Dynamic switching of RVTSO (Ssdtsos)
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

<table>
<thead>
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<th>Key Milestones</th>
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<tbody>
<tr>
<td>Fast-track Approval</td>
<td>2023-11-20</td>
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<tr>
<td>Plan review</td>
<td>Today</td>
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<tr>
<td>Start of internal review (Draft specification was already submitted to AR in November)</td>
<td>2023-12-15</td>
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<tr>
<td>Start of public review (30 days)</td>
<td>2024-01-17</td>
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<tr>
<td>Submit for TSC Approval</td>
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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”)
  - 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
  - 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