

2nd International Workshop on Mobile Cloud Computing & Services
(MCS 2011)

Vision: The Case for Context-Aware Selective Resume

Eric Wright, Eyal de Lara, and Ashvin Goel (University of Toronto)

Presented by: Eric Wright, University of Toronto
June 28th, 2011

Problem

- Energy is a limited resource
- Energy saved by sleeping
- Resuming takes time
 - Resume wakes all devices
- Precludes sleep in many cases
 - i.e., its not worth for $<$ the resume time

Solution

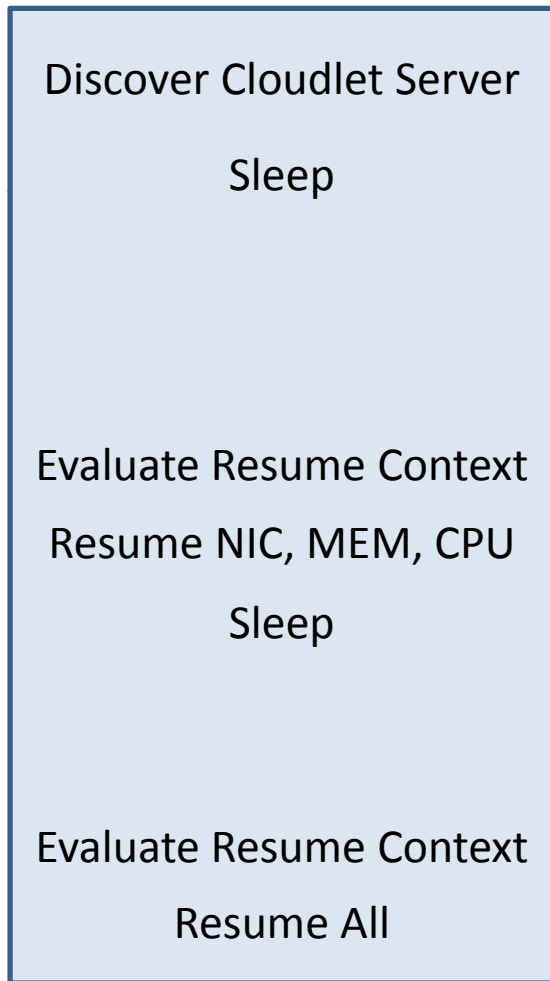
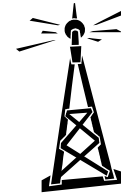
- Selective Resume
- Resume only resumes the devices / services needed
 - E.g., wake-up just the NIC and CPU
- Reduces resume-sleep cycle time
- Reduces energy use
 - More time in sleep mode
 - Fewer devices enabled

