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Open Source and commercial success
in the embedded world

Mirko Vogt - mirko@openwrt.org

mirko@openwrt.org

QCon 2014, Shanghai, China

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About me

- IT freelancer
- focus on embedded/smart devices (phones, digital picture frames, mini notebooks and wifi routers)
- Part of the OpenWrt project since 2007
- Porting / maintaining of graphical stack in OpenWrt (Xorg, Qt, GTK, Enlightenment, etc.)
- Co-founded Sharism / Qi-hardware project

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Random facts about OSS

- >90% of todays sold embedded devices involve Open Source Software

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- It's not a rumour companies do benefit from Open Source Software

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Random facts about OSS

- \>90% of todays sold embedded devices involve Open Source Software
- It's not a rumour companies do benefit from Open Source Software
- It's not just because it's free as in free of charge, but it fits better
  (intel, Google, Apple, IBM, Oracle, Amazon, Facebook, NASA, RedHat, ..)

Linux Kernel

Linux Kernel

- **too big to fail**

Linux Kernel

- **too big to fail**
  - discontinuation, relicensing, etc. highly unlikely

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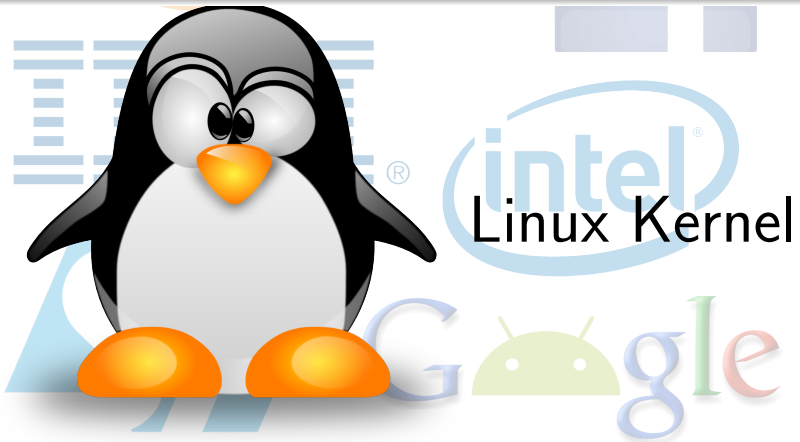Why should you consider using OSS?
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Linux Kernel

- **too big to fail**
- discontinuation, relicensing, etc. highly unlikely
- well-known, scalable, stable, audited multi platform OS

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Linux Kernel

- **too big to fail**
- discontinuation, relicensing, etc. highly unlikely
- well-known, scalable, stable, audited multi platform OS
- Alternatives?

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- Open Source projects can't be easily shut down, relicensed, etc. $\rightarrow$ gains independency to companies which use it

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- Open Source projects can't be easily shut down, relicensed, etc. → gains independency to companies which use it
- No pig in the poke
  - Base upon work which can be fully reviewed, audited and used without contracts or commitments
  - Probably already used, tested and reviewed by others

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- No pig in the poke
  - Base upon work which can be fully reviewed, audited and used without contracts or commitments
  - Probably already used, tested and reviewed by others
- You can fix bugs yourself

Why should you consider contributing to OSS?

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- maintaining patchsets

company/product
specific changes
....

OpenWrt

Release: AA

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- maintaining patchsets

- Trees diverged!

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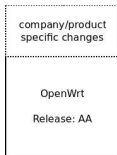Why should you consider using OSS?
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- maintaining patchsets

  - Trees diverged!
  - What to do? backporting security fix? levelling up patchset?

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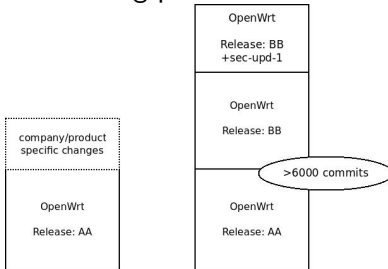How to (not) collaborate with OSS projects?
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- maintaining patchsets

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- Licenses (GPL, etc)

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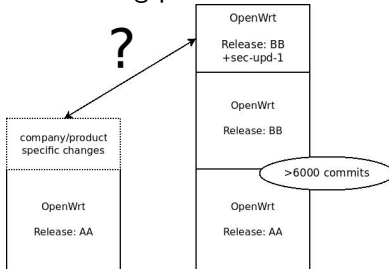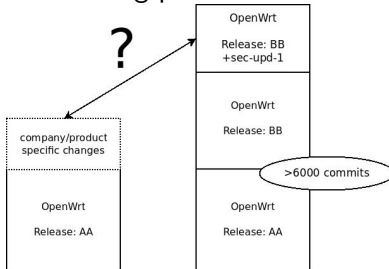Security in embedded devices

- maintaining patchsets

  - Trees diverged!
  - What to do? backporting security fix? levelling up patchset?

- Licenses (GPL, etc)

- → Solution: Submit your changes upstream! Don't fork, join!

How you should (not) collaborate with OSS projects?

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'''Best-in-class Wireless-AC router now available for purchase with even more features and OpenWrt support'''

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'''OpenWRT developers will be provided hardware
and SDKs/APIs to begin creating custom firmware'''

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They sent a patch to devel-mailinglist

- didn't follow patch submission guidelines
- it was breaking existing platforms
- containing proprietary, binary only software

'''OpenWRT firmware is coming but is not being
developed by Linksys. We are working with the OpenWRT
team to give them whatever support they need for their
release. We do not have any time frame for OpenWRT to
release firmware for the WRT1900AC but it is in progress
and will be available at some point in the near future.
We suspect that they will announce it as soon as it is
available.'''

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- Respect other party's interest

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- Respect other party's interest
- Contribute properly to OSS projects

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- Respect other party's interest
- Contribute properly to OSS projects
- Honesty in marketing / press releases

Why should you consider starting your company's software project as OSS project, right from the beginning?

- Public, decentralised review

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- Public, decentralised review
- Every complex product has bugs, especially software

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- Public, decentralised review
- Every complex product has bugs, especially software
- Backdoors (D-Link, Netgear, Linksys, ..)

  ```
  strcmp(request->user_agent,
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  ```

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- Trustworthy and maintained devices are a selling point!

Security in embedded devices

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- Hackers are not necessarily the bad guys anymore, but the companies which don't protect their customers data
  - If you get hacked by a 16 year old script kiddie, who is to blame?

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    - Sony PlayStation hack as example:
      https://en.wikipedia.org/wiki/PlayStation_Network_outage

      '''The PlayStation Network outage was the result of an "external
      intrusion" on Sony's PlayStation Network and Qriocity services, in
      which personal details from approximately 77 million accounts were
      stolen and prevented users of PlayStation 3 and PlayStation
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      [..]
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- You really don't want that kind of PR

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- Think about update paths while designing a new product (signing, verifying, etc.)

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- Think about update paths while designing a new product (signing, verifying, etc.)
- Keep in mind IPv6 is coming $\rightarrow$ every single device will be exposed to the internet
  - especially interesting in consideration with the upcoming *internet of things*

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  - especially interesting in consideration with the upcoming *internet of things*
- Trustworthy computing

```
'''What I mean by this is that customers will always be able to rely on
these systems to be available and to secure their information.
[..]
Trustworthiness is a much broader concept than security, and winning our
customers' trust involves more than just fixing bugs and achieving
[service] availability.
[..]
No Trustworthy Computing platform exists today.'''
```

Thanks!

Thanks!

Questions?