

2022  
DESIGN AND VERIFICATION™  
**DVCON**  
CONFERENCE AND EXHIBITION  
**UNITED STATES**

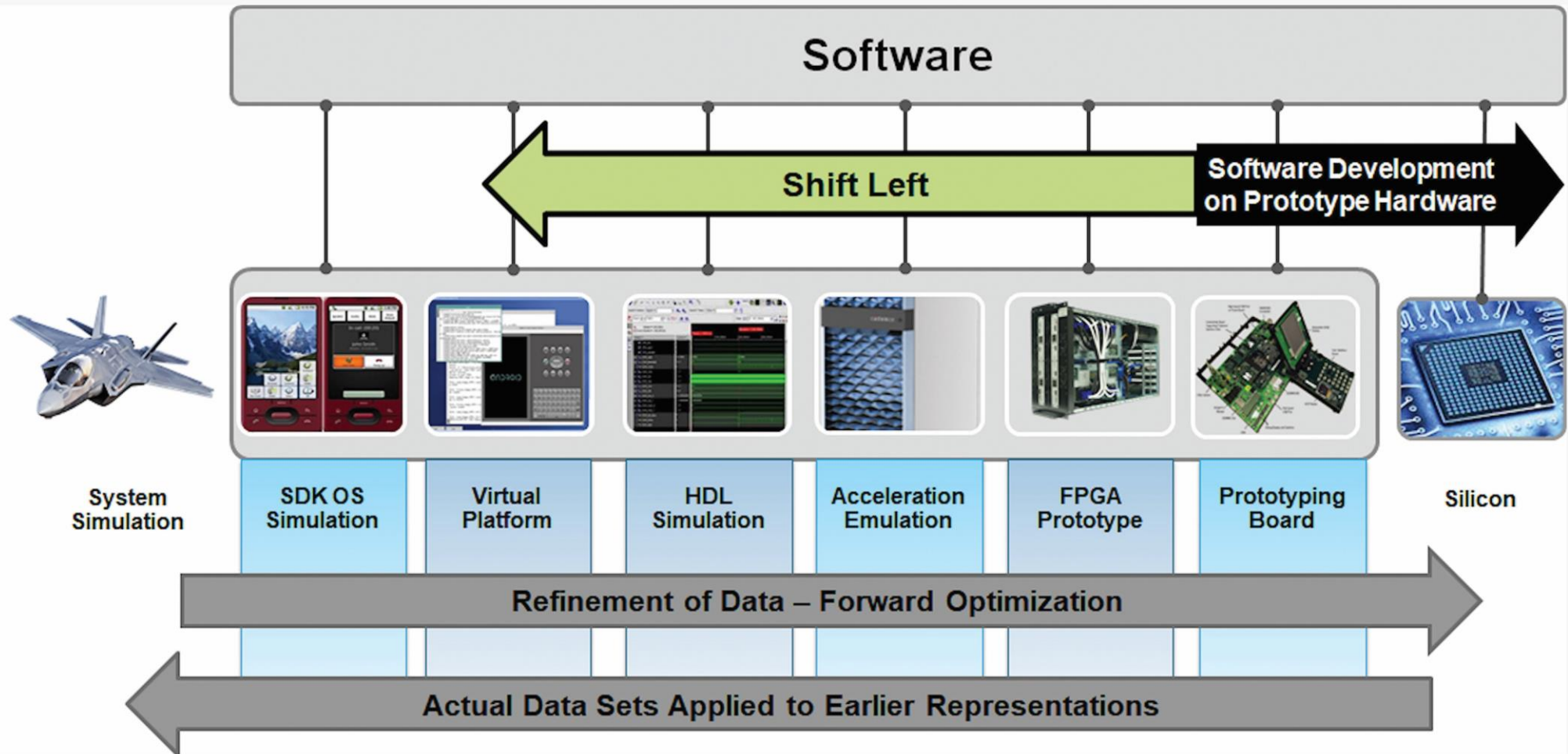
Is it a software bug?  
Is it a hardware bug?

