kernelci.org

~~1.5~~ 2 million boots and counting

Kevin Hilman, BayLibre

Kernel Recipes 2016, Paris

Who?

Live

- Live, work in Seattle, Washington
- Sometimes work from Nice, France

Work -- Kernel developer

- BayLibre: linux consultancy
- Linaro
- TI
- Self-employed
- MontaVista
- ...

Kernel (co)maintainer

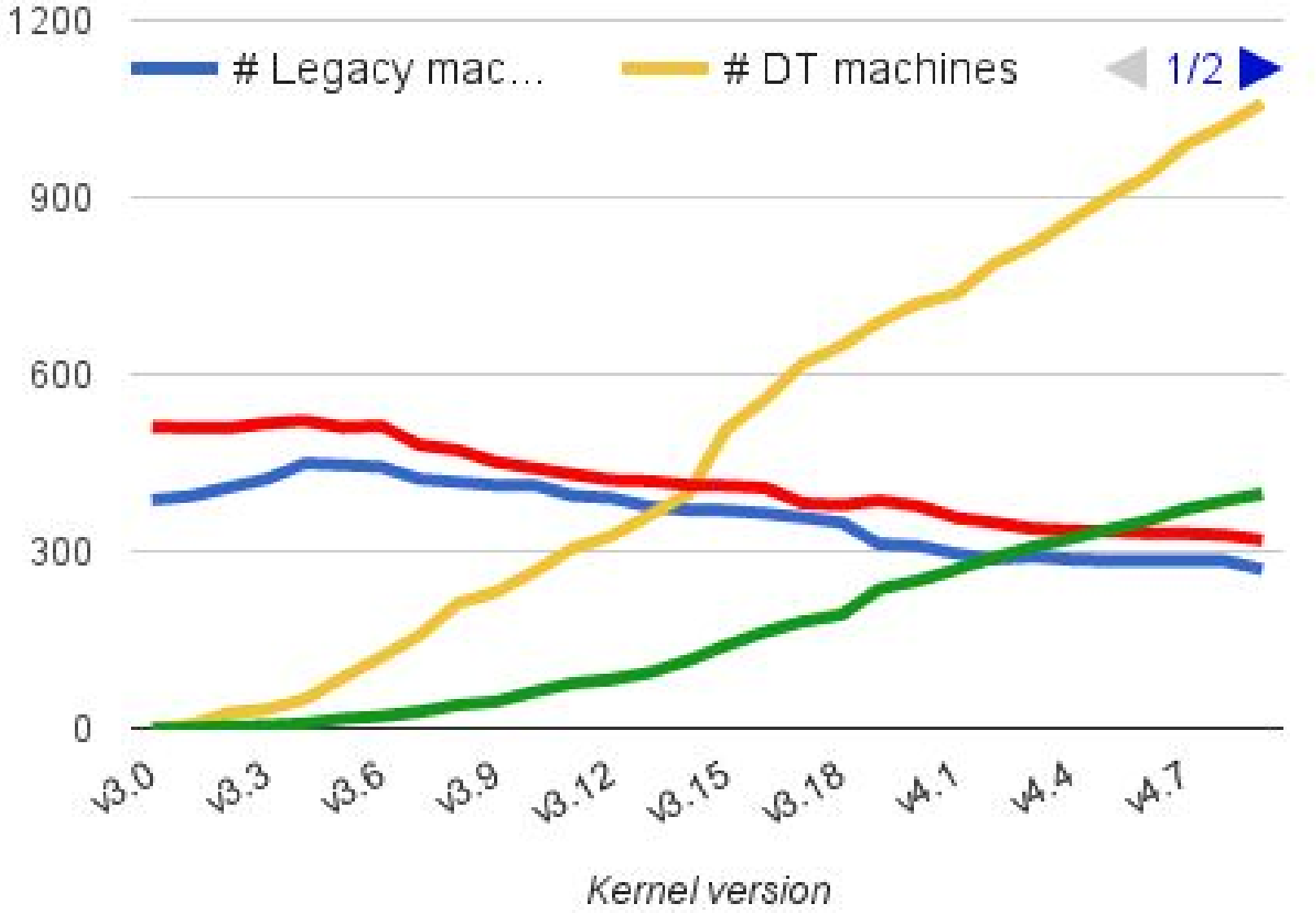
- Amlogic SoCs (ARM)
- TI Davinci SoCs (ARM)
- Generic PM domains (genpd)
- Adaptive Voltage Scaling (AVS)
- arm-soc tree (backup, helper)

Pandering...

