东亚时区RISC-V双周会

2022年07月21日·第040次

https://github.com/cnrv/RISCV-East-Asia-Biweekly-Sync

Host: 陈嘉炜

Organizer: PLCT Lab wuwei2016@iscas.ac.cn

会议议程（15:00 - 16:00）

- 自我介绍、等待参会者接入、非技术话题八卦（5分钟）
- RVI 的更新和八卦（基本上跟东亚双周会群内消息同步）
- Unratified Specs 的参考实现进展
- 东亚地区小伙伴的项目更新
- 自由讨论

RISC-V International 同步、全球开源社区八卦

- 新的一批 chair/co-chair/acting-chair 任命
  - 恭喜 Xiaohan Ma [RISC-V] [sig-ras] [RISC-V][soc-infra] Reliability, Availability, and Serviceability (RAS) SIG
  - [RISC-V] [tech-chairs] Welcome to new SIG-Embedded Chair, Ligang Zhang
- 龙蜥RISC-V架构的开发者预览版也有了，能够跑起来XFCE桌面。
- RISC-V Linux 内核及周边技术动态 第三期
  - https://mp.weixin.qq.com/s/OsRer2ykn-S9miOh3L4NKw
-

AOSP for RISC-V - 汪辰、陆旭凡（cont.）

RVI upstream 仓库针对 riscv64-android-12.0.0_dev 的更新：

- rollback commented code: https://github.com/riscv-android-src/platform-bionic/pull/34 回退测试构建中对 LLVM modules 的依赖。
- Updated the android12.md：https://github.com/riscv-android-src/riscv-android/pull/6，修正文档中对 CTS 环境搭建的描述
- revert the changes：https://github.com/riscv-android-src/platform-frameworks-av/pull/1，回退代码中因为早期编译器不支持的语法所作的修改
- remove build options for aosp 10：https://github.com/riscv-android-src/platform-build-soong/pull/6，删除从 aosp 10 上引入的编译选项，这些选项在 12 上不需要了。
- Remove the line "sdk_rv.mk" in target/product/sdk_phone_riscv64.mk：https://github.com/riscv-android-src/platform-build/pull/2，针对 makefile 的清理。已提交尚未 merge
- build libcompiler_rt and increase system_sever timeout factor: https://github.com/riscv-android-src/device-generic-goldfish/commit/c9b433476da39fb2c352fdb24d1f922abacd920a
- Aosp-riscv (https://github.com/aosp-riscv) 这边和 RVI upstream 针对我们已修改的主要仓库的同步工作已接近完成，我们将不在 aosp-riscv 中增加新特性，后面的开发工作将已 RVI upstream（https://github.com/riscv-android-src）为主。

AOSP for RISC-V - 汪辰、陆旭凡

bionic unit test (on emulator) status update：

- 数学库 round 问题研究：https://gitee.com/aosp-riscv/working-group/issues/I5BV63，修改 PR: https://reviews.llvm.org/D128240: 为compiler-rt 中添加获取浮点 round mode的功能，已根据 review 意见提交改进，等待 reviewer accept。
- Signal Stack unwinding 异常：https://gitee.com/aosp-riscv/working-group/issues/I5D6NY，目前发现 llvm-project 的构建 manifest 未 pick 最新的 bionic 和 ndk，提交 issue 讨论：https://github.com/riscv-android-src/toolchain-llvm-project/issues/5。
- "-nan" 打印处理异常：https://gitee.com/aosp-riscv/working-group/issues/I5CKA4，相关 GNU toolchain issue：https://github.com/riscv-collab/riscv-gnu-toolchain/issues/1092，暂 pending

Articles update:

- Call Stack (RISC-V): https://zhuanlan.zhihu.com/p/542845861
- Stack Unwinding - Overview: https://zhuanlan.zhihu.com/p/543823849
- Stack Unwinding 之基于 Frame Pointer: https://zhuanlan.zhihu.com/p/543825539

