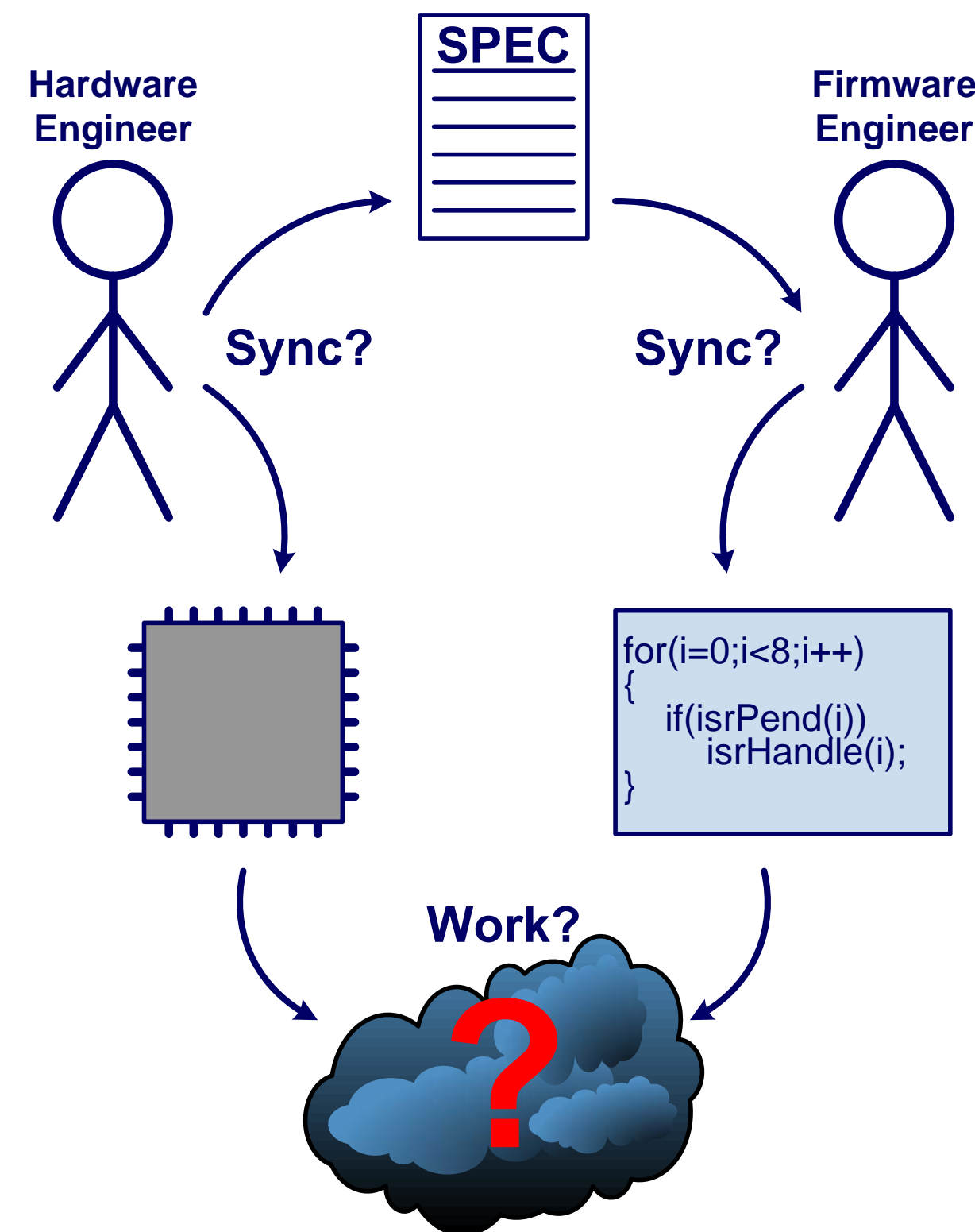


Keeping Hardware, Firmware, and Documentation Files in Sync

presented by: Gary Stringham

Problems:

- Hardware engineers wrote the design twice; once for the documentation and once for the chip design files. But both were not the same.
- Firmware engineers read the documentation and transcribed it to firmware. But the transcription was not correct.
- The design changed due to design iteration, porting, and enhancement, but not all hardware, firmware, and documentation file stayed in sync.