- Lived a couple years in France
- Travel in France often
- Je me débrouille en français


Embedded Linux Consulting
Device Drivers

Code size and supported machines

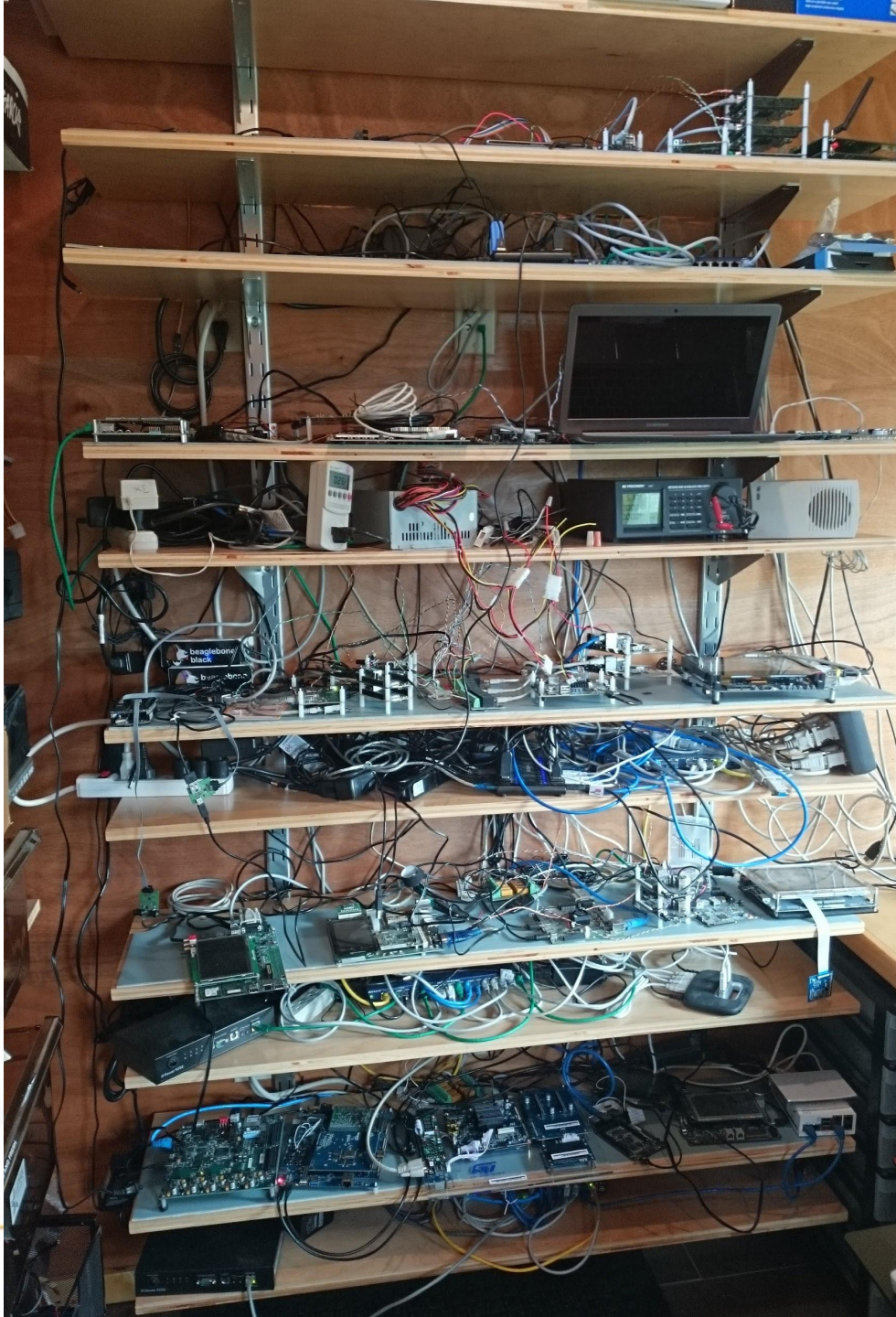


Why?