RISC-V GCC进展

Palmer于月初提交了RV64E相应的工具链支持，目前处于RFC的状态，欢迎大家去psabi社区提出宝贵的建议

gcc: https://gcc.gnu.org/pipermail/gcc-patches/2022-July/598307.html

gas: https://sourceware.org/pipermail/binutils/2022-July/121785.html

Kito向gcc upstream发送了zfh的patch,目前仍在review中

https://gcc.gnu.org/pipermail/gcc-patches/2022-July/597964.html

钟居哲解决了register coalescing问题：https://github.com/riscv-collab/riscv-gcc/commit/b18303237190045dbbe51199a7717fb4f405cd9c

正在解决https://gcc.gnu.org/bugzilla/show_bug.cgi?id=99407#c2中的问题

廖仕华向gcc upstream发送了zmmul的patch,目前仍在review中

https://gcc.gnu.org/pipermail/gcc-patches/2022-July/598148.html

https://sourceware.org/pipermail/binutils/2022-July/121728.html

binutils uptream现已支持了S系列的三类扩展，并且对h扩展进行了兼容

https://sourceware.org/git/?p=binutils-gdb.git&a=search&h=HEAD&st=commit&s=RISC-V%3A+Add+%27S

Clang/LLVM 进展 (PLCT)

Gollvm:

- 按照riscv abi重新实现了，几个新的pr已经合并，代码在老地方：https://github.com/plctlab/gollvm
- 目前的状态：ninja check-gollvm大部分都可以通过：https://github.com/plctlab/gollvm/issues/16

LLVM upstream:

- 已经合并，感谢前实习生，薛奇星同学百忙之中抽空完成了zmmul: https://reviews.llvm.org/D103313

- 新的patch
  - lldb，提出在RISCV上跳过Float16的测试： https://reviews.llvm.org/D129736
  - 优化cfg, 删除一些move操作：https://reviews.llvm.org/D129757
  - zc扩展的自扩展zca：https://reviews.llvm.org/D130141

- 有比较多的更新，lldb-server 完善了对RISCV64的适配：https://reviews.llvm.org/D128250

Clang / LLVM 社区的更新（廖春玉、陆旭凡）

1. D130203, D130099, D130146，D129980 RISC-V后端指令选择优化
2. D129948 Fold stack reload into sext.w by using lw instead of ld.
3. D129957 优化ineg+setge/le/uge/ule 节点的指令选择
4. D130222 Add scheduling class for vector pseudo segment instructions.

QEMU/Spike/Sail/ACT进展 (PLCT)

- Qemu:
  - Zmmul: https://lists.nongnu.org/archive/html/qemu-riscv/2022-07/msg00121.html
  - Csr: https://lists.nongnu.org/archive/html/qemu-riscv/2022-07/msg00137.html
- Spike:
  - Csr实现的相关更新
    - https://github.com/riscv-software-src/riscv-isa-sim/pull/1040
    - https://github.com/riscv-software-src/riscv-isa-sim/pull/1041
    - https://github.com/riscv-software-src/riscv-isa-sim/pull/1042
  - Sscofpmf 相关更新: https://github.com/riscv-software-src/riscv-isa-sim/pull/1036
  - Zce添加Stateen相关更新: https://github.com/plctlab/plct-spike/tree/plct-zce-upstream
- Sail/ACT暂无更新

gem5 相关进展 (PLCT)

1. RVV 扩展的 Draft PR 已提交上游，我们也一直在保持更新：https://gem5-review.googlesource.com/c/public/gem5/+/59789
2. 开发进展：
   a. 新增部分 reduce 指令
   b. 新增 stride load 指令
   c. 新增乘除取余指令
   d. 使用新的单元测试修复了一些 bug（进行中）
3. 其他相关工作：
   a. RVV 单元测试已支持 99% 的指令：https://github.com/ksco/riscv-tests/tree/spike
   b. [实验性质] 为了更全面地使用 riscv-tests，尝试为 gem5 新增了 HTIF 设备支持，已经可以部分工作，但仍存在问题：https://github.com/plctlab/plct-gem5/tree/htif-dev
   c. 一些小的修复和改进工作，已提交上游：
      i. arch-riscv: Use more precise mnemonics：https://gem5-review.googlesource.com/c/public/gem5/+/61149
      ii. arch-riscv: Treat InvalidRegClass as zero register：https://gem5-review.googlesource.com/c/public/gem5/+/61150
      iii. [尚未 merge] util-docker: Add mold to Dockfile：https://gem5-review.googlesource.com/c/public/gem5/+/61409

