Computer Systems Research

Ardalan Amiri Sani

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Finding the "right way" to build systems

What does it take?

- Systems programming
 - Programming (i.e., hacking) the OS kernel, hypervisor, core system services, drivers, etc.

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- Programming (i.e., hacking) the OS kernel, hypervisor, core system services, drivers, etc.
- Countless hours
 - Often a bug can take days or weeks to fix

Then why should you do it?

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- Experience the satisfaction of fixing a bug, and even better, make a difficult system work

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- The Turtles Project from OSDI'10
 - The authors did it simply because someone told them it can't be done
 - Now their code is integrated in Linux kernel

• Zongheng Ma



- Zongheng Ma
 - First author on our HotMobile'17 paper
 - Second author on our recent ASPLOS'18 paper

• Zhihao (Zephyr) Yao



- Zhihao (Zephyr) Yao
 - First author on our ASPLOS'18 paper
 - Now a PhD student in my group
 - First author on our CCS'18 paper

• Yuxin (Myles) Liu



- Yuxin (Myles) Liu
 - \circ Second author on a paper under submission

• Meta Novitia



- Meta Novitia
 - Making great contributions to a project, which we will submit to a top conference (and she will be the second author)

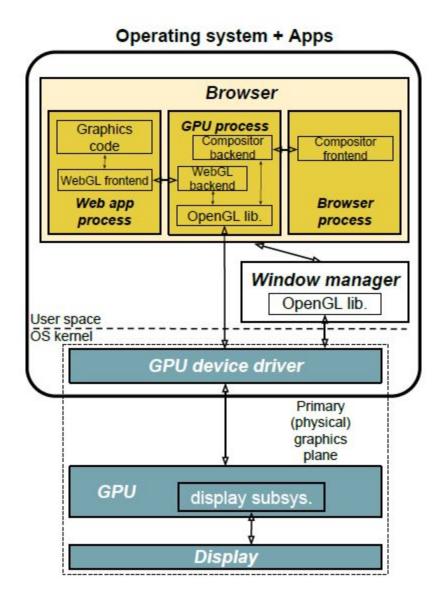
Sugar: secure GPU acceleration for web browsers

- WebGL allows web apps to perform hardware accelerated 3D rendering using the power GPU
- Unfortunately, WebGL raises a lot of security concerns

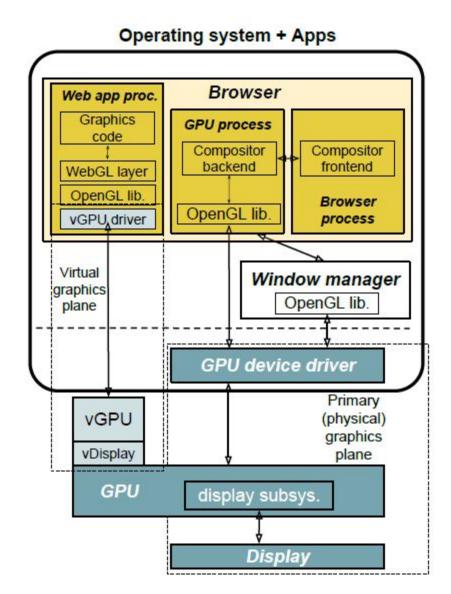
An attack through WebGL

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On success, you will see a series of "PASS" messages, followed by "TEST COMPLETE".
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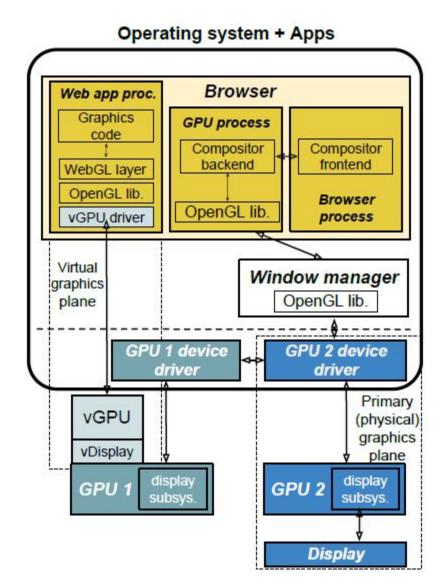
What is the problem?



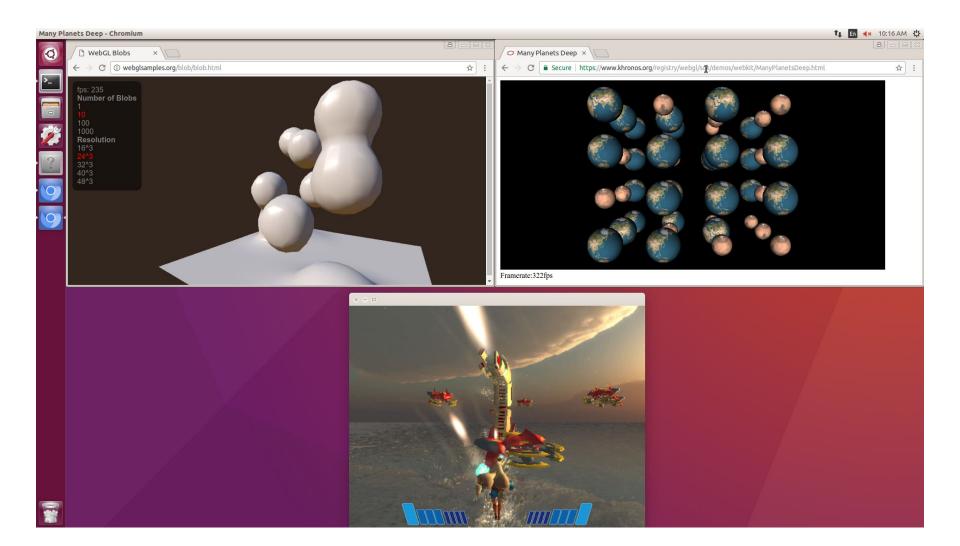
How we solved it



How we solved it



Sugar in practice!



What you would be potentially working on

There are several active projects in the group

- Help us build a new secure OS, called OctopOS
- Help us analyze existing system software to find vulnerabilities
- etc.

Summary

- Systems research is difficult but awesome
- If you like the challenge and you think you can do well at systems programming, send me an email!
 - ardalan@uci.edu