Started helping with arm-soc

- Wide variety of SoC families
- Huge variety of boards
- Nobody has all of it
- Lots of ways to break other boards

- Olof Johansson and I had small board farms
- Started automating basic boot tests
- Sending email reports
- Focused on ARM sub-arch maintainers



What? kernelci.org

Build

- Mainline, linux-next, arm-soc
- Stable, stable-rc
- Various maintainer trees
- ARCH=arm arm64 x86 mips
- All upstream defconfigs, plus
  - ARM: Thumb2, EFI, LPAE,...
  - Big endian
  - 260+ defcfongis

Reporting

- Web, Email, RSS

Boot

Boot kernels on a variety of hardware

- 31 unique SoCs (arm, arm64, x86, MIPS)
- 200+ unique boards
- 2300+ boots / day

Since May 2014:

- 2 M boots, 875k builds
- 6k tests

...and still counting:

http://kernelci.org/stats/


ARM
ARM VERSATILE
ARM
ARM VERSATILE
NETGEAR

Goals

- Wide range of hardware
- Quickly find regressions
- Distributed
  - 9 different board farms contributing
    - More coming soon...
  - Automation framework independent
    - Most using Linaro LAVA
- Open
  - wiki.kernelci.org
  - REST: api.kernelci.org
  - #kernelci on IRC, Freenode

Labs -- Thank you!

- Collabora
- Embedded Bits
- Pengutronix
- BayLibre
- Linaro
- Free Electrons
- TI
- tbaker
- khilman
- <your lab here>

Primary Developers

- Tyler Baker, Linaro
- Milo Casagrande, Linaro
- Kevin Hilman, BayLibre

Booting is fine,
but what about real tests?

We are running tests...

- kselftests
- hackbench
- cyclictest
- lmbench
- LTP

But....

… no reporting or automated regression checking (yet.)

… and only on a small subset of platforms.

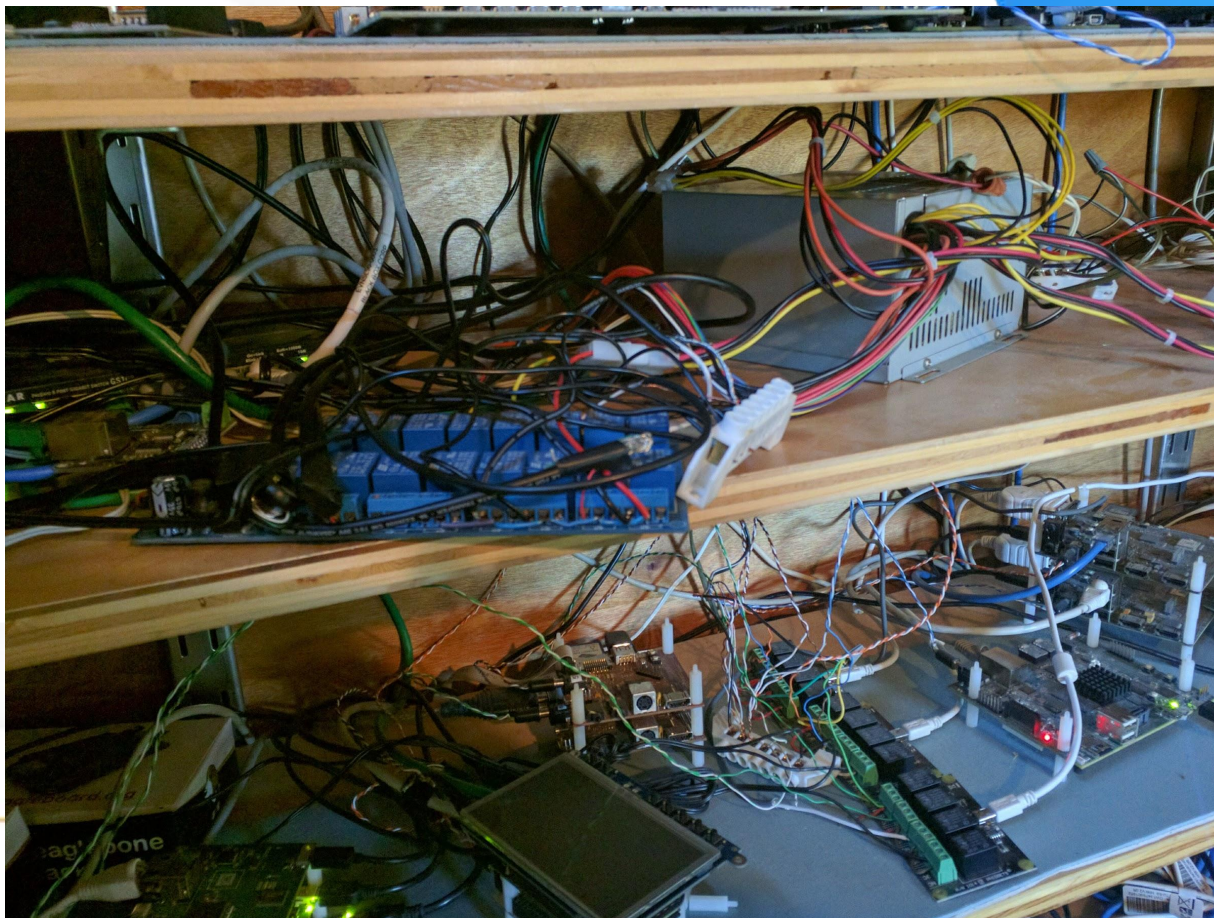
We need help:

- Front-end: visualization, reporting
- More hardware, dedicated to long-running tests.
- Detecting regressions

Next steps: features

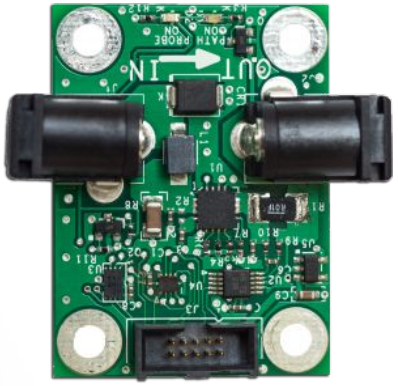
Compare views

- “diff” similar builds or boots
- Size: kernel image, modules, ELF sections
- Build errors, warnings
- Boot errors, warnings
- Boot time

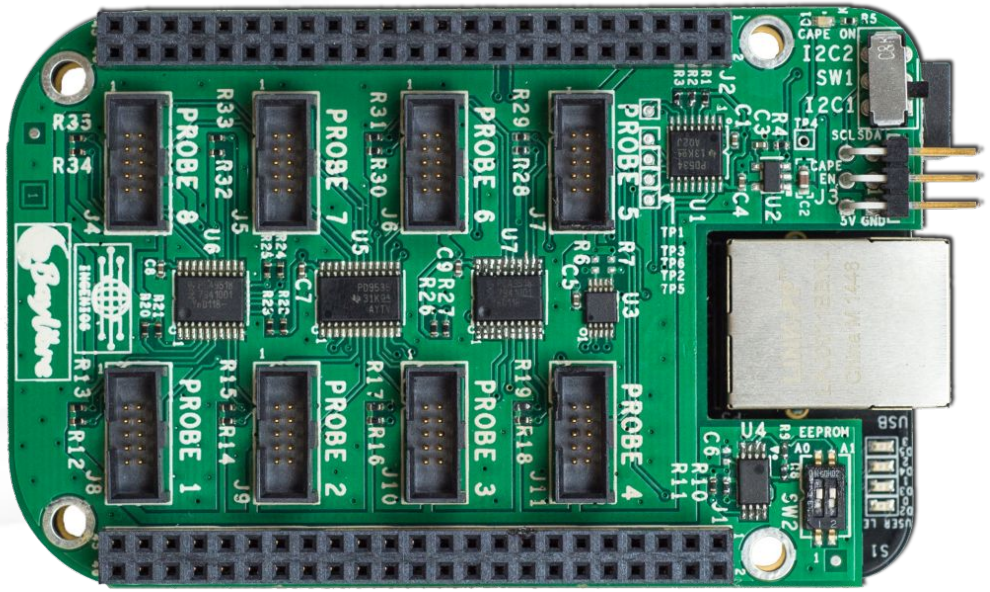


In progress: Energy regressions

- Measure power during boot, tests
  - Current, Voltage: min, max, avg
  - Energy
  - Detect major changes



