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CSE 291: Operating Systems in Datacenters

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Agenda for Today

- Announcements
- Project write-ups
- Intro to miscellaneous topics
- OS Verification
- Reducing Embedded Carbon

Announcements

- Project presentations
  - In class next week (12/5 and 12/7)
  - Sign up on Canvas
- Course evaluations
  - Please fill these out – feedback is very helpful!
  - Due Saturday December 9th at 8:00 am
- Project write ups
  - Due Thursday December 14th at 11:59 pm

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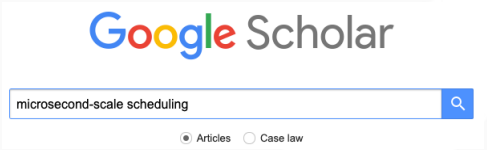
Project Write-Ups

Project Write-Ups

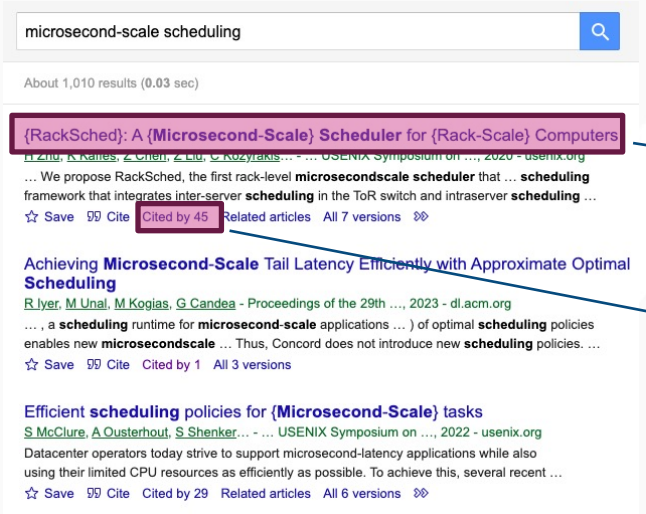
- 5-7 pages, depending on group size
- Similar content and structure as papers from class
  - Introduction, background, evaluation, related work, etc.
- Should provide more detail than your presentation
- Key differences:
  - Describe both what worked and what didn’t work
  - Describe what steps you would take next to continue the work
- See doc on Canvas for details

Tips for Finding Related Work

- How do you find the most related work on a topic?
- Use Google Scholar
  - E.g., what's the most relevant work about CPU scheduling?



start with keywords



find most relevant papers

what papers did this paper cite?

what papers have cited this paper?

Iterate until you converge on a set of relevant papers

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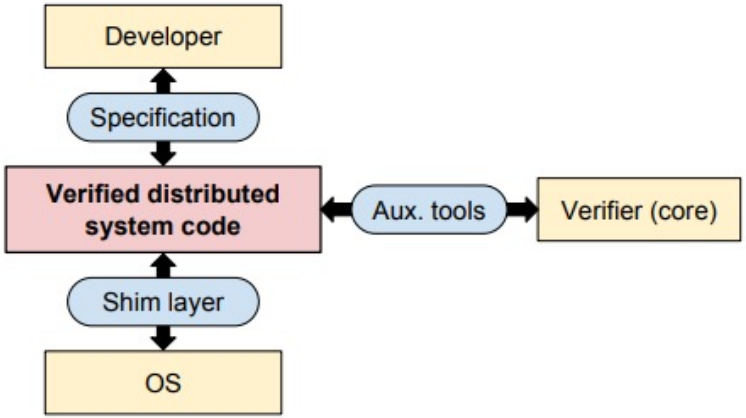
Miscellaneous Topics

Workshop vs. Conference Papers

- Workshop papers tend to be earlier stage work. They might:
  - Identify fundamental open questions
  - Critique the status quo
  - Advocate for a new approach or research direction
  - Debunk existing work
  - Report experience from real deployments
  - Describe promising new research directions
- Emphasis is on exploring new and exciting ideas
- Papers don’t typically include a full implementation and evaluation

Formal Verification

- It’s hard to write bug-free code!
- Can we prove that our code is correct?
- Typical components of verification:



“An Empirical Study on the Correctness of Formally Verified Distributed Systems”, EuroSys 2017

Datacenter Energy Consumption

- Datacenters consume huge amounts of energy
  - Responsible for 2% of global energy use today
  - Increasing concerns about the carbon emissions from datacenters

Microsoft datacenter in Wyoming

Meta datacenter in Texas

https://www.datacenterknowledge.com/microsoft/microsoft-creates-blueprint-green-data-center-design
https://www.dallasnews.com/business/real-estate/2017/05/03/facebook-s-fort-worth-data-center-opening-this-week-is-getting-bigger/

Carbon Emissions

- Types of carbon emissions:
  - Embodied carbon – emissions from manufacturing devices

  - Operational carbon – emissions from using the device

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Beyond Isolation Discussion
Myths and Misconceptions Around Reducing Carbon Discussion