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# Agenda

- Introduction
- Is it a Software bug?
- Can we trust the emulation build?
- Is it a hardware bug?
- Post Silicon debug
- Conclusion

# Shift Left



- I am preaching to the choir



# In an Ideal World

## What Your Software Team Would Like the RTL Team to Know.

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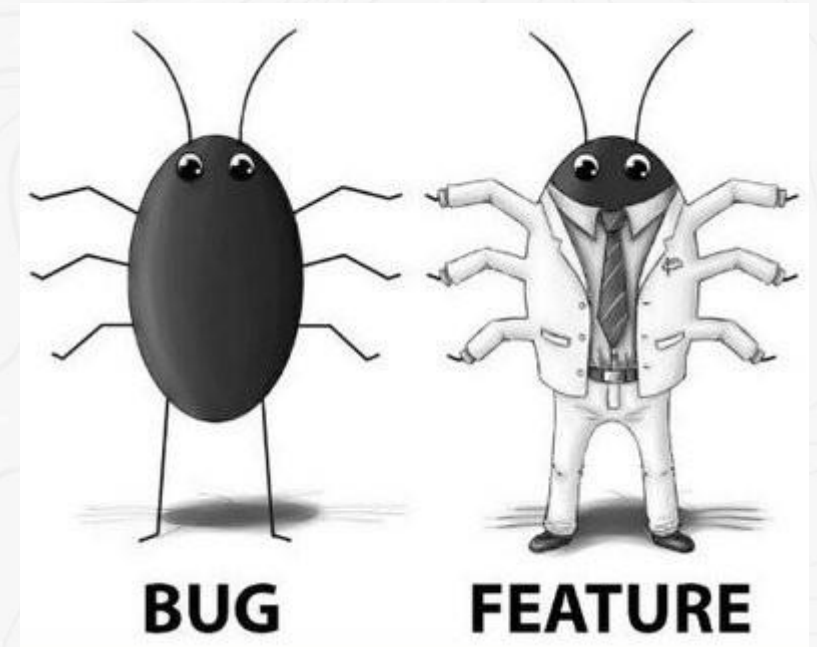
### I. Introduction

We all want to have successful tape-outs. However, the tape-out is not the end of the story for any design project. There is a saying, “the product does not ship until the device driver works.” The design could be the most beautiful and functional in the world. The verification team could have verified every facet of the design, but if the software is not able to run, people at home will not have their latest video game system or phone. Furthermore, according to Harry Foster’s 2018 Verification Survey [1], specification issues are the second and third most common root cause of functional bugs. These issues do not just affect the RTL and verification teams, but the software teams as well.

**COMMON  
SENSE**

- DVCON 2020

# Software Team vs Hardware Team



- Who owns the Hardware Software Interface (HSI) ?