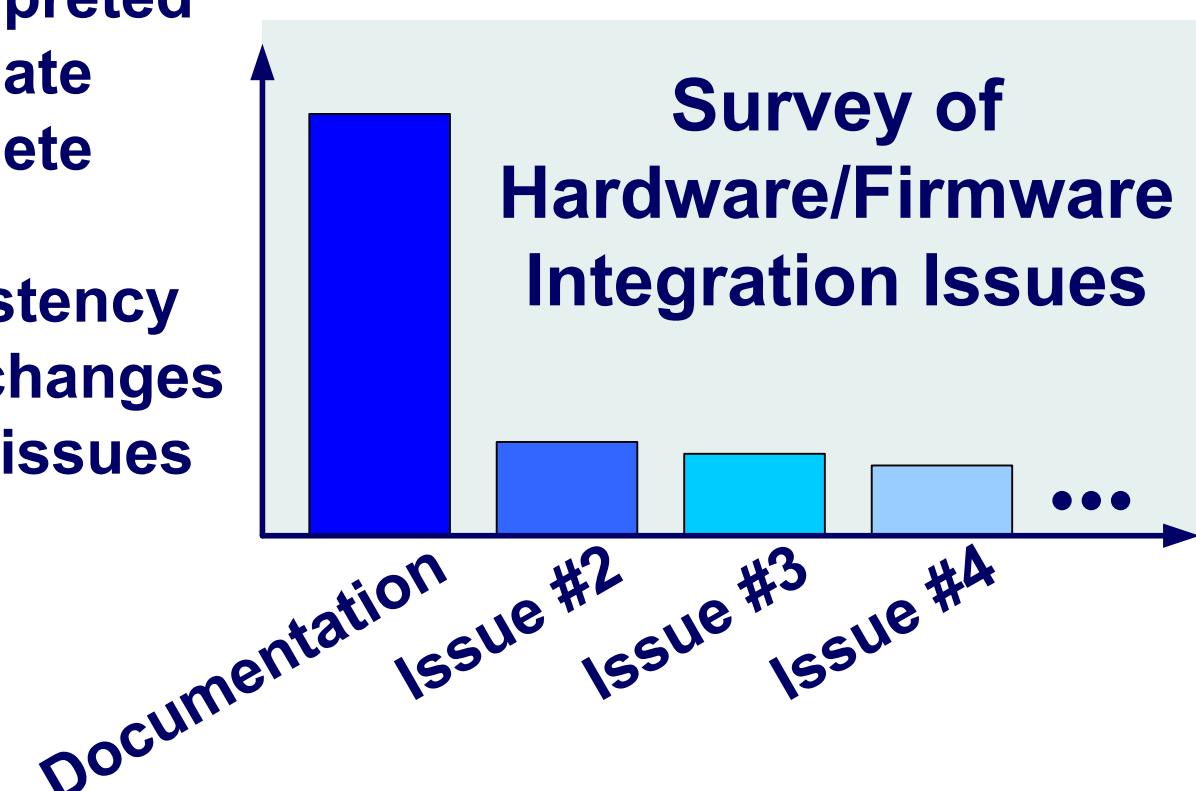


Consequences:

- Hardware/firmware integration stretched into months.
- An abort function in firmware required 550 lines of code.
- Firmware workarounds were complex and bug-prone.
- End product had reduced feature set.
- Narrowly avoided \$500,000 chip respin.
- Customer shipments were delayed.

Analysis:

- Survey showed documentation was #1 problem by far.
- Too many chances for human error.
- Documentation issues:
 - Misinterpreted
 - Out of date
 - Incomplete
 - Errors
 - Inconsistency
 - Partial changes
 - Porting issues

