

Debugging Session Preview

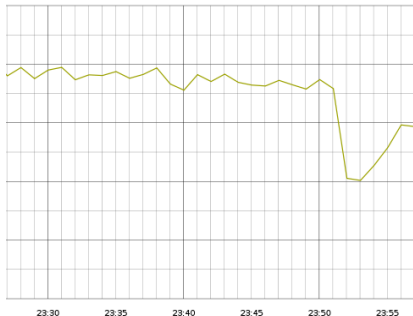
Xu Zhao

University of Toronto

Session: 3:50 pm - 5:10 pm, Tuesday

Why Care About Debugging?

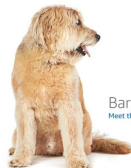
- ▶ More than 50% of development time are on debugging
- ▶ Service down time is critical



Google's blackout in 2013 caused 40% drop in global Internet traffic

SORRY
something went wrong
on our end

Please go back and try again
or go to [Amazon's home page](#).



Barney
Meet the dogs of Amazon

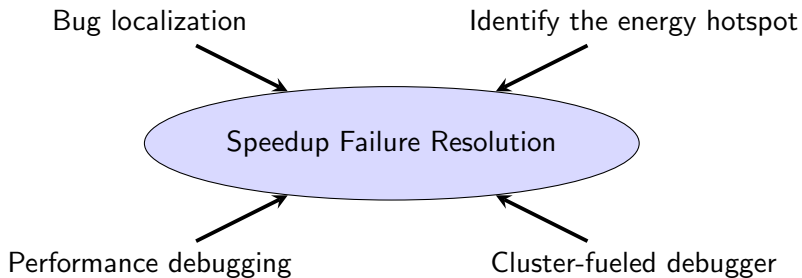
Amazon service down on prime day

Debugging is Hard

Debugging is twice as hard as writing the code in the first place. So if you write the code as cleverly as possible, you are, by definition, not smart enough to debug it.

– Brian Kernighan

Topics of Tomorrow's Papers



Orca: Differential Bug Localization in Large-Scale Services

Ranjita Bhagwan

Rahul Kumar

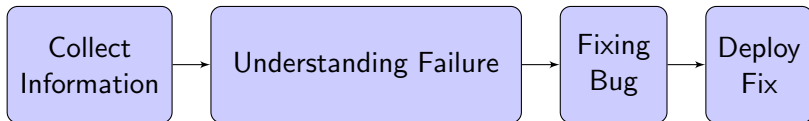
Chandra Sekhar Maddila

Adithya Abraham Philip

Microsoft Research India

- ▶ Quick service recovery by reverting the buggy commit

Traditional Debugging



Orca: Differential Bug Localization in Large-Scale Services

Ranjita Bhagwan

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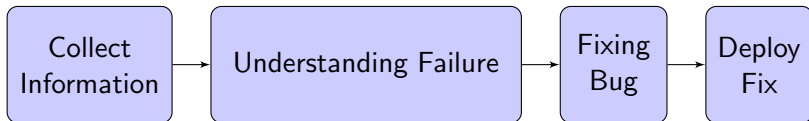
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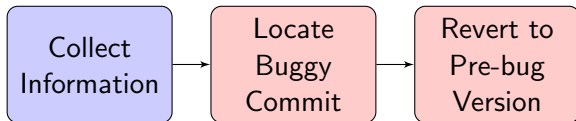
Microsoft Research India

