

FreeBSD USB

by

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The Year of USB kernel changes

- Supported new devices for existing drivers
- A few new USB device drivers
- Minor quirks and fixes for existing drivers
- Full support for USB Hardware on Rpi (DesignWare OTG, Device and Host mode)
- Experimental support for Mentor Graphics USB Host Mode.
- Stability fixes

The Year of USB kernel changes

- USB Audio 2.0 support
- XHCI controller driver got MSI interrupt support
- Grep for USB in the FreeBSD commit logs

The Year of FreeBSD USB Security

- Wrappers, size checks and other string filters are doing their work in the USB kernel.
- FreeBSD 8+ USB is an exemplary USB stack:
 - http://www.nccgroup.com/media/190706/usb_driver_vulnerabilities_whitepaper_january_2013.pdf
- FreeBSD 8+ USB core is half the size of Linux 2.6 USB, 100K vs 250K LOC
 - <http://www.cs.dartmouth.edu/~pete/pubs/WESS-2012-usbsurface.pdf>
- No 0-days known for the FreeBSD USB core.

Who is using FreeBSD's USB stack

- FreeBSD
- DragonFly BSD (alternate USB stack)
- Various embedded OS'es via custom ports

The FreeBSD 8+ USB stack in the bootloader

- See `/usr/src/sys/boot/usb`
- A standalone compilation of the USB kernel and a few USB drivers
- Can be used as starting point for USB embedded development
- Very small footprint (-O2, garbage collection)
- Not in use yet

FreeBSD advanced USB testing

- New USB testing tool available under:
`/usr/src/tools/tools/usbttest/`
- Targeted for USB mass storage devices and USB modems and general so-called Chapter 9 tests.
- Can identify “USB standard” broken devices.
- Many PR's are about broken MSC devices.

FreeBSD 8+ USB in UserSpace

- Webcamd

<https://wiki.freebsd.org/WebcamCompat>

- USB HID

<https://wiki.freebsd.org/uhidd>

- Cx88

<http://corona.homeunix.net/cx88wiki>

- QEMU and VirtualBox

- And more ...

Cuse4BSD – the new UNIX loopback device standard ?

- Created to make Webcamd possible
- Multiple projects exist, in house and outside.
- Will get a Python wrapper in not too long
- Some minor fixes through the year
- Now got KQUEUE support

The END

- Any questions ?