Transkernel: Bridging Monolithic Kernels to Peripheral Cores

Liwei Guo, Shuang Zhai, Yi Qiao, and Felix Xiaozhu Lin
Purdue ECE

http://xsel.rocks
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

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