

An Update on Building the RISC-V Software Ecosystem

Arun Thomas

BAE Systems

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Way Back in January



Let's build out the RISC-V
Software Stack in 2016.

Arun's 2016 RISC-V Wishlist

- Upstream support for GNU toolchain, clang/LLVM, and QEMU
- Upstream support for Linux kernel, Yocto, Gentoo, and BSD
- Debian/RISC-V port

Making Progress

- Upstream support for GNU toolchain, clang/LLVM, and QEMU
 - Getting ready to send patches for review
 - Let's focus on upstreaming in the next 6 months
- Upstream support for Linux kernel, Yocto, Gentoo, and BSD
 - FreeBSD 11 will officially support RISC-V!
 - Let's focus on Linux kernel, Yocto, and Gentoo
- Debian/RISC-V port
 - See Manuel's talk tomorrow

Can we do better?

My Take in January



Recruit developers

Reduce startup costs

Specs. Docs

My Take in July



Foundation should **fund** developers to build core SW infrastructure

We should decide on a **process** for proposing ISA enhancements. **Start now.**

Funding Developers

What Might These Folks Do?

- Upstreaming and Maintainership
- Porting software to RISC-V
- Performance optimization/analysis
- Enhancing test suites and methodologies
- Continuous integration
- Release management

Funding Models



Proposing ISA Enhancements

Standards, Drafts, RFCs, Proposals, ...



RISC-V RFCs

- A straw man proposal to spark discussion:
github.com/arunthomas/riscv-rfcs.git
- RFCs are written in Markdown text format
- Submit RFCs via GitHub pull requests
- Discussion on isa-dev and GitHub

Requesting Comments

The screenshot shows a GitHub repository page for 'arunthomas / riscv-rfcs'. At the top, there are buttons for 'Watch', 'Star', and 'Fork', each with a '0' next to it. Below this is a navigation bar with 'Code', 'Issues', 'Pull requests', 'Wiki', 'Pulse', 'Graphs', and 'Settings'. The current branch is 'master' and the file path is 'riscv-rfcs / rfcs / 0001-rfc-process.md'. A pull request is shown, titled 'RFC 1: RFC Process' by 'arunthomas', with a commit hash '2bac9a8' and a timestamp '5 minutes ago'. Below the pull request, it says '1 contributor'. The file details show '38 Lines (26 sloc)' and '959 Bytes'. There are buttons for 'Raw', 'Blame', and 'History'. A table lists the authors and state:

authors	state
Arun Thomas	Straw Man

RFC 1: RFC Process

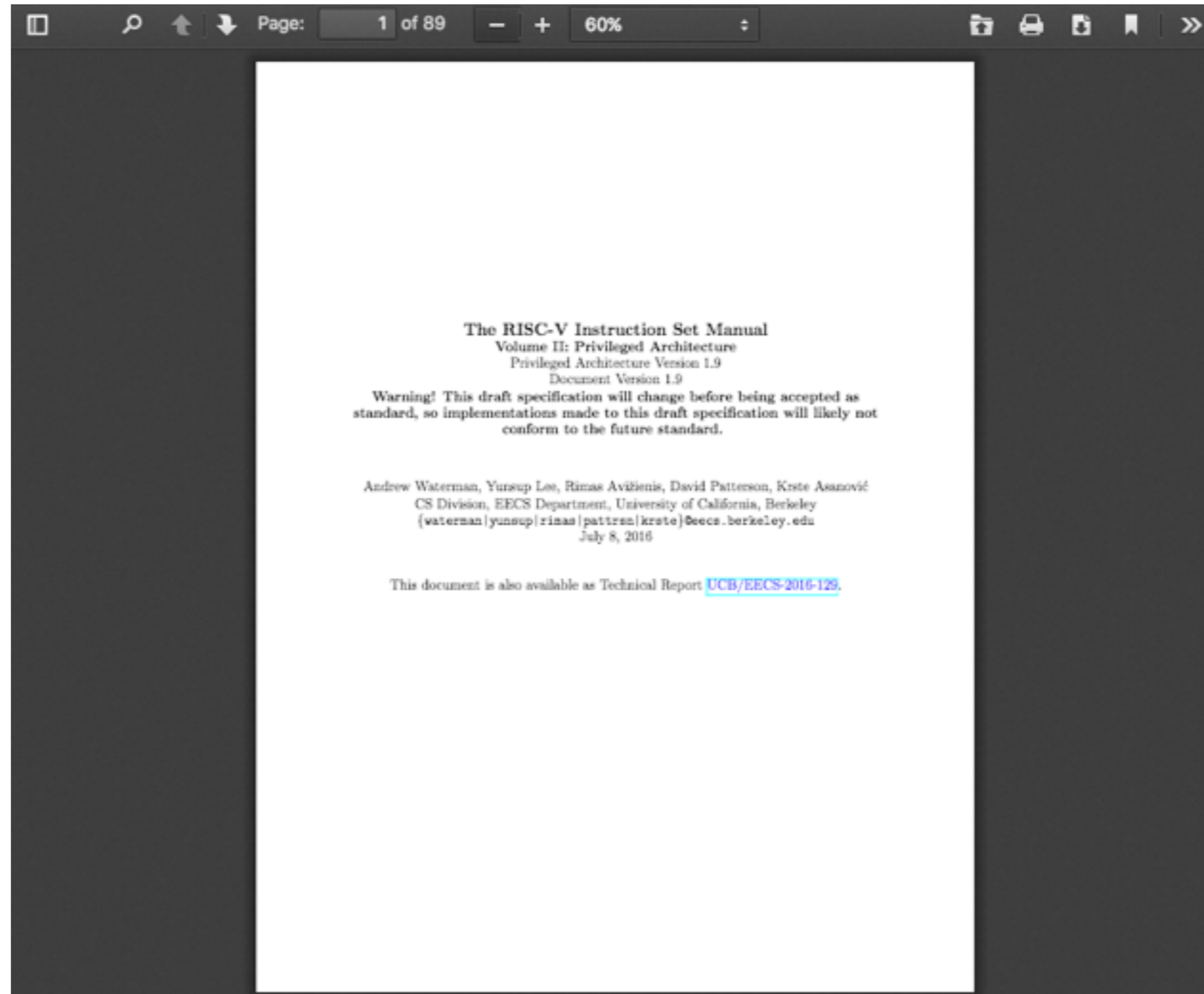
Introduction

As the RISC-V community grows, it will need to decide on a **process** for defining RISC-V standards and enhancements. One option is to use a GitHub repository such as this to capture proposals to enhance the RISC-V ISA or other aspects of the RISC-V project.

Proposal

- Use a GitHub repository to host RISC-V RFCs

Requesting Comments



Summary

- We are making progress on the software stack, but we could move faster
- Foundation should **fund** software developers
- Community should decide on a **process** for proposing ISA enhancements

Make ISAs great
again.

Questions/Comments?

- What do **you** think we should be doing to build the RISC-V software stack?
- Let's keep this discussion going at the workshop/committee meetings and on the mailing lists.
- Contact: arun.thomas@acm.org, @arunthomas