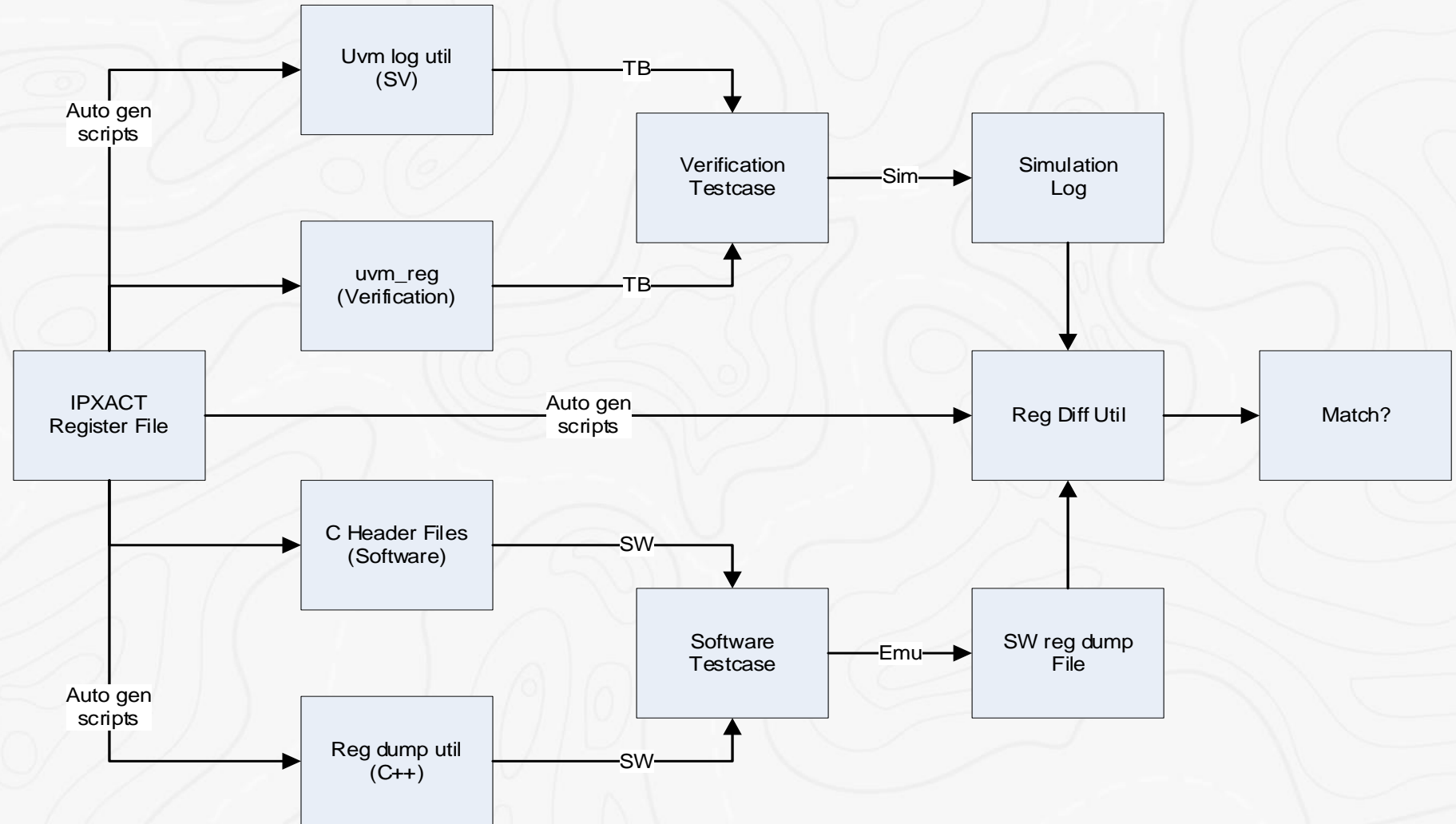


# Emulation Engineer



