
tm
The libre embedded GNU/Linux distro

whoami

- Co-Founder `LibreWRT` project
- Founder and Lead Developer of `libreCMC`
- Worked for a few non-profits that provide free (libre) education resources
- Advocate for the usage of Free (libre) Software
- I break stuff for other people

LibreWRT

- A fork of OpenWrt with similar goals
- Started at LibrePlanet 2010 w/5 other individuals.
- Focus around PDAs, Audio Players and an eReader.
- First target was the Ben Nanonote (PDA)
- Left the project late 2011

What is libreCMC?

- libre Concurrent Machine Cluster
- Fork of OpenWrt → LEDE → OpenWrt???
- Linux-libre kernel
- Remove targets which have a hard dependency on blobs (drivers, platform init and loadable firmware)
- Started the fork October 2012

What is libreCMC?

- Distributed compile / build farms with random hardware (distcc, Icecream, GNU parallel).
- Inspired by hardware limitations when working on LibreWRT
- Failed due to lack of time and technical reasons
- At this point “libreCMC” is just a name (for now)
- Approached to create a maintained libre distro for routers
- Too lazy to come up with a better name

libreCMC

- Project goal is to provide a fully free software distro for embedded devices.
- Made GNU FSDG endorsed distro list in 2015
- LibreWRT folded into libreCMC at the same time
- Current focus is on Routers and NAS devices
- Release every 3 mo.
- Target LTS support for 10 years (starting with 1.5.x).

Why?

Embedded Realm

- Long been non-free
- Most solutions have “blobs”
- Black boxes everywhere!
- Manufactures violate licenses
- Manufactures / ODM (Original Device Manufacture) impose obsolescence
- User has little freedom

Embedded Realm

- Secure Boot w/o user control mechanism
- Cut serial lines
- Void warranty for changing software and force scary messages (This device might cause death because it is unlocked : My Phone).
- Forcefully brick devices when unauthorized software is used (Nintendo 3DS warning on box)

Embedded Realm

- OpenWRT : Non-free parts (functional aspect)
- DD-WRT : Takes away freedoms / restrictive / does not build from source.
- OpenEmbedded/Yacto / Angstrom : bloat and compliance issues
- Ubuntu Core 4 GB of space / 1GB fallback imgs
- Embedded Debian : 16M images?
- Embedded space is growing out of control

Embedded Realm

- Package management comes at a cost
- Updates are not always an option
- Not everything needs to be connected to the Internet (IoT is not usually the answer)
- Security model needs to account for lack of updates (still not an excuse for OEMs to not support hardware)…
- Fail gracefully

libreCMC : The Hard Truth

- LibreCMC does not support everything under the sun.
- Freedom, security or bloat are the main reasons for lack of support of feature X
- Not competing with other projects
- If it works, great! If it does not, maybe it can in the future

libreCMC Project(s)

- Essentially 2 projects: consumer facing (stable) and Research
- Consumer facing project helps fund research from OEM device sales and donations
- A sustainable model will help keep the project around and development alive
- A lot of research work does not pan out (expensive)

libreCMC Project(s)

- Main focus of resources is on targeting routers and routing applications
- Focus on other areas will expand once other parts of the puzzle come together

libreCMC

- Research (unstable) → consumer (stable) → OEM (stable)
- Research:

1)Bloat

2)Build System

3)Distributed / Grid computing

4)Long-Term Support / extended Long-Term Support eLTS 10 / 15 yrs

Applications

- Router, controllers, PDA-like, communications.
- LSaaS (Local Software as a Service)
- LPaaS (Local Platform as a Service)
- Advocation of decentralized services (Federated services)

Research

- Embedded OS design
- Find what works
- Re-invent all the wheels!

Research Design

- Accommodate other kernels and paradigms
- Do more with less : fewer dependencies
- Strict standards with sane fallbacks
- Build with the past and future in mind

Research : Build System

- libreCMC currently uses (OpenWRT/LEDE) buildroot
- Current situation: everything breaks within ~2 years (custom, buildroot, yacto/OpenEmbedded)
- Source needs to be buildable for 10+ years
- STOP making hard dependencies on one version of X or distribution (Fedora Core 3)?

Research : Build System

- Allow for other compilers and tools to be integrated

Research : Bloat

- Resources are cheap now, but not for most people (many still rock single core sys. W/ 4 GB of RAM)
- Resources can change in price (look at RAM now)
- The smaller the parts, the better we can audit and secure the sum of the whole system
- More than half of libreCMC targets have <4M of flash and 16 MB of RAM.

