

# **Computer Systems Research**

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Finding the “right way” to build systems

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  - 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

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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

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- Zongheng Ma





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

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- Zhihao (Zephyr) Yao



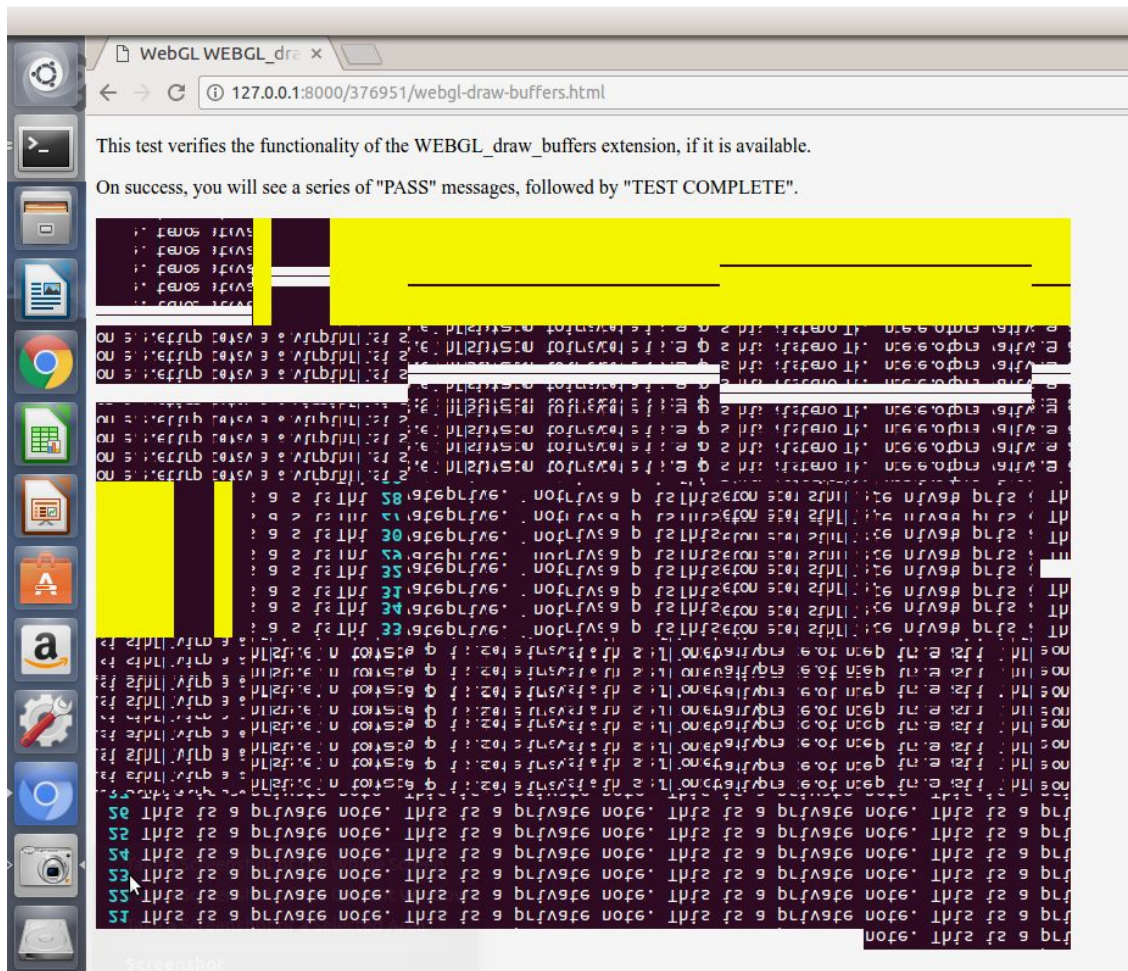
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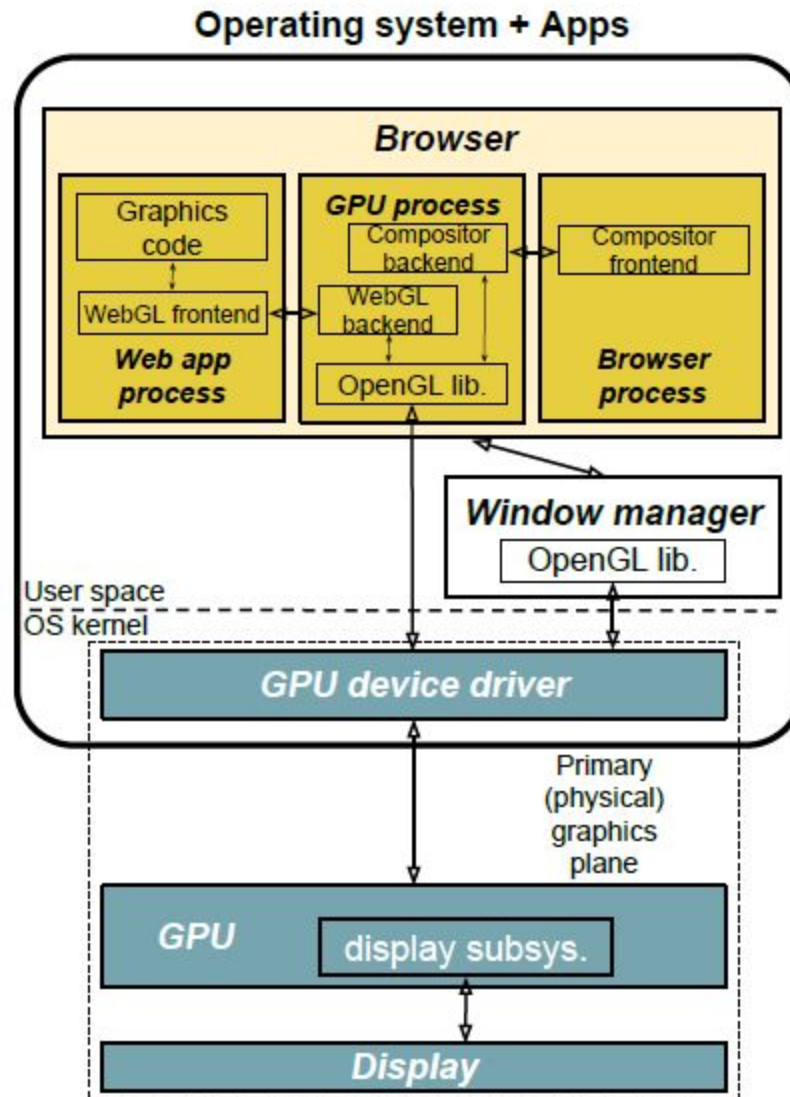
# **Sugar: secure GPU acceleration for web browsers**