*“Any sufficiently advanced technology
is indistinguishable from magic”*

- Arthur C. Clarke, 3rd Law of Prediction

*“Any sufficiently fast resume
is indistinguishable from being awake”*

Cloudlet Scenario

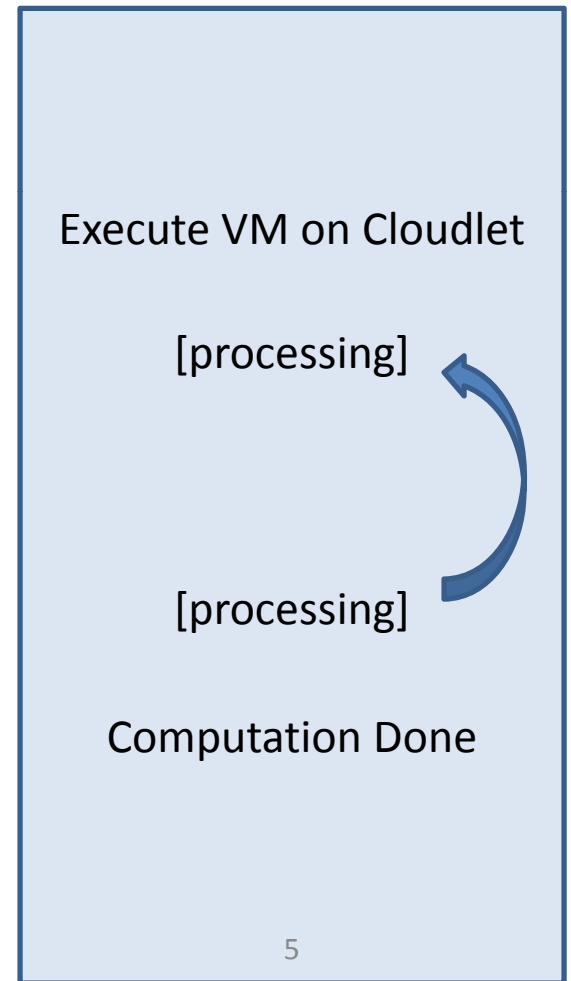


1. Send VM Overlay

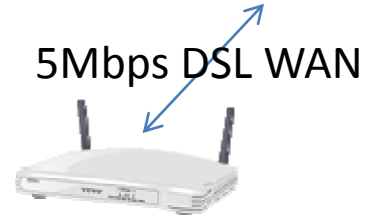
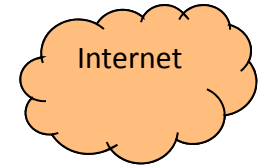
2. Send Data Request

3. Return Data

4. Send VM Residue



Data Transfer



50Mbps Wifi LAN

Copy File to Memory
Sleep

Evaluate Resume Context
Resume NIC, MEM, CPU
Sleep

Evaluate Resume Context
Resume MEM, CPU

1. LAN Tx: 5Mb @ 50Mbps (0.8s)
2. Send Data Request
3. LAN Tx: 5Mb @ 50Mbps (0.8s)
4. Send File Complete Ack

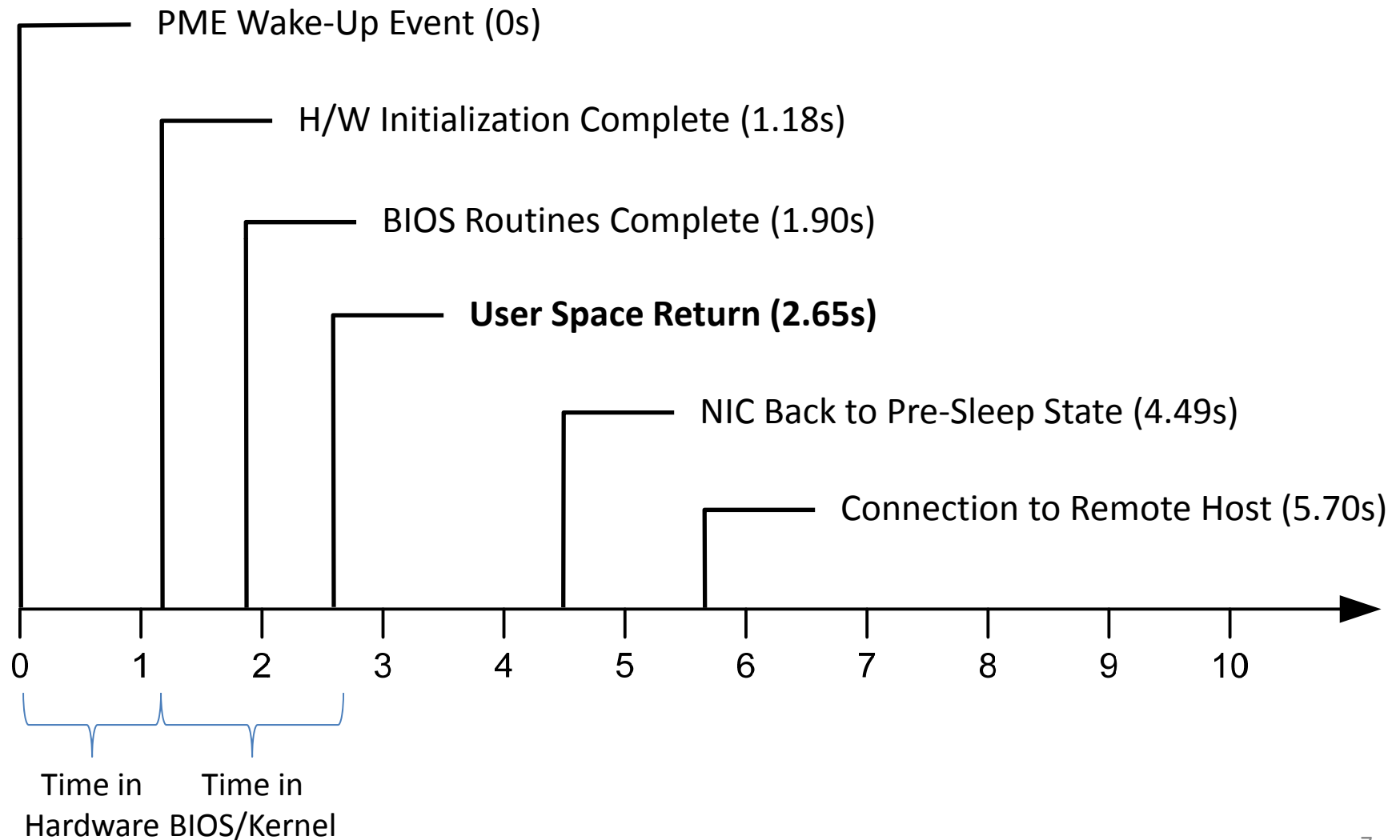
Buffer Data
WAN Tx: 5Mb @ 5Mbps (8s)
Low Buffer