V8 for RISC-V 更新（邱吉、陆亚涵）

V8 继续根据review修改 rv32的patch,上游要求尽可能的合并rv32和rv64的代码

3736732: [riscv32] Add RISCV32 backend | https://chromium-review.googlesource.com/c/v8/v8/+/3736732

OpenJDK for RISC-V 更新（RV64及upstream）

Tier1-3 testing for jdk-mainline on RV64 unmatched board
-- compiler/runtime/TestConstantsInError.java (fixed)
-- java/util/concurrent/atomic/Serial.java (debugging)

Merged jdk8u-backport PRs:
https://mail.openjdk.java.net/pipermail/jdk8u-dev/2021-August/014155.html
-> https://github.com/openjdk/jdk8u-dev/pull/37 (8150669: C1 intrinsic for Class.isPrimitive)
https://mail.openjdk.java.net/pipermail/jdk8u-dev/2021-December/014476.html
-> https://github.com/openjdk/jdk8u-dev/pull/43 (8233019: java.lang.Class.isPrimitive() (C1) returns wrong result if Klass* is aligned to 32bit)

Merged jdk-mainline PRs:
https://github.com/openjdk/jdk/pull/9461 (8290137: riscv: small refactoring for add_memory_int32/64)
https://github.com/openjdk/jdk/pull/9550 (8290496: riscv: Fix build warnings-as-errors with GCC 11)

Reviewed jdk-mainline PRs:
https://github.com/openjdk/jdk/pull/9463 (8290164: compiler/runtime/TestConstantsInError.java fails on riscv)
https://github.com/openjdk/jdk/pull/9487 (8290280: riscv: Clean up stack and register handling in interpreter)

Voting: https://mail.openjdk.org/pipermail/jdk-updates-dev/2022-July/015840.html (New JDK Updates Committer: Jie Fu)

RV64 loom port commits:
https://github.com/RealFYang/jdk/commit/abea94e32b9e5516354a2dca9b9eeb863ee406ef (Add several helper functions)
https://github.com/RealFYang/jdk/commit/9d705c5262268634679a77c0bfedb925c268c93a (Held monitor count)
https://github.com/RealFYang/jdk/commit/4ef0cf54539454f5cb3df96fae2b626b60630ba3 (RISCV frame constructors changes)
https://github.com/RealFYang/jdk/commit/f3038fb680087aff1c29d3f6b0651d19d339101f (Implement several functions)
https://github.com/RealFYang/jdk/commit/79d3d0d274e032f6a1611276f0b20d5562d7f940 (Add call for post_call_nop)

TODO: 1. Apply for JCK (Java Compatibility Kit) for Java SE; 2. Prepare Weekly/Monthly RV64 JDK release

OpenJDK for RISC-V 更新（RV32/PLCT）

1. https://github.com/openjdk-riscv/jdk11u/pull/425 Update the mask of string_index_of_linear for RV32G
2. https://github.com/openjdk-riscv/jdk11u/pull/428 Improve the macroAssembler_riscv32.cpp
3. https://github.com/openjdk-riscv/jdk11u/pull/430 Fix the load/store_sized_value()
4. https://github.com/openjdk-riscv/jdk11u/pull/431 Fix offset in MacroAssembler::zero_words()
5. https://github.com/openjdk-riscv/jdk11u/pull/433 Fix convI2L_reg_reg instruct for long type
6. https://github.com/openjdk-riscv/jdk11u/pull/434 Fix castP2X and castX2P in riscv32.ad
7. https://github.com/openjdk-riscv/jdk11u/pull/435 Fix loadl instruct
8. https://github.com/openjdk-riscv/jdk11u/pull/436 Fix addL_reg_reg in riscv32.ad
9. https://github.com/openjdk-riscv/jdk11u/pull/438 Fix MacroAssembler::zero_words failed to clear memory completely

