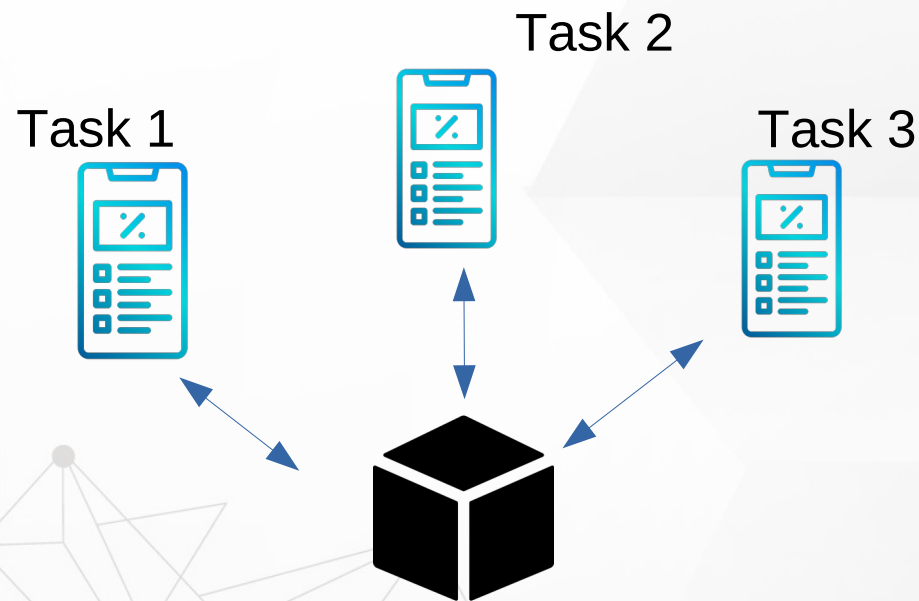


CH9 Linux Device Driver

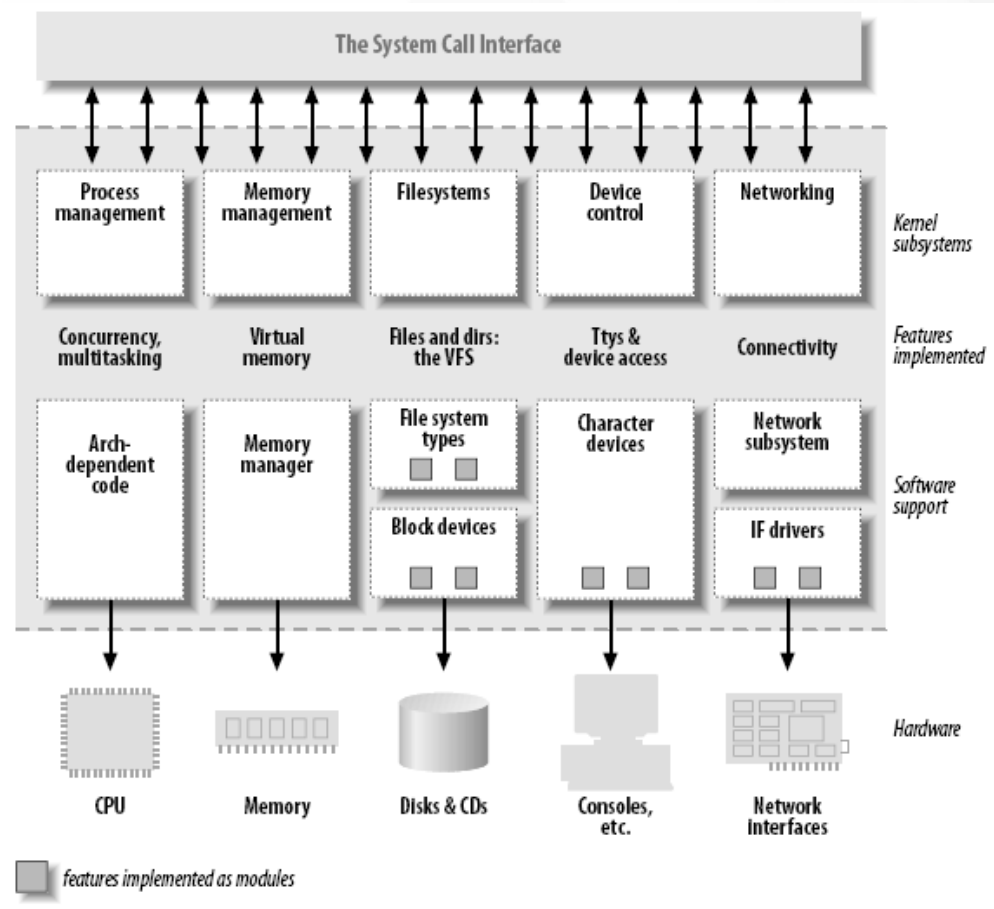
Introduction

Device drivers

- Black boxes to hide details of hardware devices
- Use standardized calls



Kernel Modularization





Example

- [CMD] make
- [CMD] sudo insmod simple.ko