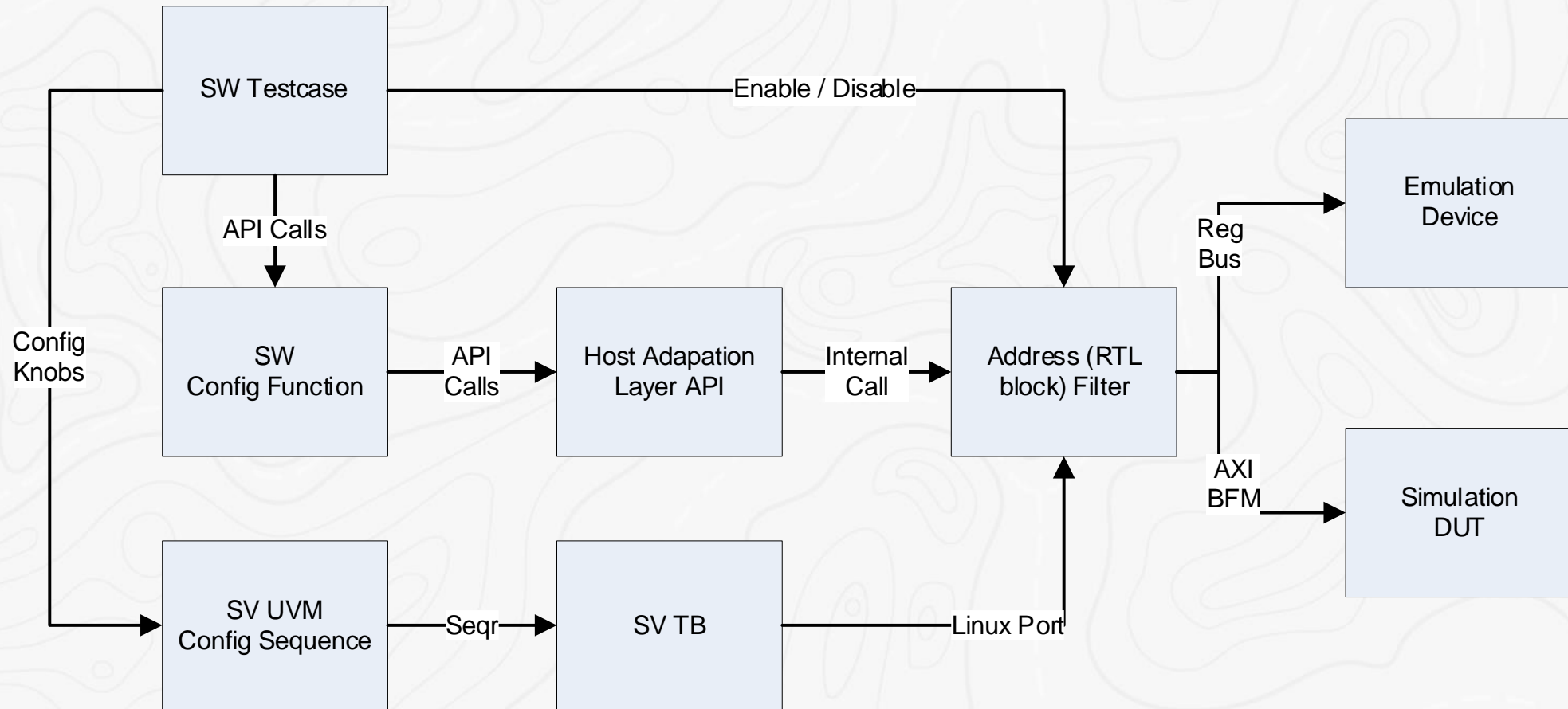
- Whose fault is it?