Full Buffer

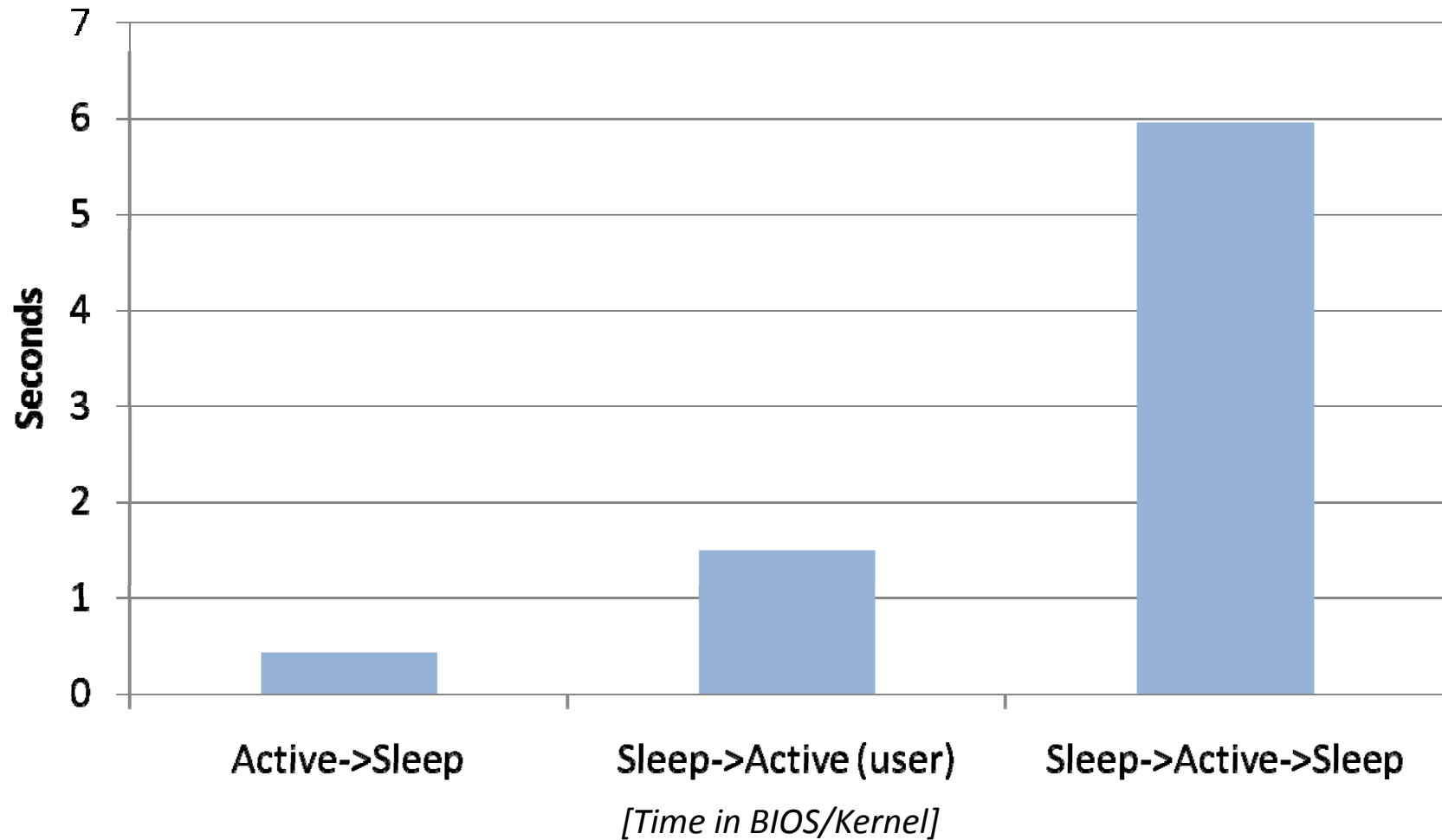
Upload Done

6

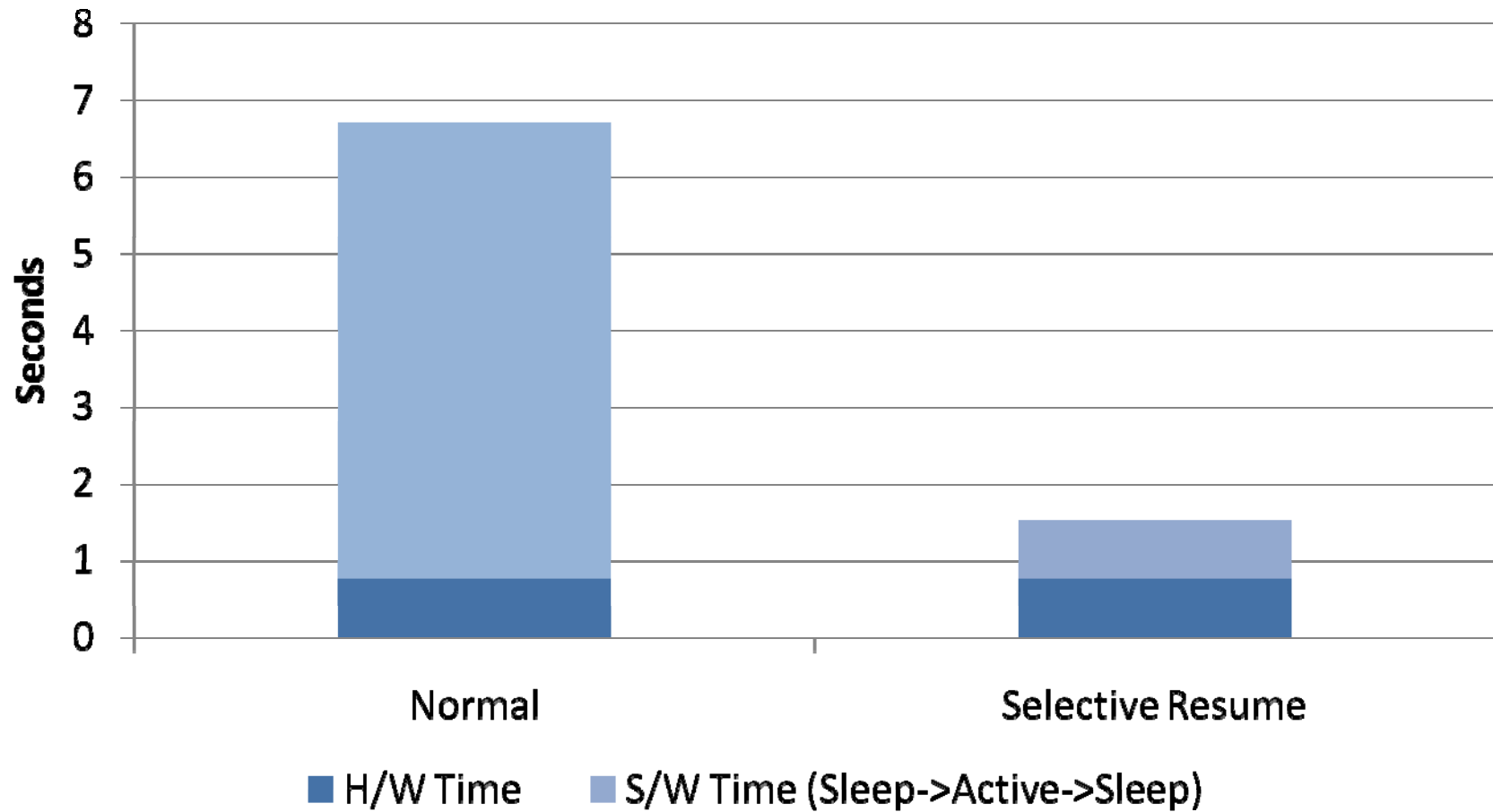
System Resume Timeline



Software Cycle Time



System Cycle Time



Conclusions

- Normal Resume
 - Most time spent in software
- Selective Resume
 - Decreases time in software
 - Enables fine-grained control or resume
 - Makes sleep states more useful

Future Work

- Analysis of mobile systems
- BIOS implementation
- Fast memory server implementation