- [CMD] dmesg | tail
- [CMD] lsmod | grep simple
- [CMD] sudo rmmod simple



Classes of Devices Driver

Char module

- simple
- access stream of bytes

Block module

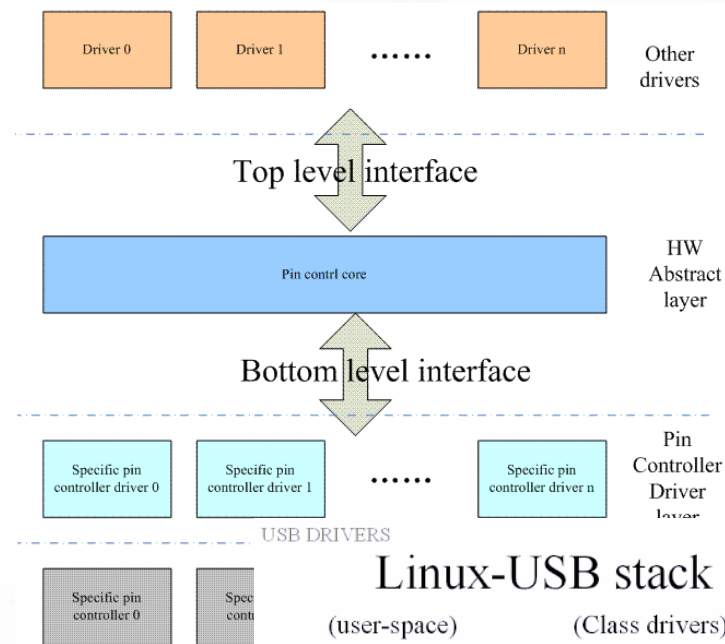
- block and char devices differ only in the way data is managed internally by the kernel