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

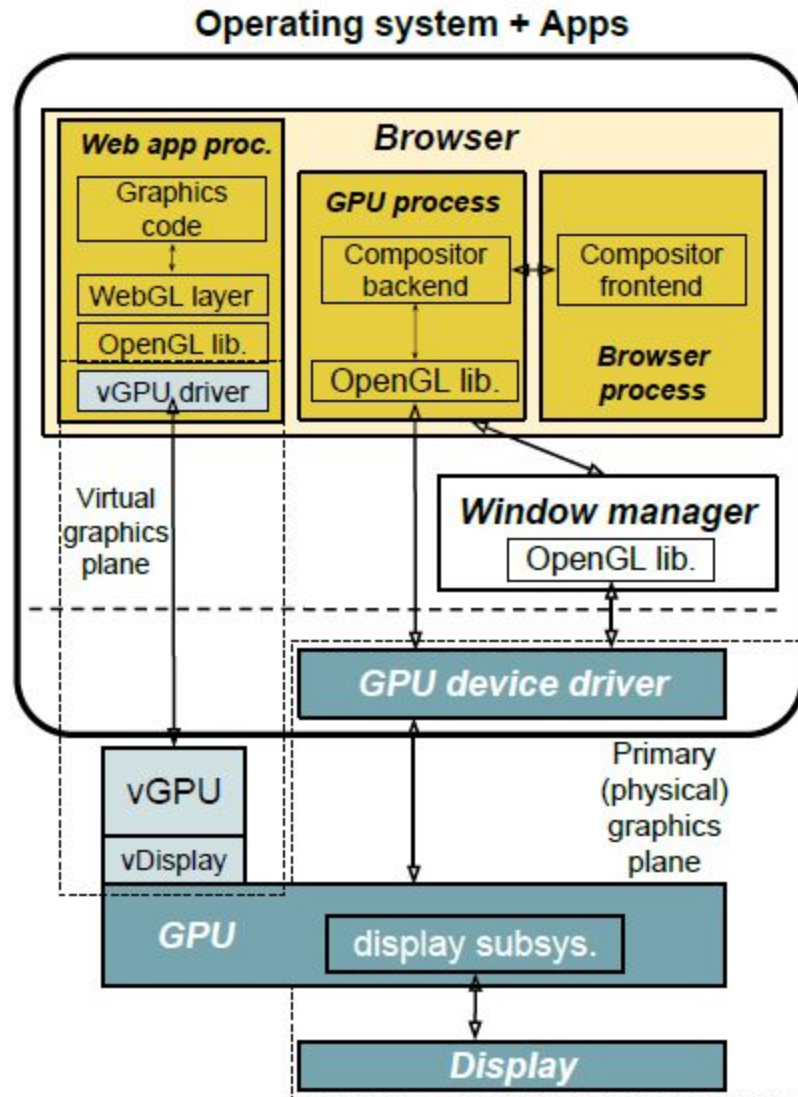
# An attack through WebGL



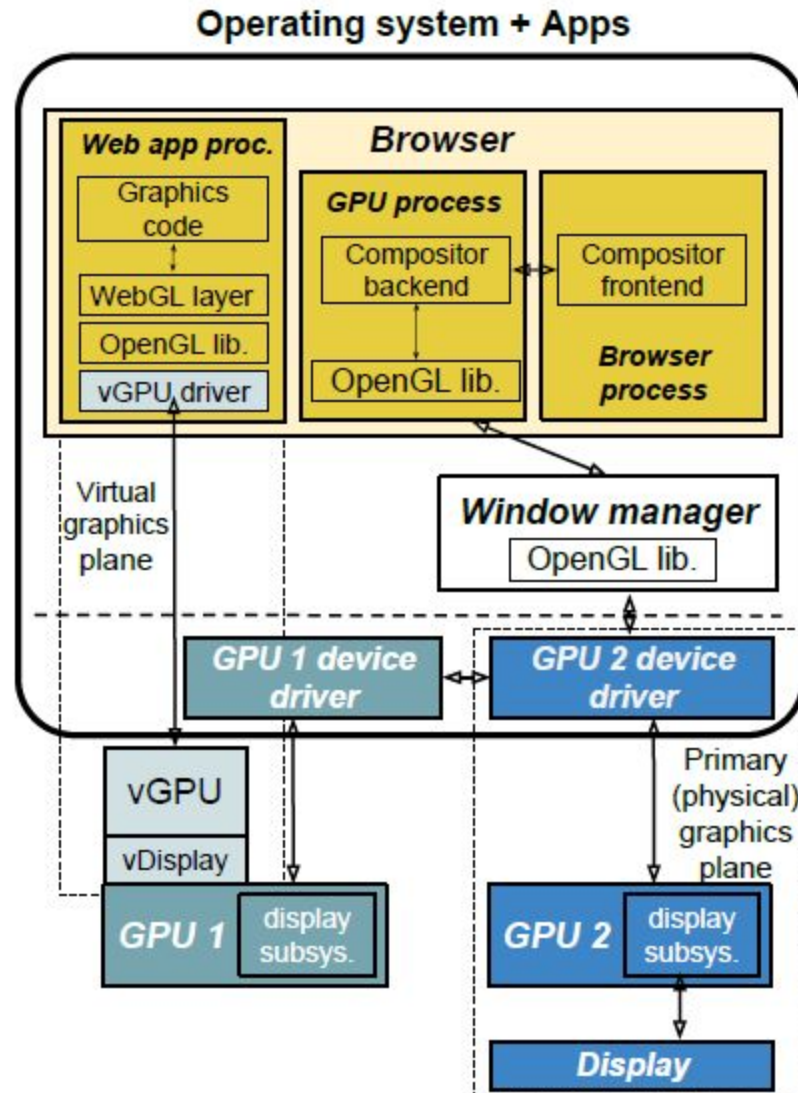
# What is the problem?