openEuler RISC-V

- 移植进度：
  - 核心包：4143/4238　97%
  - 扩展包：2270/4269　53%
  - 三方包：未开始
- oerv OBS 构建:扩展软件包
  - 扩展软件包数量到8700+
    - 核心包：openEuler:Mainline 对应的包
    - 扩展包：主要是openEuler:Epol + openEuler:Factory + Factory:RISC-V 以及Factory:RISC-V:XXX系列 工程管理的包。
  - 22.09工程创建
  - src-openeuler版本监控：https://gitee.com/openbuildservice/watch
- PR 新增 16个
  - https://github.com/isrc-cas/tarsier-oerv/blob/main/biweekly/2022-07-14.md
  - porting：eclipse、tensorflow、chromium、KDE、texlive系列、R系列等
- 测试/验证
  - openEuler RISC-V RVLab测试
  - openEuler自动化测试框架mugen
  - 虚拟化测试工具avocado的调研(进行中)
- 文档
  - 翻新 QEMU 搭建环境文档
  - RISC-V openEuler实习生团队内训课程(进行中)

Gentoo for RISC-V 的情况更新（Gentoo小队）

- A total of 6 keywording commits: https://whale.plctlab.org/riscv/RISC-V-双周会/20220721/commits.txt
- BPF next kernel tree, libbpf, riscv: Use a0 for RC register, @935dc35c7531
- BCC: (WIP) patch to make bcc works on riscv
  - this work on new kernel: https://github.com/iovisor/bcc/pull/4109
  - a less invasive approach: https://github.com/iovisor/bcc/pull/4118

Arch Linux RISC-V（东东）

1. 移植进度

   [extra] 2606 / 3034 (85.89%)

   [community] 7502 / 9250 (81.10%)
2. Archriscv-packages merged 54 PR.
3. addpkg: ldc
4. rebuild: rust
5. Presentation: 移植 ldc 到 riscv 要踩的坑有哪些, 如何给 Linux 内核贡献代码, 修个 gcc 咋就这么难呢

Fedora for RISC-V（傅炜）

- SRPM打包编译进度
  - [fc36] 144000 / 22832 (65%) [pause]
  - [rawhide]【On Going】重点工作
- 以 server 和 desktop 的功能包为目标:
  - firefox【waiting for Rust 1.62.1-1 rebuild 】
  - Podman [block: criu] need riscv support 重点工作
  - Chromium [依赖包齐全，整理补丁中]

- 软件版本:
  - GCC gcc-12.0.1-0.16 / Glibc 2.35-14 → gcc-12.1.1-3.1 / Glibc 2.35.9000-31
  - Binutils 2.38.14[updating]→ 2.39 [need to update for opensbi/uboot/kernel]
  - Python 3.10.4 → 3.11[rawhide]
  - Perl 5.34.2→ 5.36.0-490[rawhide]
  - LLVM/Clang 14.0.0-1→ 14.0.5-1[rawhide]
  - Rust 1.61-2 [need qemu fix from Felix]--> Rust 1.62.1-1[rawhide]
  - QT-5.15.3 and QT-6
- Images:
  - QEMU/D1/Icicle/Unmatched Images
  - New koji builder Image (F36) 3GB 持续更新中
  - Workstation (GNOME&KDE/Deepin) Image: 7月底前

Debian for RISC-V（于波）

一、DebConf22 (17 jul - 24 jul)

[Schedule] https://debconf22.debconf.org/schedule/

[debci team]https://debconf22.debconf.org/talks/48-autopkgtest-office-hours/

[debian release]https://debconf22.debconf.org/talks/47-investigating-a-tier-system-for-release-architectures/

二、Debian RISCV Porting Update

[jsonnet patch]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014598

[openni-sensor-pointclouds done]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014665

[openni-sensor-pointclouds upstream]https://github.com/PrimeSense/Sensor/issues/18

[openni-sensor-primesense done]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014746

