

Specification Status - Historical

NOTE: We have migrated to [Jira](#). This page reflects status from until YE 2023. Please [click here](#) for an up-to-date view of the extensions under development.

The following sections of the document contain the historical program data for specifications:

- [NOTE: We have migrated to Jira. This page reflects status from until YE 2023. Please click here for an up-to-date view of the extensions under development.](#)
 - [Status Key](#)
 - [* Plan Milestone next Steps:](#)
 - [** Freeze Milestone next step:](#)
 - [*** Ratification Milestone next step \(don't start until freeze is complete\):](#)
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Status Key

The following steps and associated next sequential steps for the milestones listed in the tables above may be parallelized at times, but are most simply thought of as a sequential set. All previous steps are done. For more details on each step, see the [RISC-V Lifecycle Guide](#) section on "[Specification Lifecycle](#)" and it's specific subsections for each milestone, including step-by-step descriptions. The usable values are defined in the following sections.

NOTE: Some Milestone next steps may be marked as "N/A" for "Not Applicable" with an explanation after a trailing "-". For example, "N/A - Grandfathered" means that the step was skipped due to the fact that the process changed after the step would have been completed and it has been "Grandfathered" in (meaning accepted as N/A) as acceptable.

* Plan Milestone next Steps:

1. build plan
2. review by chairs
3. complete (nothing else to do)

** Freeze Milestone next step:

1. start
2. spec development - stable
3. AR approval (ISA/SW AR)
4. acceptance criteria complete (including waivers, or approval)
5. committee chair approval
6. freeze
7. complete (nothing else to do)

*** Ratification Milestone next step (don't start until freeze is complete):

1. start
2. send out for public review
3. public review complete
4. acceptance criteria complete
5. committee chair approval
6. TSC approval
7. BOD approval
8. ratified
9. complete (nothing else to do)

++ ISA AR State (owner)

1. Development (not ready for AR) (TG/IC)

2. Queued (AR)
3. Reviewing (AR)
4. Reworking (if necessary as a result of the review after complete goes back to the queue) (TG/IC)
5. Approved (AR)

**** Specification State values:

1. New
2. Plan Complete
3. Stable
4. Frozen
5. Public Review Started
6. Public Review Complete
7. TSC Approved
8. Ratified

Year-end 2023 Spec Development

This page serves as the starting point for understanding the status of specifications currently being developed by RISC-V. This status is best represented as progress toward the key Specification Milestones (Plan, Freeze, and Ratification-ready) which are obtained sequentially. Specific status for the relevant status columns is detailed in the [Status Key](#) section below. The chairs and vice-chairs of Task Groups, specification authors, and Horizontal and ISA Committee chairs and vice-chairs jointly own ensuring their specifications are listed below and reflect accurate status.

In-process specifications are grouped below into two tables based on whether they impact the RISC-V ISA ([In-process ISA Specifications](#)) or not ([In-process Non-ISA Specifications](#)). Items should have links to their respective specification repo ([blocked URL](#)), Ratification Plan([blocked URL](#)) if not a Fast-track item, and an Acceptance Criteria Status checklist ([blocked URL](#)).

[Completed](#) specifications are tracked in the subsequent sections.

Status of active votes by TSC and Committee Chairs can be found on the [RISC-V Vote Status](#) wiki page.

This dashboard does NOT intend to show detailed status (that's available in the status checklist for the specification, [blocked URL](#)), but rather the general status in the journey to ratification.

NOTE: This page is managed by the RISC-V staff with assistance from each specification owner. To get updates to this page or for questions, contact [help@riscv.org](#).

ISA Specification Status

Ratification Package	extensions included	Task group approved by TSC date or Fast Track approved by AR date	Specification State****	ISA AR State++	Fast Track	Priv / Unpriv	Committee (Owner)	Task Group	Plan Milestone Target Date	Freeze Milestone Target Date	Ratification Milestone Target Date	Plan Milestone Next Step*
blocked URL : Project repo blocked URL : Plan doc blocked URL : Status chklist												
Byte and Half-word Atomics	Zabha	26 Sept 2023	Stable	Approved (10/10/23)	Y	U	Unpriv IC (Ved)	N/A	Q4'23	Q4'23	Q1'25	complete
Bfloat16 blocked URL blocked URL blocked URL	Zfbfmin, Zvfbfmin, Zvfbfwma		Public Review Complete	Approved (7/15/23)	Y	U	Unpriv IC (Ken Dockser)	N/A	N/A	Q2'23	Q1'24	N/A
Quality-of-Service (QoS) Identifiers blocked URL blocked URL blocked URL	Ssqosid	06 Oct 2022	Stable	Approved	Y	P	Priv IC (Ved Shanbhogue)	N/A	4Q'22	Q2'23	Q3'23	complete
Control Transfer Records blocked URL blocked URL blocked URL	Smctr, Ssctr	07 Mar 2023	Plan Complete	Development	N	P	Priv IC (Beeman Strong)	CTR TG	Q2'23	Q3'23	Q4'23	complete
Debug blocked URL blocked URL blocked URL	Sdext, Sdtrig	2020	Stable	Development	N	P	Priv IC (Tim Newsome)	Debug TG	Q1'23	Q2'23	Q3'23	complete

