CH9 Linux Device Driver
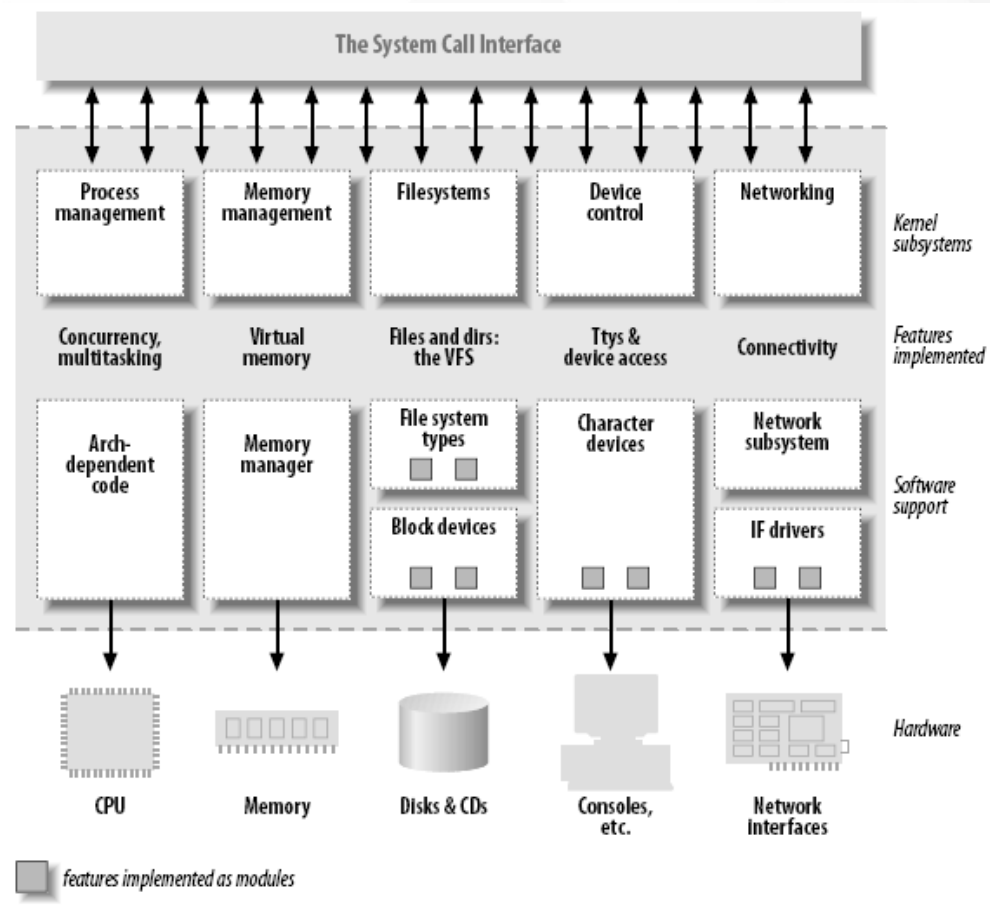
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Introduction

