CTSRD

CRASH-worthy Trustworthy Systems Research and Development

CHERI

CheriOS Microkernel

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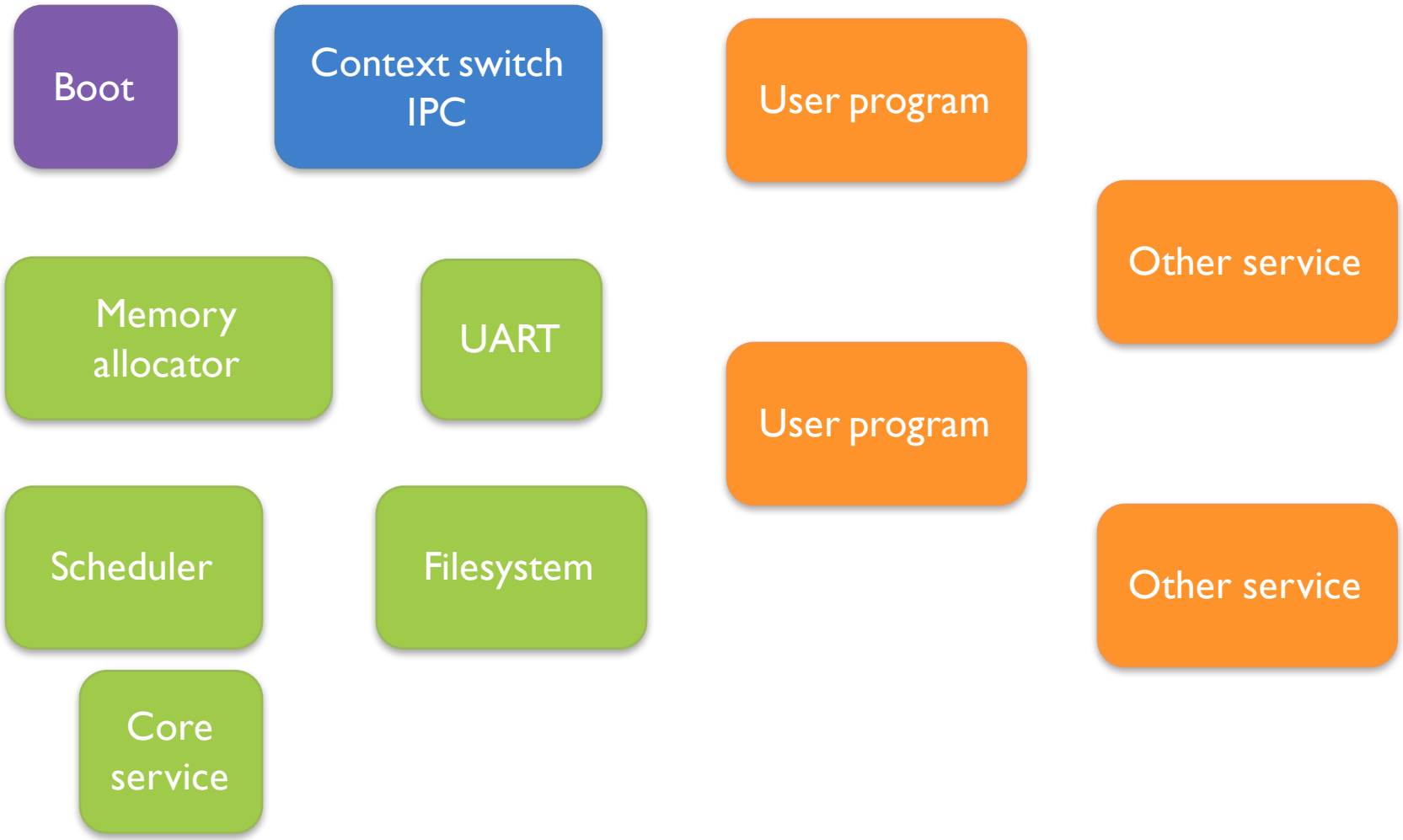
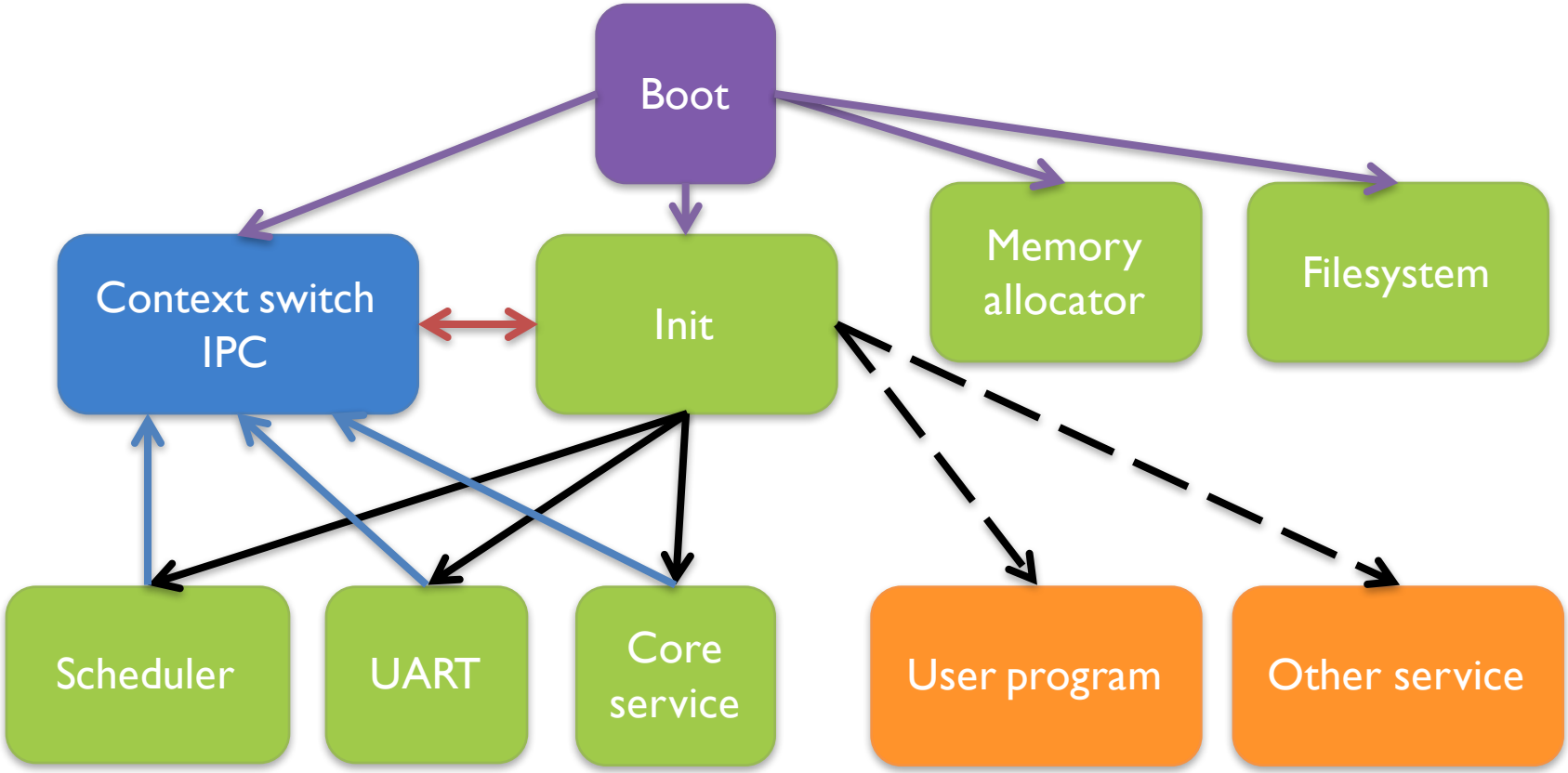
Overview