# Magic bit



- Verification testbench is the golden design document

# Out of date config sequence



- I wish the designer update the document

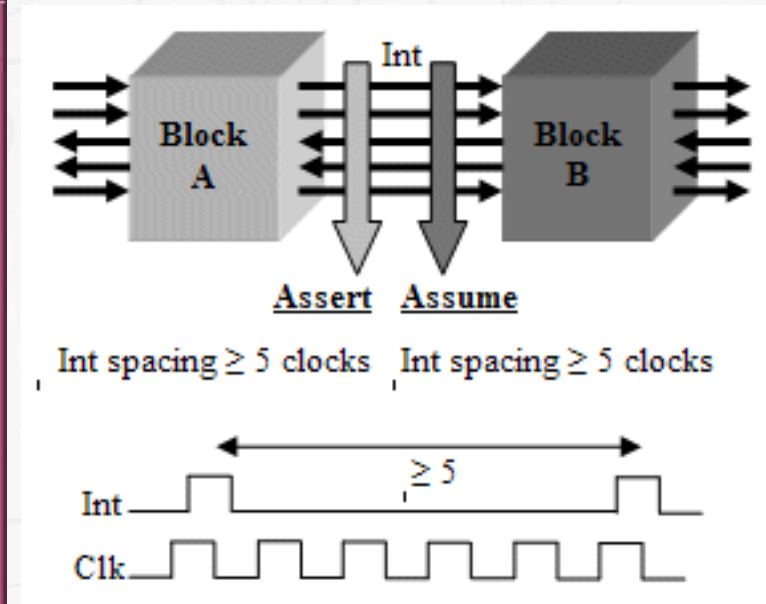
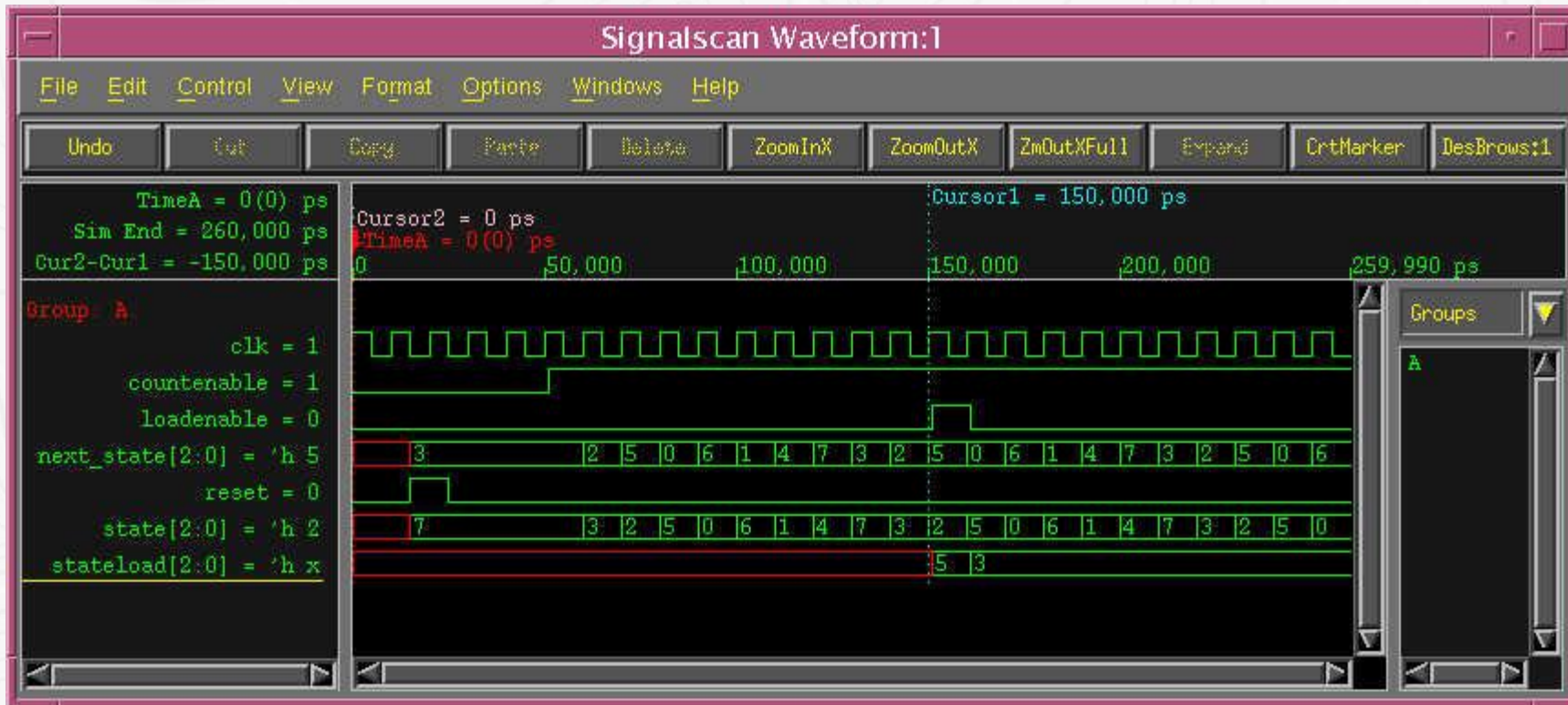


# Oops, pick up the wrong RTL release

```
// Subversion  
rev_id = `KEYSUB_SVN("$Revision: 1234 $")  
  
// GIT  
rev_id =  
`KEYSUB_GIT("$Revision: 24f2cb8760673ea6e68 $")
```

