

Jul 20, 2023 | 📅 RISC-V Control Transfer Records TG Meeting

Attendees: tech.meetings@riscv.org Beeman Strong Bruce Ableidinger

Notes

- **Attendees:** Beeman, JohnS, Snehasish, DavidW, RobertC, BruceA, Atish, Rajnesh
- **Slides** [here](#) (no video, sorry)
- ctrdata width update
 - Moving from MXLEN to XLEN
 - Only have fields defined in lower 32b
 - In future may use bits >31, then will need to decide whether that extension supports RV32, defines high-half register, etc
 - Moved reserved-for-custom bits from 63:60 to 14:12
 - Could we keep 63:60 as reserved for custom?
 - Then would need to define how they work with RV32
 - RV32 should be very unlikely
 - But Linux community still requires support. Ongoing discussion
 - ctrsource & ctrtarget are XLEN, not 64-bit
 - Could CTR not support RV32?
 - Linux community requiring support for RV32 in general
 - Also useful for RTOS
 - As defined, there's no issue with supporting RV32
- What about priv mode in ctrdata?
 - Discussed in Jun 29 meeting
 - Guest shouldn't know it is a guest, so can't expose V bit
 - Can also distinguish between supervisor vs user addresses by PC
 - Linux perf captures mmmaps, can determine priv mode from that
 - Would need profiling software usage model to justify spending the bits (and solving the virtualization issue)
- Configurable Depth for VM migration
 - With changes to architecture, can be used by a hypervisor to limit a VM to depth(s) that are supported across the datacenter
 - Propose an hctrcontrol CSR, with 2 fields
 - HTE - enables external traps from VS/VU to HS
 - DEPTH - constrains depth values allowed in vsctrcontrol
 - Atish: KVM may just trap on VM writes to sctrcontrol
 - Today those writes won't trap, but get redirected to vsctrcontrol
 - Believe there's no need to trap, vsctrcontrol should handle everything
 - How often is sctrcontrol written by VM? Every schedule in/out, so every context switch
 - Trying to avoid traps in context switch, to limit profiling overhead
 - Unfortunately KVM is liberal about traps currently, esp when PMU is in use

- Though SBI enhancements should help limit them
 - Configurable depth means SW needs to clear CTR between save & restore
 - Rajnesh: clear CTR on sched-in but not on sched-out. Will get details on why
 - No risk of leak
 - Is POC available? Yes (see email sent to mailing list)
- Alternatives to configurable depth
 - Fixed depth with on-demand depth discovery
 - Concerned that this check won't be reliable, since will only ever be exercised in rare case where VM migration between differing depths occurs
 - Arch supports only a single depth
 - Hard to choose one that works well for all
 - Future extension that adds a larger depth would then have to solve this issue
- Out of time. Will look to close on this next week.

Action items

