Dynamic switching of RVTSO (Ssdtso) Ratification Plan

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Tech Chairs Review

Background

What?

- The Ssdtso extension adds a 'dynamic-RVTSO' mode of operation.
- It is supported only on implementations that default to RVWMO semantics.
- Software executing at a higher privilege level can enable dynamic-RVTSO for all lower privilege levels on a per-hart granularity.

Why?

Ssdtso is intended to provide a compatibility-mode to execute binaries that require RVTSO on **processors that prefer** (e.g., for performance reasons) to be operated in **RVWMO mode**.

Dependencies and Incompatibilities

The Ssdto extension **conflicts with Ztso**.

Key Milestones

Key Milestones	Date
Fast-track Approval	2023-11-20
Plan review	Today
Start of internal review (Draft specification was already submitted to AR in November)	2023-12-15
Start of public review (30 days)	2024-01-17
Submit for TSC Approval	2024-02-23
Board Ratification	Q1 2024

Proof-of-concept and RISC-V Tests

Specification repository

- https://github.com/riscv/riscv-ssdtso

Proof-of Concept

- QEMU and SAIL
- Linux (syscall interface, task-structure and context-switching)
  - Dynamic TSO setting per process/thread
- GLIBC (Runtime Linker support)

Tests (ACT for ISA or Software)

- Scope is limited to the testing of the CSRs and manipulation of CSRs
- Memory model testing is not supported today.

Status

Proof-of Concept resources (based on v1.0-draft2 from Oct 29)

- SAIL: https://github.com/riscv/sail-riscv/pull/342 (“LGTM”)
- Spike: https://github.com/riscv-software-src/riscv-isa-sim/pull/1501 (“LGTM”)
- QEMU: https://lists.nongnu.org/archive/html/qemu-devel/2023-11/msg02962.html (r-b)
  - uAPI: https://github.com/cmuellner/qemu/tree/ssdtso
- Linux kernel (context switch support, userspace API)
  https://lore.kernel.org/all/20231124072142.2786653-1-christoph.muellner@vrull.eu/T/#t
  - Fixes: https://github.com/cmuellner/linux/tree/ssdtso
- GLIBC (Runtime Linker support): https://sourceware.org/pipermail/libc-alpha/2023-November/152973.html
  - git: https://github.com/cmuellner/glibc/tree/ssdtso

Tests (ACT for ISA or Software)

- ACT: https://github.com/riscv-non-isa/riscv-arch-test/pull/409