

# The Future Of Linux Suspend

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# Part 1: State Of The Art

## 1 Suspend To RAM - Whitelists

- s2ram
- HAL

## 2 Suspend To Disk

- Kernel
- Userspace Suspend
- TuxOnIce



# Part 2: What's Next?

## 3 Future Trends

- Kernel - Freezer
- Kernel - Driver Infrastructure
- Kernel - TuxOnIce Merge
- Kernel - Suspend To Disk Using Kdump
- Kernel - Sleepy Linux
- Userspace - Whitelists
- Userspace - pm-utils

## 4 Users



## Part I

# State Of The Art



# Whitelists - s2ram

- Part of the uswsusp project: <http://suspend.sourceforge.net>
- Extensive whitelist, pretty good quality
- Standalone - no other software needed
- Unflexible - can only do DMI table (SMBIOS) matching
- Problems if one machine type is shipped with different graphics chips
- Needs to be recompiled to change the whitelist



# Whitelists - HAL

- Part of the hal-info package
- Pretty extensive whitelist
- Flexible - can match on everything HAL knows about
- Can easily be extended by adding a .fdi-file
- You need HAL running to use it



# Kernel Method

- "echo disk > /sys/power/state"
- Simple, proven, works
- No fancy options, relatively slow
- In mainline kernel since 2.6.0, usable since 2.6.5



# Uswsusp

- <http://suspend.sf.net>
- More complicated to set up (Distribution's job)
- Fancy options (compression, encryption, splash screens) all done in userspace
- In mainline kernel since 2.6.17rc1





# Tuxonice - Formerly Known As "suspend2"

- <http://www.tuxonice.net>
- Developed and maintained as a kernel patch by Nigel Cunningham
- Relatively easy to set up, once the patched kernel is built
- Fancy options (compression, encryption, splash screens) in kernelspace
- Well supported by Nigel



## Part II

# What's Next?



# Suspend Future - Kernel

## Freezer

- Stops all processes during suspend and resume
- Some people with freezer problems want to remove it
- Will not go away soon, but is going to be removed eventually
- Removal needs to be considered in many parts of the kernel
- First for suspend to RAM, later also for suspend to disk
- Removal will probably not solve all problems automatically



# Suspend Future - Kernel

## Driver Infrastructure / Powermanagement Core

- Rafał Wysocki is overhauling the driver infrastructure
- Planned for 2.6.24
- Development is ongoing, but slower than planned
- Takes longer in order to not break everybody's system
- Work is being done on the PM core preparing for the freezer removal



# Suspend Future - Kernel

## TuxOnIce Merge

- For some time, Nigel tried to merge TuxOnIce into mainline
- TuxOnIce is very dependant on the freezer
- The freezer is probably going away - a merge becomes more unlikely
- Nigel is contributing lots of good bugfixes for drivers and infrastructure to mainline



# Suspend Future - Kernel

## Using kdump For Suspend

- Some think that current suspend to disk methods are fundamentally broken
- Using kdump to suspend a machine shall fix this brokenness
- The experts are waiting for a working solution which is comparable to the existing ones



# Suspend Future - Sleepy Linux

Sleepy Linux - Suspend much more often

- Pavel Machek is working on it
- "Today's hardware is mostly capable of doing better: with correctly set up wakeups, machine can sleep and successfully pretend it is not sleeping – by waking up whenever something interesting happens."
- Current State: Prototype



# Suspend Future - Whitelists

- Having whitelists in different places is doubled work
- HAL is more flexible at matching hardware
- Some efforts will move from the s2ram whitelist to the hal-info list
- Even if this means that you need HAL / pm-utils installed





# Suspend Future - pm-utils

- pm-utils have effectively been forked
- Nobody is working on the original project anymore
- Lots of cosmetic changes, not much substantial
- No changes for the users (yet)



## Suspend Future - Users

- Found a problem? Report it!
- Distribution's Bugzilla - <http://bugzilla.novell.com>
- If it's a kernel problem - LKML or <http://bugzilla.kernel.org>
- Kernel developers usually don't bite! ;-)



# Suspend Future - Bug reports

- <http://bugzilla.novell.com>
- Product: openSUSE 11.0
- Component: Mobile Devices



# The Future Of Linux Suspend

Thank You!

## Important Links:

Userspace suspend: <http://suspend.sourceforge.net>  
s2ram Introduction: <http://en.opensuse.org/S2ram>  
pm-utils Introduction: <http://en.opensuse.org/Pm-utils>  
TuxOnIce: <http://www.tuxonice.net>