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

Task 2

Task 1

Task 3
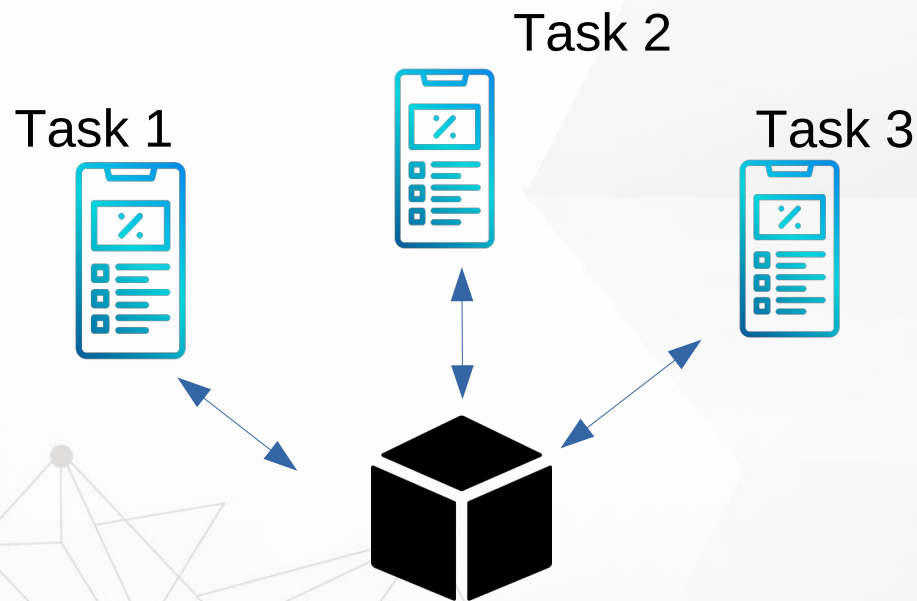
Kernel Modularization

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
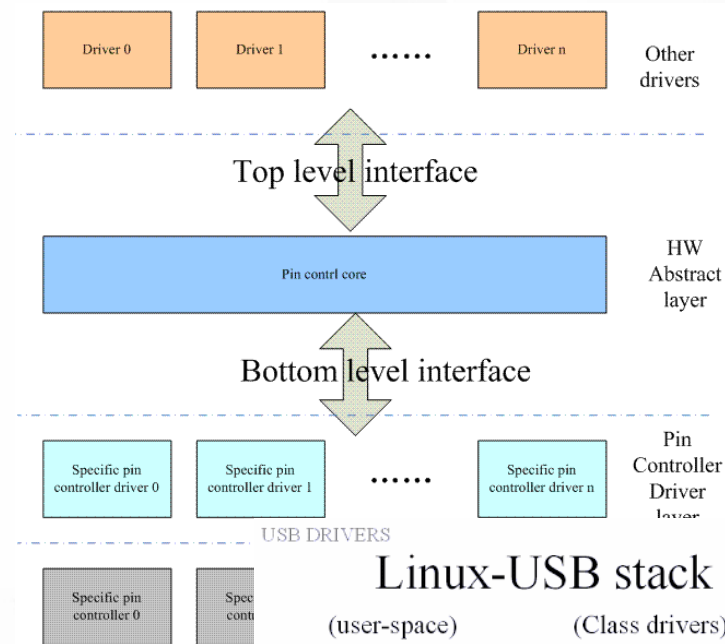
- **Block module**

