RISC-V GNU Toolchain Biweekly sync-up call Agenda…

RISC-V GNU toolchain sync-up call agenda / notes

Meeting Info

This meeting is usually held on Thursdays(UTC+0 15:00/PST 07:00/CST 23:00) every two weeks, mainly discussing the support progress and problems of the RISC-V GNU toolchain.

Please download and import the following iCalendar (.ics) files to your calendar system. Weekly:

https://calendar.google.com/calendar/ical/lm5bddk2krcmtv5iputjgqvoio%40group.calendar.google.com/public/basic.ics

Join Zoom Meeting
https://zoom.us/j/89393600951?pwd=ZFpWMkZ6Tm1TbUFXT1hZZjZZMHhRQT09

This document

This document will include minimal notes from meetings e.g. in cases where it's useful to record an agreed next action. These meeting notes shouldn't be a primary source for policy decisions - if a topic is discussed and broad consensus is reached, it should move to an RFC or review thread. If you have any topics you would like to discuss or share in future meetings, feel free to add it directly in this document.

Agenda / notes

A 'toolchain' encompasses the broad set of tasks as compiling, assembling, linking, loading, and debugging. All but one task has been covered here. It might be time to incorporate the 'loader' portion of the toolchain here, in a general, hardware-agnostic, and non-proprietary way. That means, specifically, avoiding any mention of Seggar, Lauterbach, or even WCH specialized and costly and non-standard offerings. It might be time to follow and report on the status of development of OpenOCD, for example, which is becoming the most prolific open-source loader component of the toolchain process to date. In particular, it might be time to consider evolving OpenOCD away from tcl/tk towards a more modern and user friendly configuration language. My $0.02, apologize for the lengthy passage, feel free to revise, delete, or move elsewhere. Paul S.

July 26 2023,

🟨 RISC-V GNU Toolchain Monthly sync-up 23-07-27

Topics:
- Experimental vector calling convention
- Profiles progress
- Re-arrange opcode table for consistent alias handling
- Intrinsic define discuss
- Sub-extensions support status
- Open discuss

June 29 2023,

Slide links: 🟨 RISC-V GNU Toolchain Monthly sync-up 23-06-29
Topics:
- RISCV-GNU-toolchain repo updates
- Extension version control
- Save CSRs in interrupt functions
- Sub-extensions support status
- Open discuss

May 18 2023,

Slide links: 🟨 RISC-V GNU Toolchain Biweekly sync-up 230518
Topics:
- New RISC-V ISA spec version
- RV64-ILP32 supports introduce
- Sub-extensions support status
- Open discuss

Note:
- New RISC-V ISA spec version
  Discussed if we still need keep -misa-spec option update——NO, moving on profile work
- RV64-ILP32 supports introduce
  ShiHua introduced RV64-ILP32 work on toolchain part, more concentration is on kernels, not sure the certain benefit from this work, need benchmark performance results
- Sub-extensions support status
  Introduced RVV work, ZC extension patches and Bf16 P-SIMD extension status
- Open discuss
  Palmer held GNU patchwork discuss weekly:
  https://docs.google.com/document/d/1bW2jgRmhYdHz7oVw5EUcXVAv4_cfuBaZ5bhVG1pUnIo/edit#
  Discussed PR on riscv-gnu-toolchain github repo

April 6 2023,

Slide links: 🟨 RISC-V GNU Toolchain Biweekly sync-up 230406
Topics:
- RVV gcc support status
- Profiles toolchain implementation draft
- Sub-extensions support status
- CI status of currently toolchain
- Open discuss

Note:
- RVV gcc support status
  Fine to support rvv intrinsic on gcc before gcc13 release
  Auto-vectorization is WIP
- Profiles toolchain implementation draft
  Split profile define doc form [-march PR](), welcome to add things
  [Profiles toolchain implementation draft]()
- Q: can we switch the order of YEAR and WORD-SIZE, to be back compatible with earlier compilers line -march=rv32imac?
  - A: Prefer use same name as profile, that less confusion to user, and also easier to arch string parser
- Sub-extensions support status
  ZC* extensions gcc implement patches:
  https://gcc.gnu.org/pipermail/gcc-patches/2023-April/615287.html
  Patrick introduce atomic A.6 mapping patches:
  https://gcc.gnu.org/pipermail/gcc-patches/2023-April/615264.html
- CI status of currently toolchain
  Yulong introduce fd-4 fail case fix.
  Currently only a few fail cases remain in upstream gcc for RISC-V target.
- Open discuss
  Update toolchain configure defaults: with-isa-spec
  https://github.com/riscv-collab/riscv-gnu-toolchain/issues/1218
  Now configure doc is not corresponding with gcc/binutils set

  Zbs optimal issue: https://gcc.gnu.org/bugzilla/show_bug.cgi?id=109414
  Additional instruction `sext.w` generator in gcc but not on clang in zbs

Mar 9 2023,

Slides links: 🟨 RISC-V GNU Toolchain Biweekly sync-up 230309

Topics:
- Minutes of meeting is available now

- RVV gcc support status

- Benchmark support/porting status tracing

- Sub-extensions support status

- Opendiscuss

Notes:
- Minutes of meeting are available now: This doc!
- RVV gcc support status:
  - GCC has implement all RVV intrinsic exclude segment load/store
  - Need document link in release note to mention we implement RVV intrinsic 0.11.
  - Focus on bug fix and testing now, NO optimization patch allowed, plz file bug for performance issue.