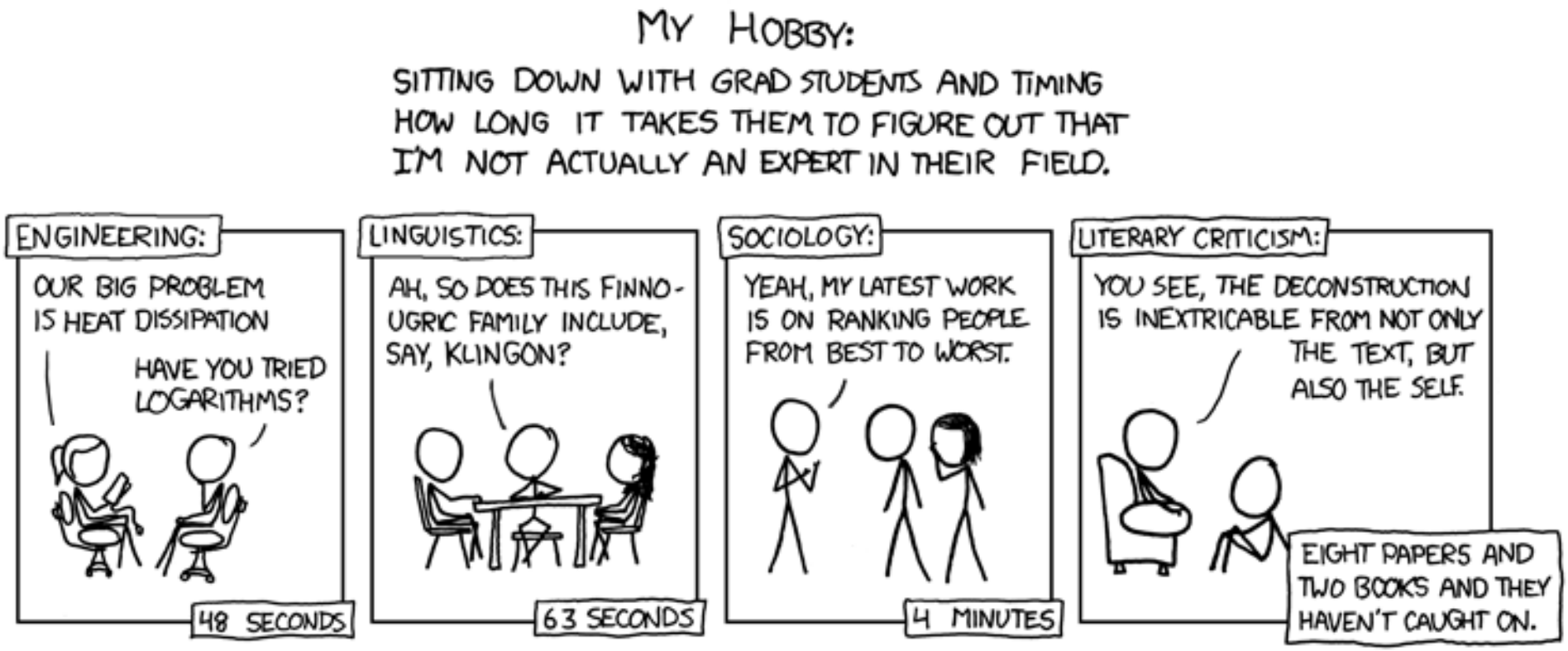
Research : Bloat

- Resources are becoming stagnant and caring less about bloat does not help
- “You could get rid of the IPv6 stack to deal with bloat” – An anonymous OpenWRT developer >_<

Final thoughts

- LibreCMC is not for everyone
- Target audience are those who care about software freedom, LTS and bloat
- Yes, there are similar projects, but there is plenty of room for more
- We are open to integrating new features as long as no blobs are needed, does not add to much bloat or security issues.

Q/A?


MY HOBBY:
SITTING DOWN WITH GRAD STUDENTS AND TIMING HOW LONG IT TAKES THEM TO FIGURE OUT THAT I'M NOT ACTUALLY AN EXPERT IN THEIR FIELD.
ENGINEERING:
OUR BIG PROBLEM IS HEAT DISSIPATION
HAVE YOU TRIED LOGARITHMS?
48 SECONDS
LINGUISTICS:
AH, SO DOES THIS FINNO-UGRIC FAMILY INCLUDE, SAY, KLINGON?
63 SECONDS
SOCIOLOGY:
YEAH, MY LATEST WORK IS ON RANKING PEOPLE FROM BEST TO WORST.
4 MINUTES
LITERARY CRITICISM:
YOU SEE, THE DECONSTRUCTION IS INEXTRICABLE FROM NOT ONLY THE TEXT, BUT ALSO THE SELF.
EIGHT PAPERS AND TWO BOOKS AND THEY HAVEN'T CAUGHT ON.

More Info

Clearnet:

- librecmc.org : main project page and wiki.
- lists.librecmc.org : libreCMC mailing lists.
- librecmc.org : libreCMC source / img downloads
- info@librecmc.org : General mail for the project.

Xkcd image – impostor - http://xkcd.com/451/