

Lab 21, porting usbd, fixed in allocb, see usb in actions

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From previous lab 20 we got **/dev/usb** connected in our system, but what to do with it? Different systems handling usb in different ways, but Inferno and Plan9 has **/dev/usb** just as communication filesystem which should managed not by kernel but user-space process **usbd** which by communication with the file server manages the connectivity and start appropriate drivers for connected usb devices.

My first attempt was to have a look at original Inferno OS used to see possibilities to just reuse it. But looks like Plan9 own used was migrated so far from what Inferno has (if they had initial common file server names conventions). Because I took **devusb.c** from Plan9/bcm I also need used similar to Plan9. But I need limbo program!

I took challenge to port the usbd from Plan9 to Inferno, at least to the point where it has to start device. At the point when everything is ready to start device, Inferno has a preference (and it is implemented in Inferno’s usbd) that it can dynamically load/unload appropriate usb dis-drivers, while in Plan9 you need to spin a extra process to manage this.

The porting process itself wasn’t so complicated and was completed after applying some efforts. But during the testing I caught some mystery that bytes in replays are often shifted which leads to problems of identifying usb responses. The investigation of the problem pointed that usbdwg writes chunks aligned for 32 bytes while memory block created in **port/allocb.c** are aligned for 8 bytes (*BY2V*). I made *allocb()* similar to Plan9 version to use define BLOCKALIGN (32).

To embed used into kernel, add the

```
1      /dis/lib/daytime.dis
2  # usb support
3  +  /dis/usb/usbd.dis /os/rpi/usb/usbd.dis
4      /dis/lib/usb/usb.dis
5      /dis/lib/usb/usbmass.dis
```

So, boot the Inferno and try final version of **usbd**:

```
01 $ usb/usbd
02 usbd: base: /dev/usb/
03 usbd: starting: /dev/usb/ep1.0
04 usbd: start dev: class:9,      1060.38162.512
05 usbd: start dev: class:255,    1060.60416.512
06 $ ls /dev/usb
07 /dev/usb/ctl
08 /dev/usb/ep1.0
09 /dev/usb/ep2.0
10 /dev/usb/ep3.0
11 $ usbd: start dev: class:3,    3727.34.528
12
13 $ ls /dev/usb
14 /dev/usb/ctl
15 /dev/usb/ep1.0
16 /dev/usb/ep2.0
17 /dev/usb/ep3.0
18 /dev/usb/ep4.0
19 $
```

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What we see here is **ep1.o** which is default root hub existing from beginning, then **ep2.o** hub, then **ep3.o** which is probably Ethernet card. Later I connected usb keyboard and you see device appeared **ep4.o**.

In next Lab we will try to implement/load and get to work USB keyboard driver.

FILES:
[rpi-lab-21.zip](#)

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