[purelibc patch]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014792

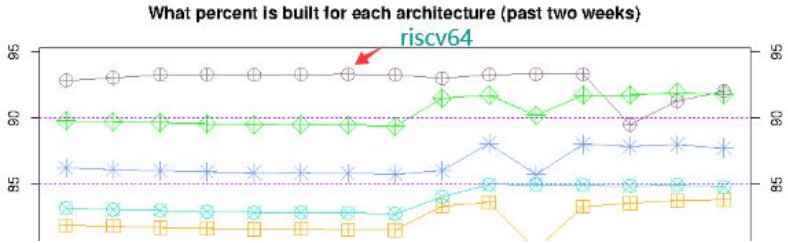
[gluegen2 done]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014852

[aseba done]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014916

[giac wishlist]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1015229

[bcolz wishlist patch]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1015737

[rush bugfix]https://bugs.debian.org/cgi-bin/bugreport.cgi?bug=1014846



FW相关更新（王翔）

- opensbi
  - 添加Cadence uart驱动
  - 为sbi_hsm_hart_start发送ipi信号时添加错误处理
  - 简化切换到低特权登记时设置MPV的代码
  - 添加kconfig支持
  - 简化从fdt提取uart的信息的代码，创建公共函数提取：基地址/频率/波特率
  - 修正uart波特率初始化除0的问题
  - 修正pmu计数器计算的bug，直接移位会整数溢出
  - 添加对event_id的合法性检测
  - 修正fw_event_map初始化，数组大小之前是错误的

RISCV性能跟踪小队 - 陈小欧、陈逸轩

1. Run Java Benchmark Dacapo on Unmatched

   文档记录
   :https://github.com/mollybuild/RISCV-Measurement/blob/master/run-Dacapo-on-unmatched.md

2. Compiled and run fpmark natively on Unmatched with clang and gcc

   https://xyenchi.github.io/unmatched/benchmark/fpmark/

```
MARK RESULTS TABLE

Mark Name                                      MultiCore SingleCore    Scaling
---------------------------------------------- ---------- ---------- ----------
FPMark                                        4105.87406511 1184.54552948 3.4662019
FPv1.0. DP Small Dataset                      955.61807387 254.65795873 3.75255530
FPv1.1. DP Medium Dataset                     27.29842116 7.69152449 3.54915611
FPv1.2. DP Big Dataset                        0.92118438 0.30547377 3.01559241
FPv1.3. SP Small Dataset                      1546.52098102 403.87376625 3.82921871
FPv1.4. SP Medium Dataset                     44.14215642 11.93425978 3.69877623
FPv1.5. SP Big Dataset                        1.83142747 0.61449165 2.98039439
FPv1.D. DP Mark                               32.13685141 9.34692868 3.43822581
FPv1.S. SP Mark                               57.73558984 16.46998052 3.50550444
MicroFPMark                                   1546.52098102 403.87376625 3.82921871
```

Benchmark	Result(msec)
avrora	34593
batik	FAIL
eclipse	FAIL
fop	20188
h2	45248
jython	134815
luindex	16098
lusearch	15916
lusearch-fix	15036
pmd	30916
sunflow	34381
tomcat	FAIL
tradebeans	FAIL
tradesoap	FAIL
xalan	28623
pass-rate	67%

```
WORKLOAD RESULTS TABLE

                                                  Mult
Workload Name                                      (it
---------------------------------------------- -----
atan-1M                                          9.861
atan-1M-sp                                       16.05
atan-1k                                          1562
atan-1k-sp                                       2409
atan-64k                                         221.9
atan-64k-sp                                      359.7
blacks-big-n5000v200                             0.854
blacks-big-n5000v200-sp                          1.231
blacks-mid-n1000v40                              21.73
blacks-mid-n1000v40-sp                           32.36
blacks-sml-n500v20                               87.71
blacks-sml-n500v20-sp                            121.9
horner-big-100k                                  47.86
horner-big-100k-sp                               70.57
horner-mid-10k                                   554.6
horner-mid-10k-sp                                774.5
horner-sml-1k                                    5494.
horner-sml-1k-sp                                 7651.
inner-product-big-100k                           4.511
inner-product-big-100k-sp                        9.970
inner-product-mid-10k                            83.50
inner-product-mid-10k-sp                         145.0
inner-product-sml-1k                             1145.
inner-product-sml-1k-sp                          2512.
linear_alg-big-1000x1000                         0.039
linear_alg-big-1000x1000-sp                      0.069
linear_alg-mid-100x100                           27.24
linear_alg-mid-100x100-sp                        38.13
linear_alg-sml-50x50                             233.6
linear_alg-sml-50x50-sp                          293.7
loops-all-big-100k                               0.032
loops-all-big-100k-sp                            0.049
loops-all-mid-10k                                0.766
```