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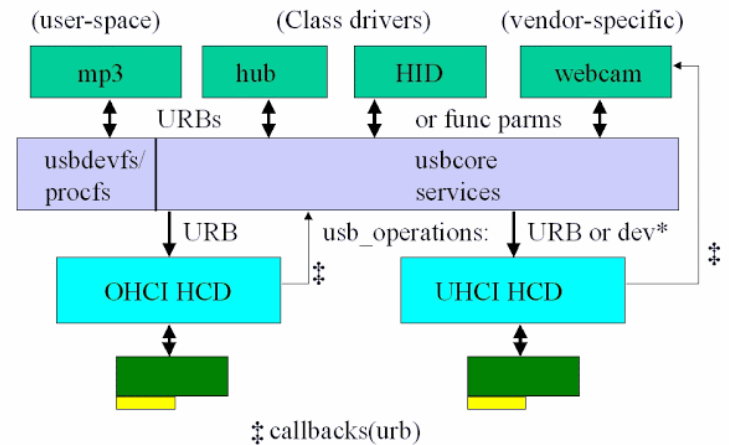
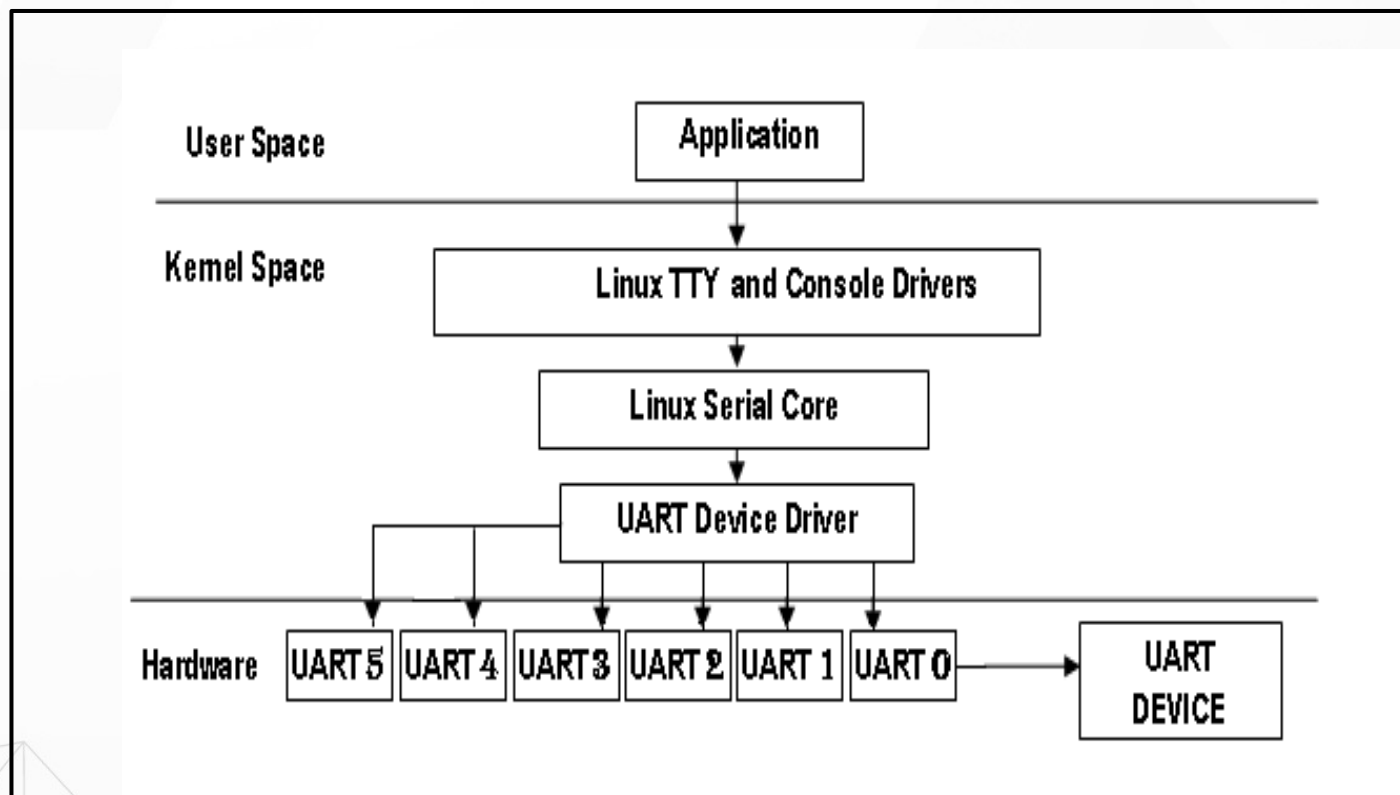- **Network module**

  - Manage network data packets

Subsystem

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

TTY Sub-system

Where are Modules in Kernel

- ${KERNEL}/drivers

  → ${KERNEL}/drivers/chars

  → ${KERNEL}/drivers/i2c

  → ${KERNEL}/drivers/gpio

  → Module aliases for module loading utilities.

- **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>

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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 moudle

→ $ modprob -r ${module_name}

→ $ rmmod

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modprobe depmod

modprobe

→ /lib/modules/'uname -r'

Depmod

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