-Benchmark support/porting status tracing
  lmbench is supported for RISC-V target, pls help us improve the table and add more benchmarks

Benchmark	link	status
SPEC	http://www.spec.org	supported
Embench	https://www.embench.org	supported
CoreMark	https://www.eembc.org/coremark	supported
FPMark	https://www.eembc.org/fpmark	supported
lmbench	https://lmbench.sourceforge.net/	supported
…	…	…

-Sub-extensions support status
  - Scalar crypto extension is fully supported upstream.
  - Rebased Zc extension gcc implement, there might have some compatibility issues when implementing the Zce extension:

- Opendiscuss
    - multilib toolchain dejagnu testing broken
      https://github.com/riscv-collab/riscv-gnu-toolchain/issues/1201
      also have libsanitizer QEMU problems when multilib enabled
    - Maskray supports --[no-]relax-gp option in ld
    - P-ext restarts draft works.
    - Zvfh not support in gcc yet, since the spec is not ratify yet
    - bf16 is discussing in psABI group
      https://github.com/riscv-non-isa/riscv-elf-psabi-doc/pull/367
    - Auto Vectorization work can be sent to gcc upstream to have a pre-review before
      gcc13 releases.

Feb 9 2023,

Slides links: □ RISC-V GNU Toolchain Biweekly sync-up 230209

Topics:
- RVV gcc support progress
  Juzhe sent the RVV intrinsics supports to gcc upstream

- Intrinsic naming guidelines
  RISC-V intrinsic naming use prefix "__riscv_" confirmed
  https://github.com/riscv-non-isa/riscv-c-api-doc/pull/31

- Libsanitizer options support
  Some libsanitizer options not support correctly with riscv-gnu-toolchain

- Profile progress discuss
  New profiles RVA/S23 documented
  https://github.com/riscv/riscv-profiles/blob/main/rva23-profile.adoc
  Need to synchronize GNU and LLVM implementations
  https://github.com/riscv-non-isa/riscv-toolchain-conventions/pull/26

- Sub-extensions support status

  - New vendor extension "Xcvalu" PR from OpenHW group
    https://github.com/riscv-non-isa/riscv-toolchain-conventions/pull/29

  - New extension ratify in 2023
    https://wiki.riscv.org/display/HOME/Specification+Status#SpecificationStatus-2023

  - Zicond extension introduce and its supports status
    https://gcc.gnu.org/pipermail/gcc-patches/2023-February/611627.html
    https://sourceware.org/pipermail/binutils/2023-January/125773.html

  - Zc extension status
    https://github.com/openhwgroup/corev-binutils-gdb/pull/65
    (see questions below in Notes)

  - Open discuss
    disassemble undefined instruction name changed from .byte into .insn
    Objdump slow problem
    https://github.com/riscv-collab/riscv-gnu-toolchain/issues/1188

Notes:
- RVV gcc support progress
  Jiawei: The RVV intrinsics on gcc plan to be fully supported before gcc13 releases.
  The RVV intrinsics doc plan to forzen recently, next RVV C Intrinsic Documentation

Release Open Meeting will discuss more details about it.

- Intrinsic naming guidelines
Jiawei: Do we also need built-in function or vendor naming rules for RISC-V?
Christoph: I think the doc had included the vendor naming rules for RISC-V intrinsics.
Kito: It's not mandatory restrict naming rules for built-in, but it's ok to use
"__builtin_riscv_" as prefix for RISC-V builtin funtions.

- Libsanitizer options support
Kito: Libsanitizer is only available for RV64 right now, and it conflicts with multilib
support, you can check the build way and issue it if there still have problems.

- Profile progress discuss
Christoph: I will rewrite the doc recently, using upcast letters for profiles
implementation.
Kito: We had discussed this several times in this meeting, I will make a discuss at
next LLVM conference. By the way, what is the RVA23 document status?
Philipp: It's still a draft and not frozen yet.

- New vendor extension "Xcvalu" PR from OpenHW group
Kito: I see Jeremy's reply and will check it later.
Christoph: What is the "Xplup" extension mentioned in slides?
Jiawei: It's an old vendor extension from OpenHW group.

- New extension ratify in 2023
Jiawei: Over 20+ RISC-V new extensions plan to ratify in this year, like
BF16, J-ext, Zicond, you can check the RISC-V wiki pages for more info.

- Zicond extension introduce and its supports status
Philipp: Already sent the support patches to upstream.

- Zc extension was ratified and OpenHW group updated the support
Jiawei: Zc extension was ratified and OpenHW group updated the support, we
will rebase them and send patches recently.
PaulS: Not sure if it's too late, but there are a few questions re: Za, Zb, Zc, Zs (bitmanip): [show opcode as 7-bits like all other insn for unzip and zip by psherman42 · Pull Request #181 · riscv/riscv-bitmanip · GitHub](#) and [insn is I-type, opcode should be OP-IMM[-32] for zext.h by psherman42 · Pull Request #180 · riscv/riscv-bitmanip · GitHub](#)

- Objdump slow problem
Christoph: riscv-gnu-toolchain reported a new issue that says objdump slows 80x when changing Binutils from
version 2.37 to 2.38.
Kito: It sounds like an interesting problem, I'll check back with Nelson.

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Sekme 2

Sekme 3