- ▶ Quick service recovery by reverting the buggy commit

Traditional Debugging



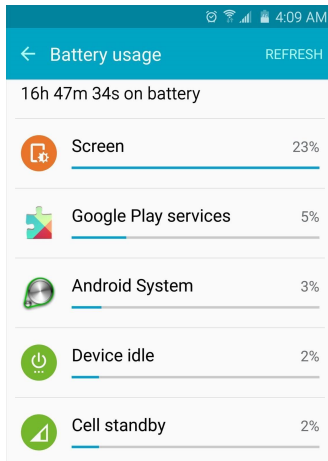
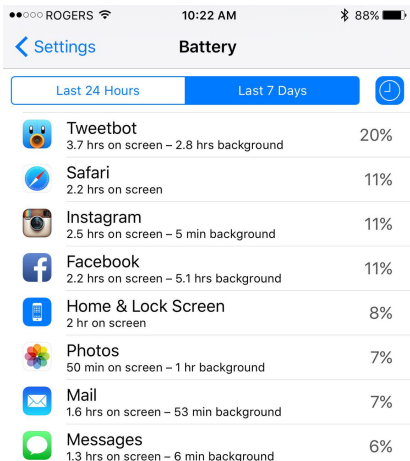
Orca



Differential Energy Profiling: Energy Optimization via Diffing Similar Apps

Abhilash Jindal and Y. Charlie Hu
Purdue University and Mobile Enerlytics, LLC

- ▶ Power is the most constraining resource on mobile devices
 - ▶ both iOS and Android provide following user interfaces



Differential Energy Profiling: Energy Optimization via Diffing Similar Apps

Abhilash Jindal and Y. Charlie Hu
Purdue University and Mobile Enerlytics, LLC

- ▶ Power is the most constraining resource on mobile devices
- ▶ Which part of the application is the energy hotspot?
 - ▶ Breakdown the app into basic execution units called *application tasks*.

Observation

Energy consuming pattern can be very different even for similar application tasks.

Example: energy consumption breakdown of two IM apps



UI Task	Other App Tasks
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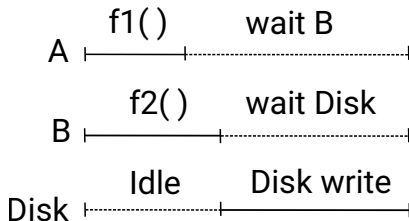
UI Task	Other App Tasks
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wPerf: Generic Off-CPU Analysis to Identify Bottleneck Waiting Events

Fang Zhou, Yifan Gan, Sixiang Ma, Yang Wang
The Ohio State University

Key Question

- ▶ Where is the bottleneck?

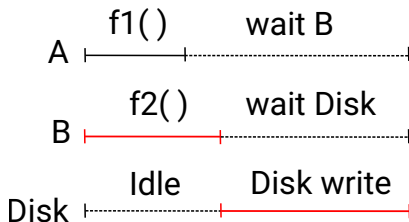


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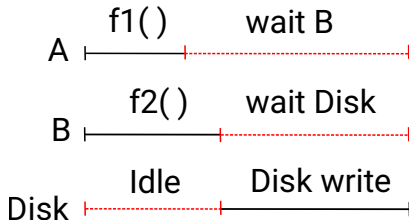
On-CPU Analysis: does not reveal the blocking pattern

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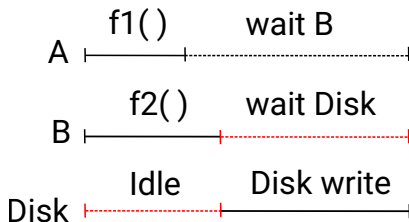
Off-CPU Analysis: result could be misleading

wPerf: Generic Off-CPU Analysis to Identify Bottleneck Waiting Events

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The Ohio State University

Key Question

- ▶ Where is the bottleneck?



wPerf: correctly identify bottlenecking wait events

Sledgehammer: Cluster-fueled debugging

Andrew Quinn, Jason Flinn, and Michael Cafarella
University of Michigan

Highlights

- ▶ The best way to understand a failure is to replay it
- ▶ First distributed deterministic replay tool
- ▶ Debugging distributed systems as easy as GDB

Conclusion

Attend the 3:50pm session on Tuesday!

3:50 pm–5:10 pm

Debugging

Session Chair: Rebecca Isaacs, *Twitter*

[Orca: Differential Bug Localization in Large-Scale Services](#)

Ranjita Bhagwan, Rahul Kumar, Chandra Sekhar Maddila, and Adithya Abraham Philip, *Microsoft Research India*

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