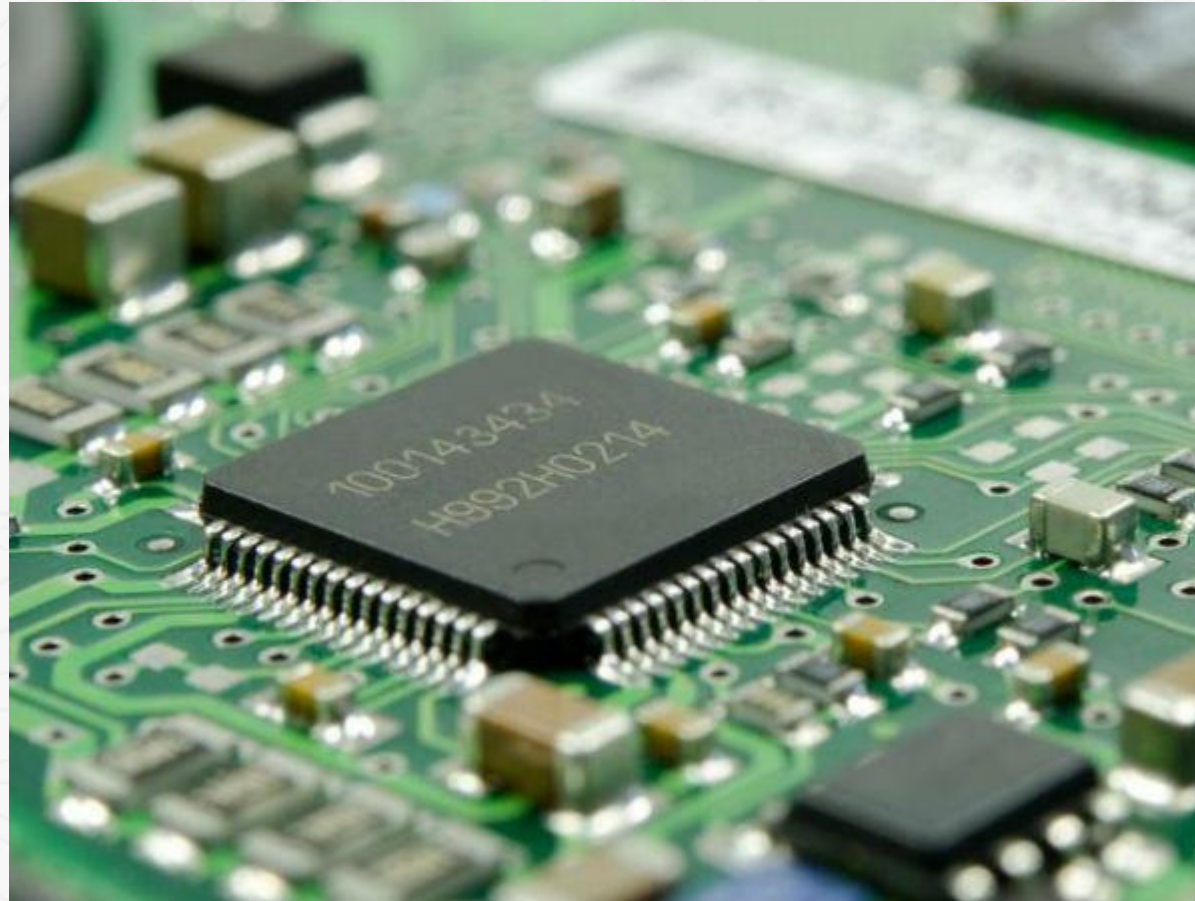
- Emulation team: sorry folks, it is our fault

# Debug it like simulation



- Waveform and SVA don't lie
- How to dump waveforms in the emulators?