香山开源RISC-V处理器 - ICT / PCL

- 前端流水线
  - 优化 BPU 和 FTQ 时序 和 Fetch 流水线的时序表现
- 后端流水线
  - 优化译码、重命名、派遣、ROB、发射时序
- 访存单元
  - Load 流水线调整为 4 拍，优化时序表现
- 缓存
  - 优化 SRAM 相关的时序
  - 将 L3 从 multi-cycle path 改为半频

MLIR RISC-V Vector (RVV) Dialect Proposal - 张洪滨

(注:提交人不在线)

相关链接

- RFC Patch - https://reviews.llvm.org/D108536
- RFC Post - https://discourse.llvm.org/t/rfc-add-risc-v-vector-extension-rvv-dialect/4146/32
- MLIR + RVV 集成测试环境搭建文档 - https://gist.github.com/zhanghb97/ad44407e169de298911b8a4235e68497
- MLIR + RVV 环境搭建 - https://github.com/buddy-compiler/buddy-mlir/blob/main/thirdparty/build-rvv-env.sh
- MLIR + RVV 相关实验 - https://github.com/buddy-compiler/buddy-mlir/tree/main/examples/RVVExperiment

WIP

- Vector Config Operation 被认为是好的想法，下一步先做一个 Demo 出来
- 尝试使用 vector prediction intrinsic 增加可重用性（AOT 正确工作，JIT 在指令选择阶段报错）
- 在设计过程中需要考虑对多维向量的支持

面向 RISC-V 的 OpenCV 情况更新 - 韩柳彤

- **为 Universal Intrinsic 增加可变长向量指令的支持**

  Google Summer of Code 2022: Optimizing OpenCV Universal Intrinsic for RISC-V Vector

  PR：https://github.com/opencv/opencv/pull/22179 已经被合并

  - 修改了测试用例，使其适应于可变长架构
  - 增加了必要的 Universal Intrinsic 函数
  - 增加了兼容层
  - 修改了图像处理模块中的向量化循环，启用新的RVV后端

  在特定情况下(未启用任何SIMD)会挂掉 OpenCV 主干分支，正在修复

Chisel and Additional Technology / Sequencer

- Highlight
  - 红人bringup起了USB
  - 秦君 sharzy 完成了Lane VFU
  - 光辉完成了SRT的perf benchmark
- sequencer在火车上咕了

自由讨论 / AOB

- 各位工作生活都还顺利？

RISC-V 笔记本计划的进展 / 吴伟

- ROMA 笔记本在路上了，还有至少一家也传言要做/在做🎉
  - FLAG已经立住了
- 软件部分，目光开始看向
  - LibreOffice：我们很高兴有一位全职员工 **陈璇** 同学 all in，貌似有进展！
  - LuaJIT：出现了**两名暂时不透露姓名**的勇者
  - DynamoRIO：Ryan 同学 all in，SemiHalf 先合入了第一个 PR🎉
  - Valgrind：出现了**两名暂时不透露姓名**的勇者
  - DartVM：呼唤了！还没来……
  - Mono：已经发了招聘信息但是还没有同学
  - Chromium：SUSE上ok但是其它发行版还不行，呼唤勇士

Spidermonkey for RISC-V - 吴伟

- 过去两周没有新的进展【招募实习生！】
  - 重新加入了 PLCT Roadmap 2022 计划
  - 但是这次并没有重新放入到 LFX Mentorship（专业对口的太少了）
  - https://github.com/plctlab/gecko-dev-riscv/pull/3
- 欢迎感兴趣移植的小伙伴通过实习、兼职或全职形式加入
  - https://github.com/lazyparser/weloveinterns/blob/master/open-internships.md
  -