Transkernel: Bridging Monolithic Kernels to Peripheral Cores

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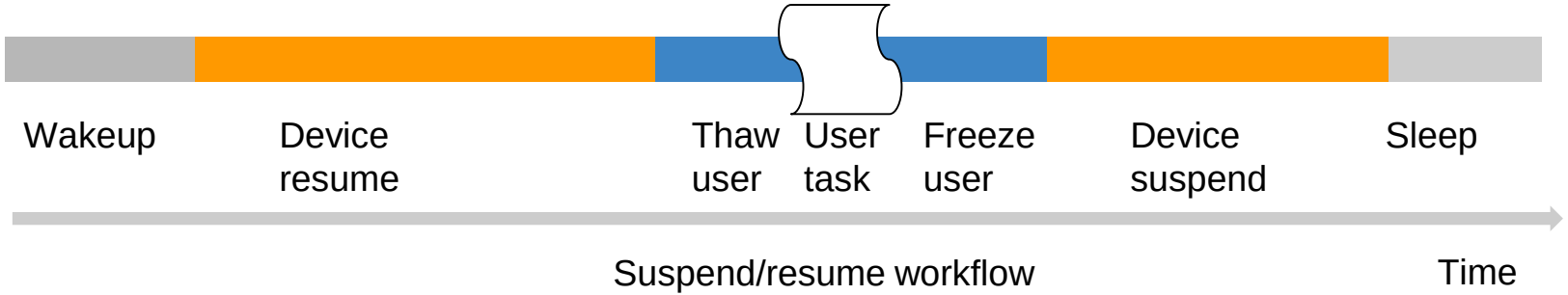
Ephemeral tasks in smart devices

1. **Prevalent**: push notifications, periodic sensor data logging, etc.

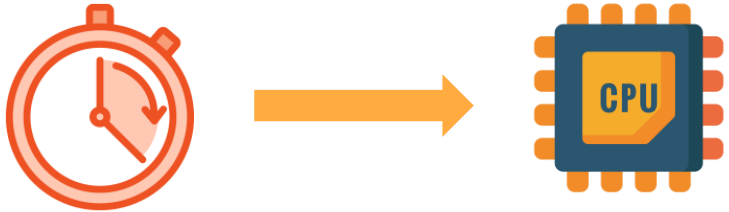


2. **Energy-hungry**: held accountable for substantial energy drain (~30%) in commodity SoCs [1]
   - Device suspend/resume is the key bottleneck

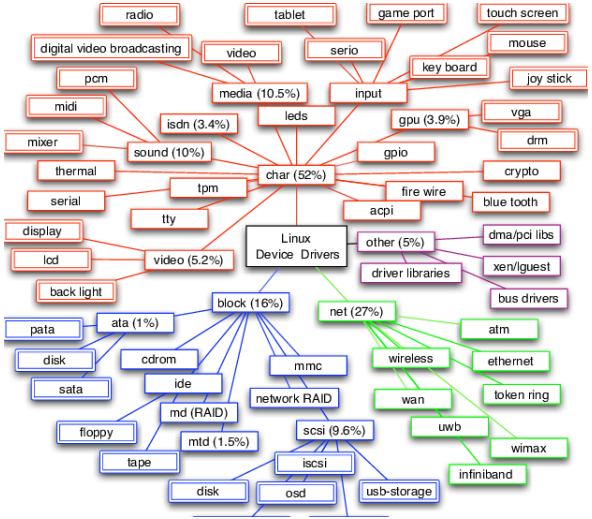
[1] Decelerating Suspend and Resume in Operating Systems, HotMobile'17

Why is device suspend/resume so inefficient?

1. Devices are bound by physical factors



2. Complex dependencies make it hard to parallelize

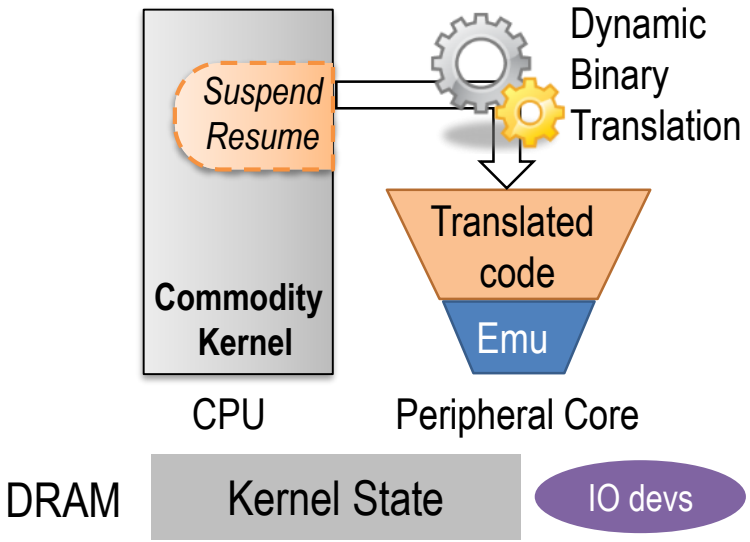


*: Understanding modern device drivers, ASPLOS'12

Hence, such a process mismatches CPU; instead, the process is better off running on a peripheral core

Our approach: Transkernel

- A novel OS model that bridges the monlithic kernel to the peripheral core



Join us on Thursday at track “Exotic Kernel Features #2” and check out the paper for more!

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