- Microkernel based on the **CHERI model**
- **Pure-capability** ABI
  - no legacy pointers, no MMU
- Make full use of **compartmentalization**
- Kernel mode**: Context switch**
  - IPC
  - Exceptions

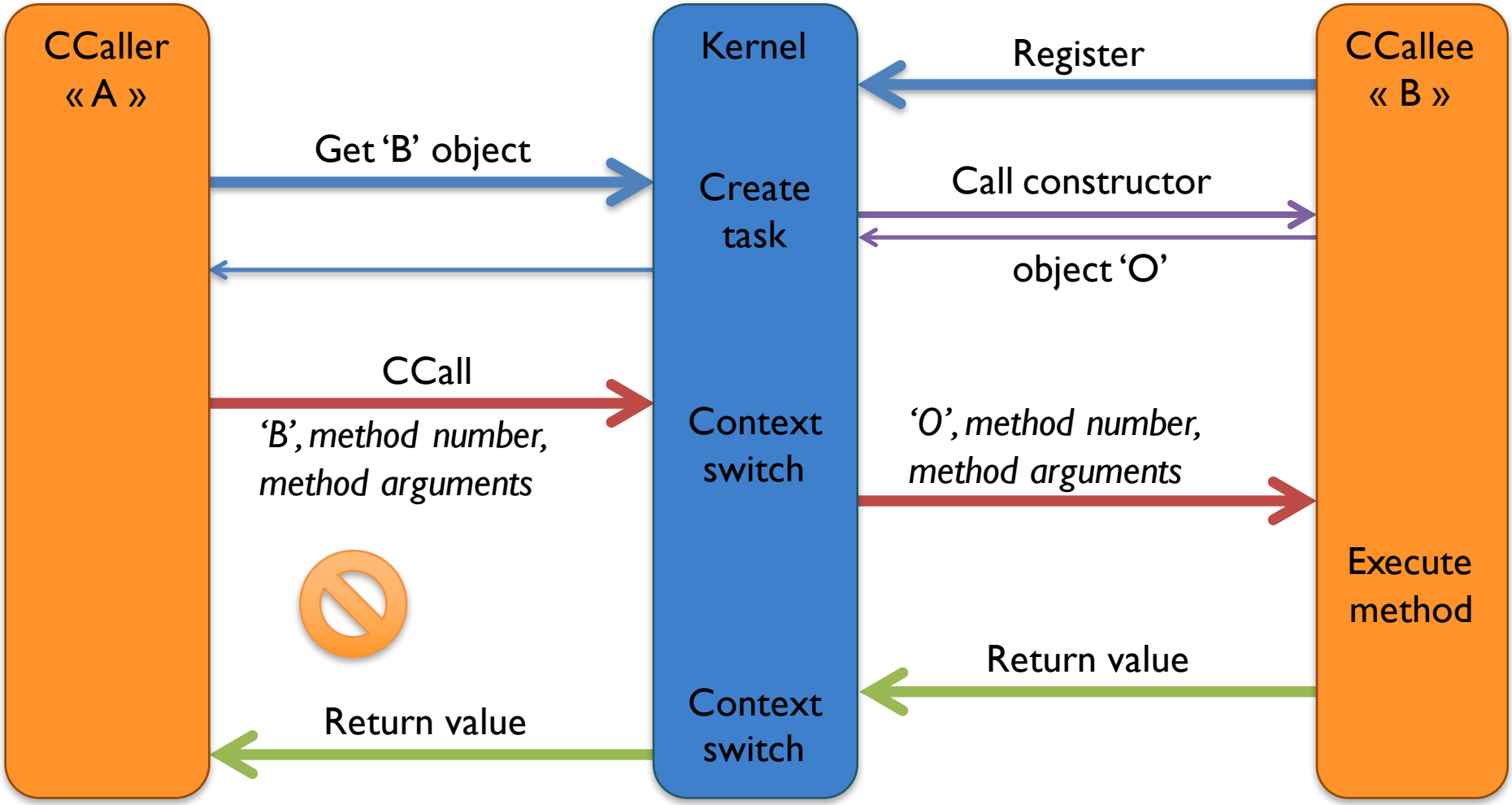
Compartments



Boot process



Inter Process Communication

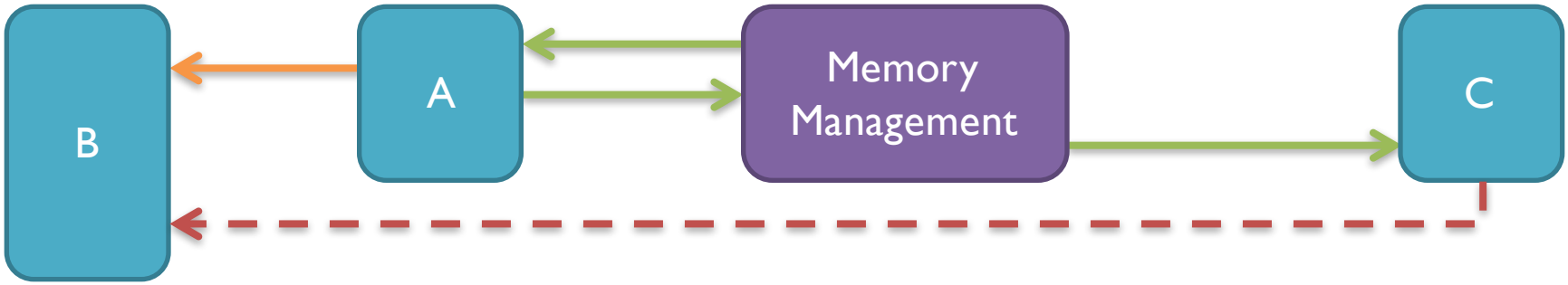


IPC (2)

- Callee might **not return** (bug, untrusted, …)
  ➔Make the call asynchronous
  - **Return to caller**; caller polls the kernel to know if the callee is done
  - Caller gives a **time limit** to the kernel
    - Other kind of limit?
- Communication with the kernel
  - **CCall** or **syscall**?

Memory management

- Revoking a capability is hard



- How can we free memory?
  - Restrict sharing of pointers
  - Garbage-collect
  - MMU

Thank you!

https://github.com/CTSRD-CHERI/cherios