# How we solved it

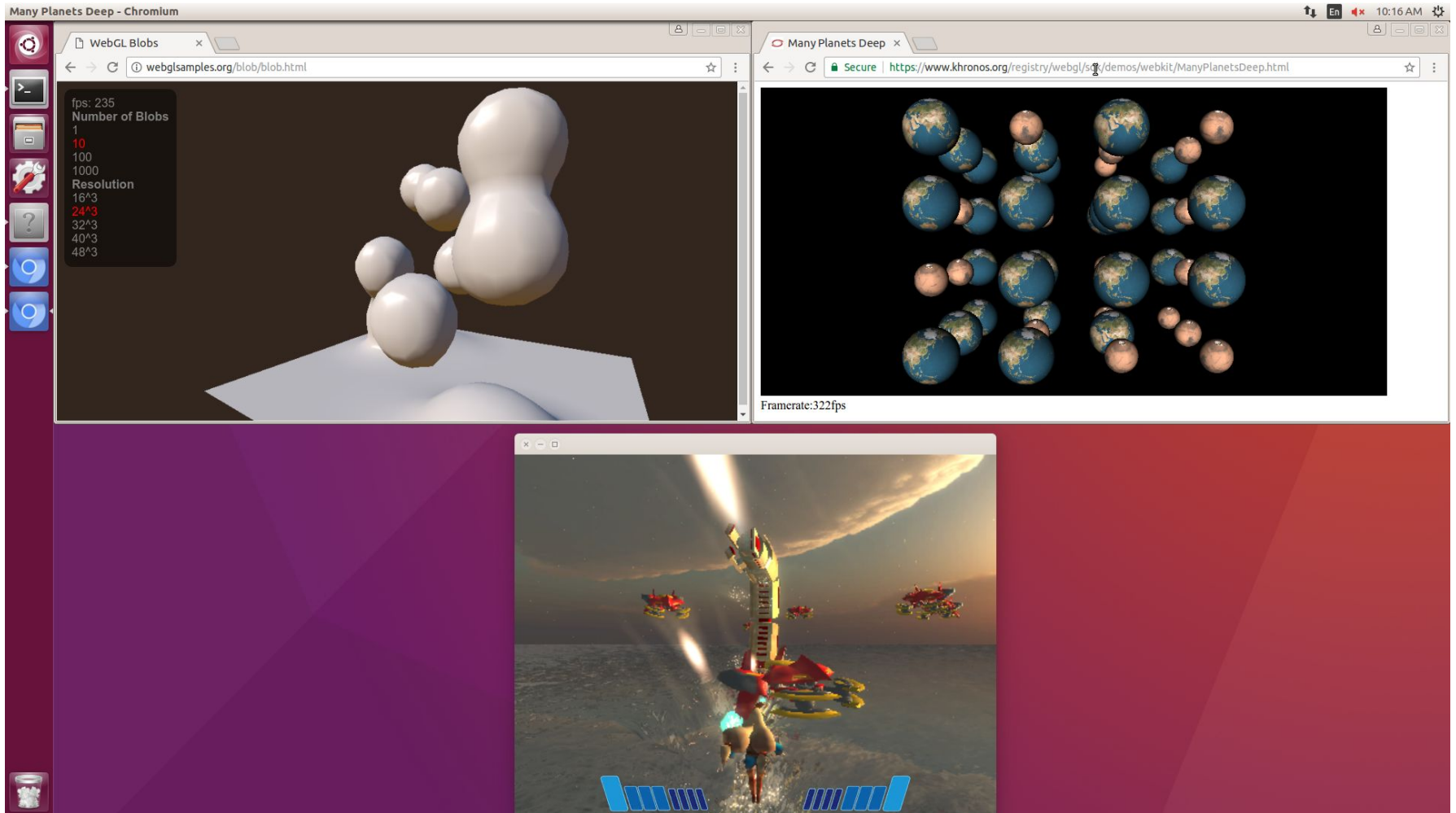


# How we solved it





# Sugar in practice!



# 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](mailto:ardalan@uci.edu)