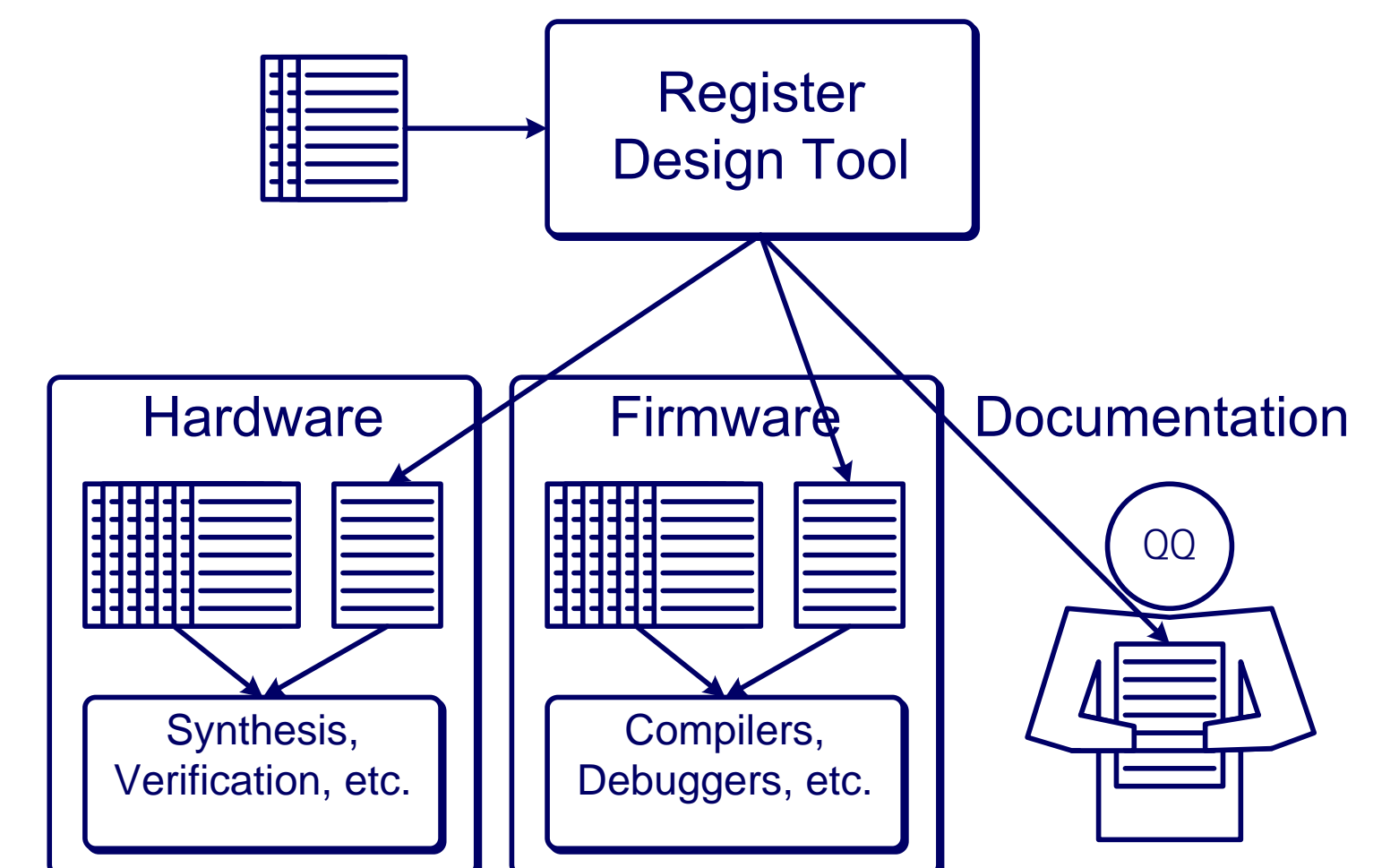


Attempted Solutions:

- Home-grown tools: Awk, perl, or other solutions were limited, required in-house support and were difficult to adapt to changes.
- Virtual prototypes: Allows testing before silicon but still requires humans to sync hardware vs. firmware, and virtual vs. real.

Register Design Tools:

- New and primarily unknown market niche.
- One master design file is processed to generate necessary design files:
 - Hardware files: Verilog, VHDL, verification, virtual prototypes.
 - Firmware files: C, C++, virtual prototypes.
 - Documentation: Paper, web, others.
- Changes made in the master design file is reflected everywhere.



Register Design Tool Vendors

Tool	Vendor	URL
1Team®-Genesis Registers	Atrenta	atrenta.com
Bitwise™	Duolog Technologies	duolog.com
Blueprint™	Denali Software	denali.com
csrCompiler™	Semifore, Inc.	semifore.com
IDesignSpec™	Agnisys Inc.	agnisys.us
SpectaReg™	PDTi	productive-eda.com

Future Feature Requests:

- Produce hardware files for one version but produce firmware files to support all versions.
- Provide a means to specify and enforce team's design standards.

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