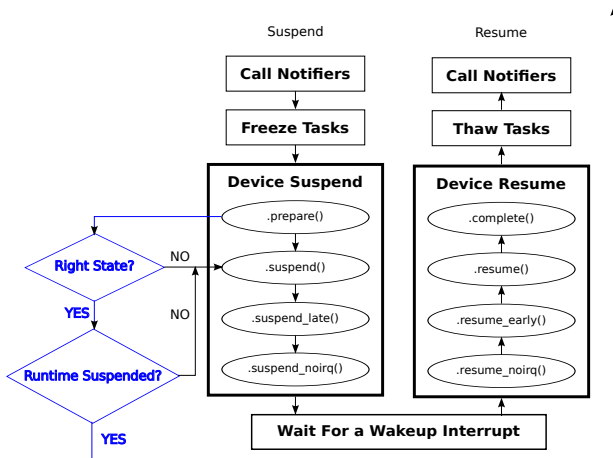
Full System Suspend Time Profile (analyze_suspend.py)



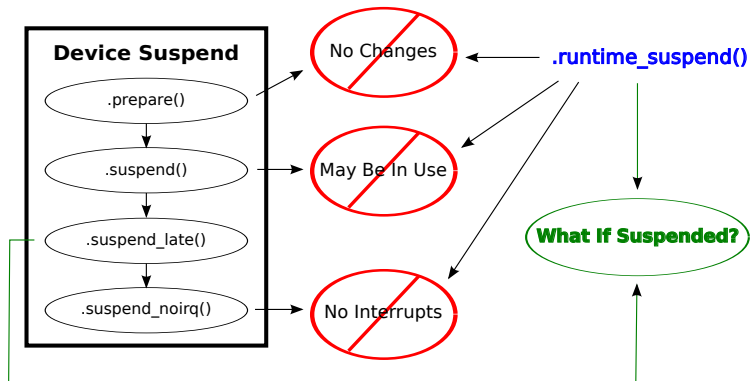
Deferred Resume Of Devices



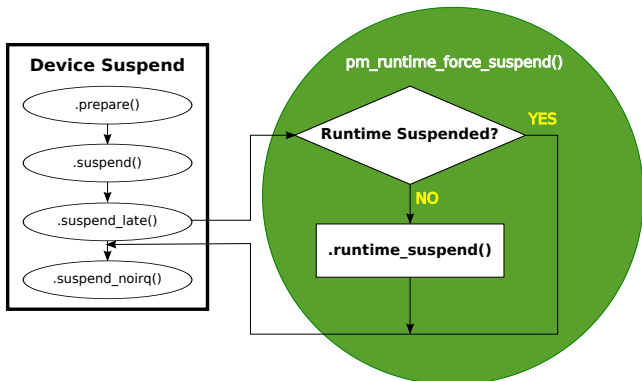
Device Suspend/Resume Avoidance



Can Runtime Suspend Callback Be Reused?



Generic Wrapper PM Callback Routines



References



R. J. Wysocki, *Why We Need More Device Power Management Callbacks* (https://events.linuxfoundation.org/images/stories/pdf/lfcs2012_wysocki.pdf).



R. J. Wysocki, *Power Management in the Linux Kernel – Current Status and Future* (http://events.linuxfoundation.org/sites/events/files/slides/kernel_PM_plain.pdf).

Tools, Documentation And Source Code

- <https://github.com/01org/suspendresume>
- <http://git.kernel.org/cgit/linux/kernel/git/rafael/linux-pm.git>
- Documentation/power/devices.txt
- Documentation/power/pci.txt
- Documentation/power/states.txt
- Documentation/power/runtime_pm.txt
- include/linux/cpuidle.h
- include/linux/device.h
- include/linux/pm.h
- include/linux/suspend.h
- drivers/base/power/*
- drivers/cpuidle/*
- kernel/power/*

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Thanks!

Thank you for attention!