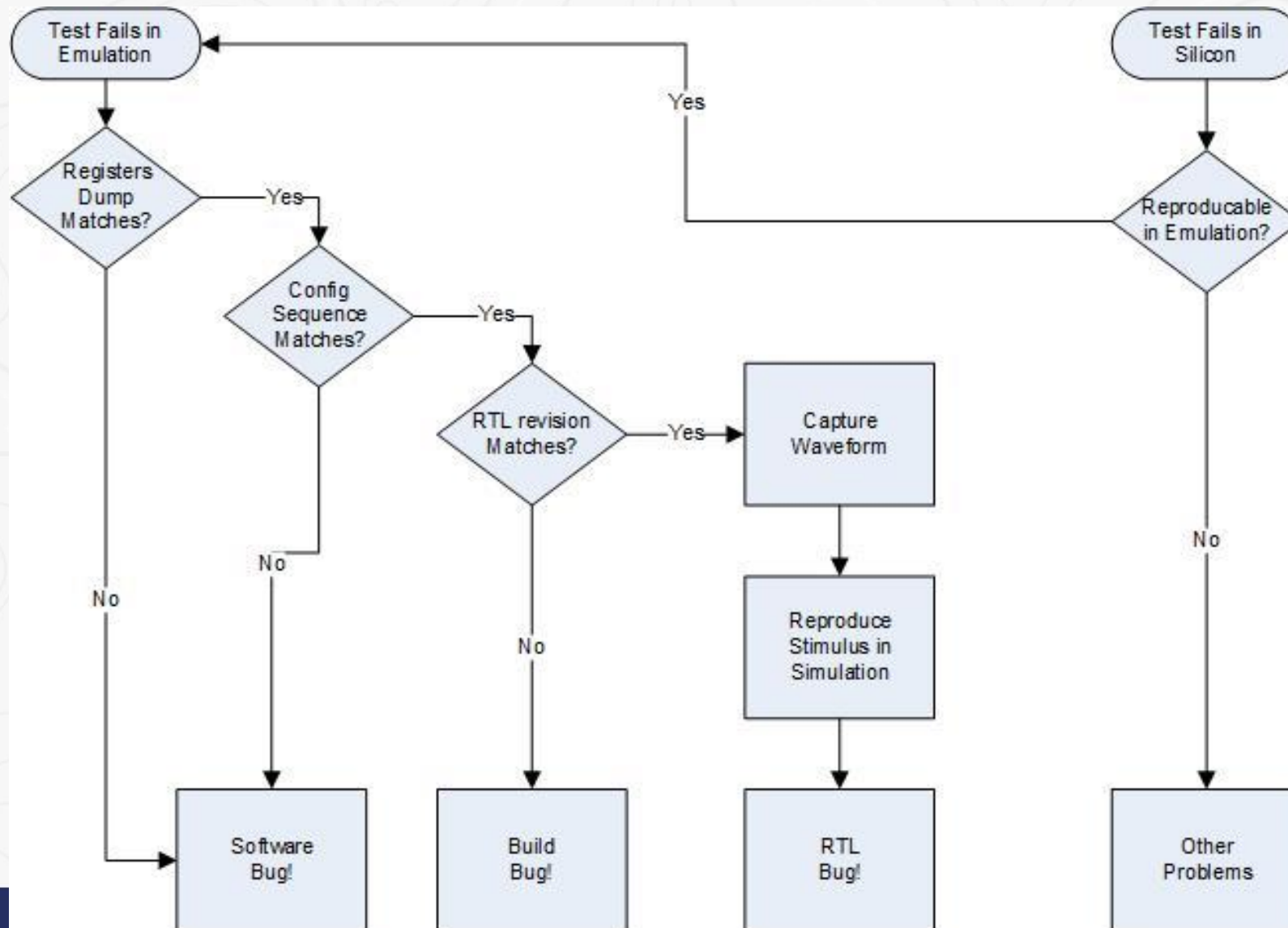
# Always keep the emulation platform alive



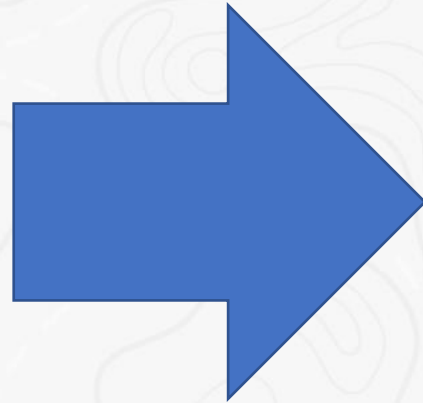
- 3 days post-silicon is a lot more expensive than 3 days pre-silicon



# Recap



# Conclusion



- The hard bugs are still hard to debug

# Questions