Network module

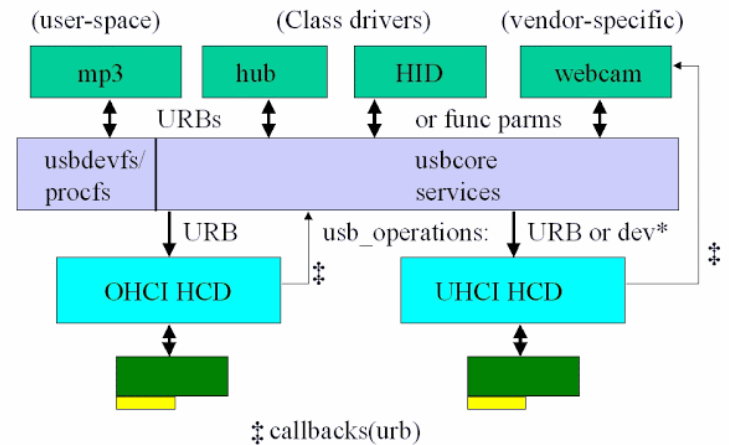
- Manage network data packets

Subsystem

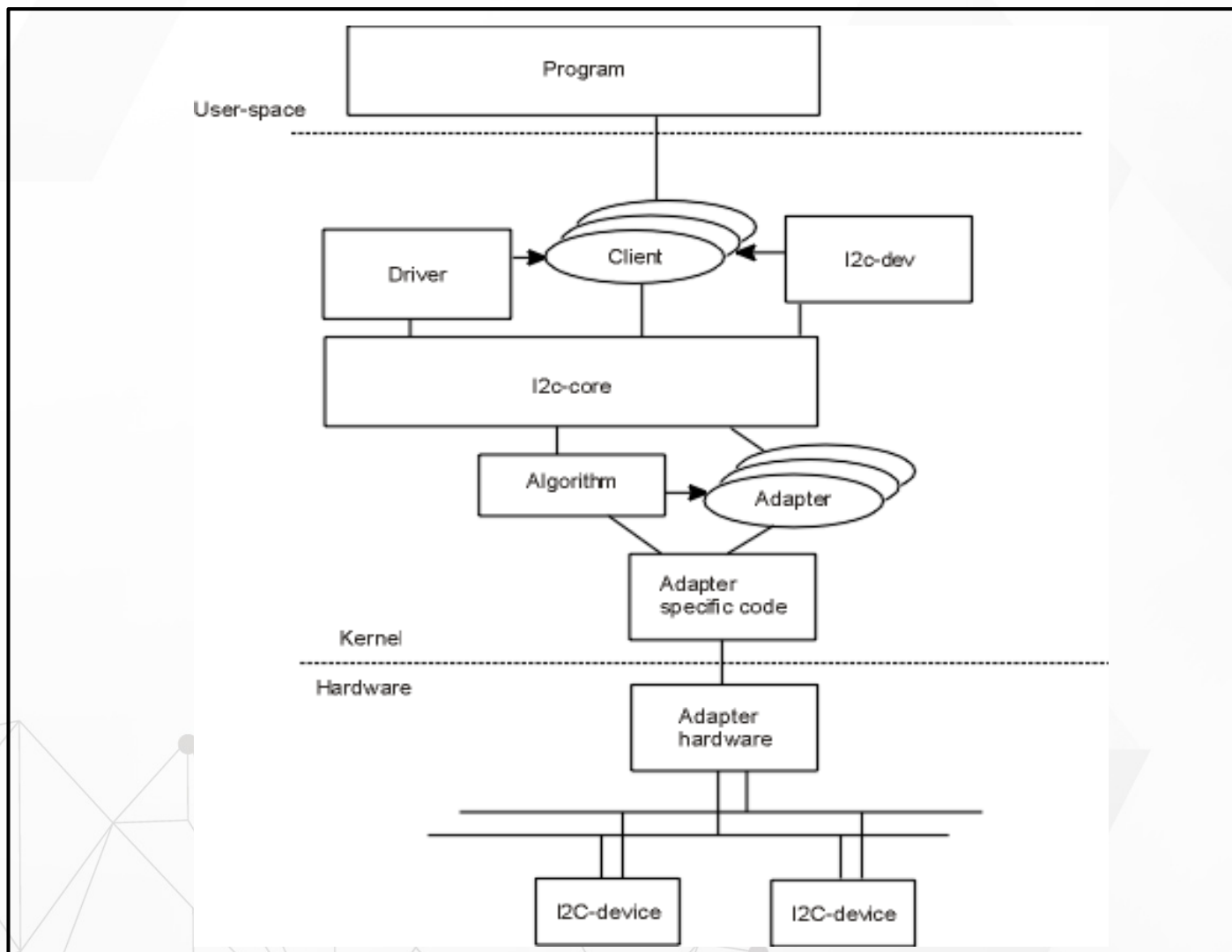
- ▶ DRM Subsystem
- ▶ GPIO Subsystem
- ▶ I2C Subsystem
- ▶ SPI Subsystem
- ▶ MTD Subsystem



Linux-USB stack architecture



I2C Sub-system





Where are Modules in Kernel

➤ `${KERNEL}/drivers`

→ `${KERNEL}/drivers/chars`

→ `${KERNEL}/drivers/i2c`

→ `${KERNEL}/drivers/gpio`



Linux Kernel Configure

➤ Kernel build configure

➤ `${KERNEL}/.config`

➤ Kconfig

➤ `${KERNEL}/drivers/chars/Kconfig`

➤ `[CMD] make menuconfig`

Build Modules

➤ Build modules

→ [CMD] make modules

➤ Add install patch

→ [CMD] export **INSTALL_MOD_PATH**=../modules

➤ Install module to INSTALL_MOD_PATH

→ [CMD] make modules_install

→ Installs all modules in /lib/modules/<version>



Module Deploy



modules_install

- `modules.alias` : Module aliases for module loading utilities.
- `modules.dep` : Module dependencies
- `modules.symbols` : Tells which module a given symbol



Install Module

Install module

- `$ modprob ${module_name}`
- `$ insmode ${module_name}`

Remove module

- `$ modprob -r ${module_name}`
- `$ rmmod`



modprobe depmod



modprobe

→ `/lib/modules/'uname -r'`



depmod

→ creates a list of module dependencies `/lib/modules/version`