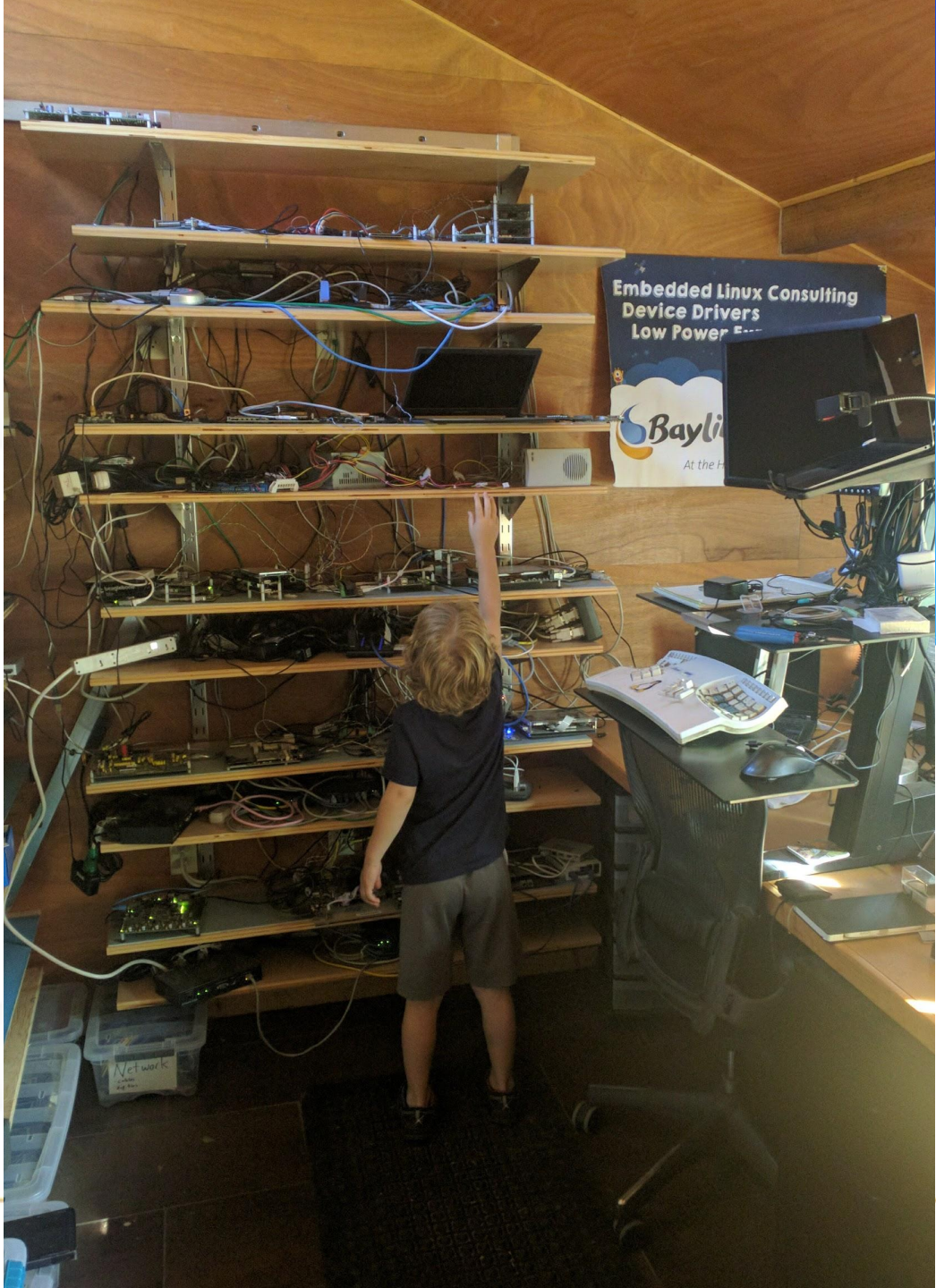
- Measurement
  - ARM energy probe
  - BayLibre ACME
  - ...



What's next

- Visualization for test results, regressions
- Full-text search
- More in the cloud, distributed, Elastic Search?

- More compiler versions
- More arch support (MIPS)
- Cortex M support
  - STM32
  - Energy Micro
  - M4 on i.MX[67]



How to help?

