Linux Wireless 2009

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Who am I?

Who am I?
Background
Current Work
Future Work
Fedora
Conclusion

Governmental Regulations
Full MAC vs. "Soft" MAC
Wireless Extensions

Governmental Regulations

Governmental regulations are a much larger concern for wireless networking than for wired technologies (e.g. Ethernet).

- Users could face legal consequences if we do the wrong things!
- Some vendors are reluctant to cooperate with us...

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Full MAC vs. "Soft" MAC

Designs for wireless LAN adapters fall into two broad categories...

- Full MAC devices look a lot like Ethernet
    - Behavior is determined solely by vendor...
    - Lots of firmware, needs CPU and memory resources – expensive...
    - Lots of vendor control, easier to support open source drivers!
- "Soft" MAC devices expose the ugly truth...
    - Little or no firmware – cheaper to produce...
    - Hardware vendor has less control...
    - Behavior can be made consistent across lots of devices!

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Wireless Extensions

The "wireless extensions" API is ancient and venerable?

- Based upon the IOCTL system call...
- Drivers forced to reimplement lots of code...
- Specification is vague about behavioral details...
- Semantics are based on individual attributes rather than specific actions...
- Get the picture?

Fortunately, cfg80211 is maturing as a viable replacement!

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New Drivers
Regulatory Compliance
Power Saving Improvements
cfg80211 Support

New Drivers

New drivers continue to show-up...

- mwl8k
- ar9170
- p54spi
- iwmc3200wifi
- wl1251
- Always new PCI/USB IDs for existing drivers too...

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Regulatory Compliance

CRDA is a userland component used to update the kernel with regulatory information...

- Invoked by udev when regulatory domain is set...
- Uses signed database of regulatory rules...
- Without CRDA, kernel relies on limited set of regulatory rules!

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Power Saving Improvements

Saving power is important!

- Constant improvement to drivers...
- IEEE802.11 standard power saving

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cfg80211 Support

The new configuration API for wireless is cfg80211...

- A sane API built around Netlink sockets...
- Maturing as we speak...
- Older "full MAC" drivers need to be ported...
- Wireless Extensions must die!

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Roaming Improvements
Automated Testing
lib80211 Expansion

Roaming Improvements

Roaming between access points is an important part of the wireless experience...

- Full MAC devices mostly roam in firmware...
- Other devices rely on userland for roaming...
- Kernel could provide hints and other services to be helpful!

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Automated Testing

Test automation is helpful for avoiding regressions...

- mac80211_hwsim driver can eliminate some hardware needs...
- Need test plans and scripting!

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lib80211 Expansion

Wireless code yearns for consolidation...

- Too many wireless stacks...
- Cryptography code could be shared...
- Other common bits related to frame parsing, etc...

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Kernel
Userland
FUDCon

Kernel

How does the Fedora kernel get it's wireless bits?

- Before 2.6.27, kernel bits came straight from wireless-testing!
- Now kernel bits come from equivalent upstream kernel, plus selected fixes...
- http://wireless.kernel.org/en/users/Download

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Userland

New wireless userland components have emerged upstream...

- iw is a command-line tool for interacting with nl80211
- crda provide regulatory rules to the kernel
- udev rule for setting regulatory domain depends on system-config-date!

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FUDCon

Wireless mini-summit at FUDCon!

- Several upstream wireless hackers among us...
- Wireless presentations prepared for mini-summit, please vote for our presentations and join us!

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Slides available:
http://www.kernel.org/pub/linux/kernel/people/
linville/fudcon-berlin-2009/