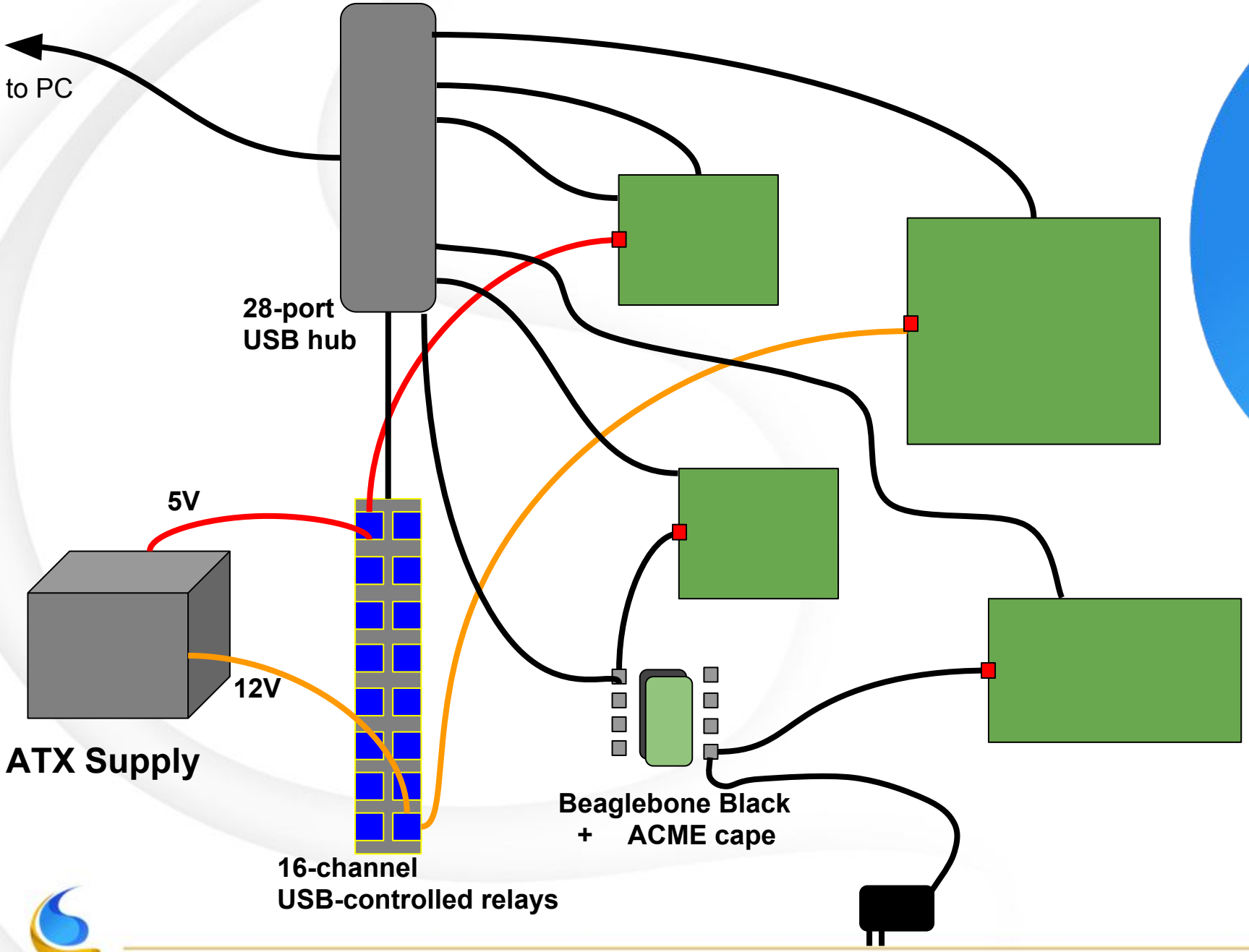
- Try it
  - Check the platforms/boards you care about
  - Find/report regressions
  - Confirm fixes
- Contribute back
  - Automate your lab
  - Submit results
  - Send me hardware

Write some tools…

All the historical data is in the backend. You could write a tool to:

- Track and plot kernel bloat
- Analyze test results for your platform
- …

Big Data...


to PC
28-port
USB hub
5V
12V
ATX Supply
16-channel
USB-controlled relays
Beaglebone Black
+ ACME cape