Fast Interrupt blocked URL blocked URL blocked URL	Smclic, Ssclic, Ssclc, Smclicshv, Smclicconfig	2020	Plan Complete	Development	N	P	Priv IC (Dan Smathers)	Fast Interrupts	N/A	Q3'23		N/A
Indirect CSR Access blocked URL	Smcsrind, Sscsrind		Public Review Started	Approved	Y	P	Priv IC (Beeman Strong)	N/A	Q3'23			complete
Instruction/Data Consistency blocked URL	Zjid	2020	Stable	Development	N	P	Priv IC (Martin Maas)	I/D Consistency	N/A	Q2'23		N/A - Grandfathered
"May Be Ops" (for CFI, etc.) blocked URL blocked URL	Zimop, Zcmop	17 Oct 2022	Public Review Complete	Development	Y	U	Unpriv IC (Andrew Waterman/Ved Shanbhogue)	N/A	N/A	Q2'23		N/A
Packed SIMD blocked URL blocked URL blocked URL	Zbpbo, Zpn, Zpsfoperand, P	2020	New	Development	N	U	Unpriv IC (Kevin Chen)	Packed SIMD	Q3'23	Q4'23	Q4'23	start
Pointer masking blocked URLblocked URL blocked URL	Smmprm, Smpnrm, Ssnprm	2020	Stable	Reworking	N	P	Priv IC (Martin Maas)	Pointer Masking	Q1'23	Q2'23		complete
Priv 1.13 blocked URL blocked URL blocked URL			New	Development	N	P	Priv IC (TBD)					build plan
Resumable Non-maskable Interrupts blocked URL blocked URL	Smmrmi	17 Oct 2022	Plan Complete	Reviewing	Y	P	Priv IC (Andrew Waterman)	N/A	N/A	Q1'23		N/A
Shadow Stacks and Landing Pads blocked URLblocked URL blocked URL	Zicfiss, Zicflp	11 Aug 2022	Plan Complete	Queued	N	U + P	Unpriv IC + Priv IC (George, Ved)	SS-LP-CFI	Q4'22	Q3'23	Q3'23	Complete
Supervisor Counter Delegation blocked URLblocked URL blocked URL	Smcdeleg, Sscclg	31 Jan 2023	Stable	Queued	Y	P	Priv IC (Beeman Strong)	N/A (Fast Track)	Q1'23	Q2'23	Q3'23	Complete
Supervisor Memory Tracking Table (SmMTT) blocked URLblocked URL blocked URL	Smsdid, Smmtd, Svpams, Smsdia	23 Aug 2023	Plan Complete	Development	N	P	Priv IC (Ravi Sahita)	SmMTT	Q3'23	Q4'23	Q2'23	Complete
S-mode PMP blocked URL blocked URL blocked URL	Sspmp	29 Aug 2022	Plan Complete	Development	N	P	Security HC (Dong Du)	S-Mode Physical Memory Protection	Q1'23	Q3'23	Q4'23	Complete
Vector Crypto - all-rounds AES blocked URL blocked URL blocked URL	Zvknf	04 May 2022	Stable	Development	N	U	Unpriv IC (TBD)	Cryptographic Extensions	3Q'22	TBD	YE2024	Complete

In-process Non-ISA Specification Status

Ratification Package blocked URL : Project repo blocked URL : Plan doc blocked URL : Status chklst	Task group approved by TSC date	Specification State****	Committee (Owner)	Task Group	Plan Milestone Target Date	Freeze Milestone Target Date	Ratification Milestone Target Date	Plan Milestone next step*	Freeze Milestone next step**	Ratification Milestone next step ***	Last Updated	I
ACPI FFH blocked URL blocked URL blocked URL	07 Oct 2022	Public Review Complete	Privileged Software HC (Atish Patra & Sunil VL)	Platform Runtime Services	Q2'23	Q3'23	Q4'23	complete	complete	TSC approval	20 Dec 2023	
AP-TEE-IO blocked URL blocked URL blocked URL	11 Oct 2023	New	Security HC (Samuel Ortiz, Jiewen Yao)	AP-TEE-IO	Q4'23	Q1'24	Q2'24	complete			30 Oct 2023	
Architectural Test User Specification blocked URL blocked URL blocked URL	2020	New	ISA Infrastructure HC (Allen Baum)	Architecture Test SIG				review by chairs			31 Jan 2023	Ne ide the of ap ant dis giv wa sta bac 20:
Boot & Runtime Services (BRS, formerly OS-A SEE) blocked URL blocked URL blocked URL	23 Jun 2022	Plan Complete	Privileged Software HC (Aaron Durbin)	BRS	Q2'23	Q3'23	Q4'23	complete	spec development - stable		24 May 2023	
Confidential VM Extension (CoVE, formerly AP-TEE) blocked URL blocked URL blocked URL	15 Sept 2022	Plan Complete	Security HC (Ravi Sahita, Guemey Hunt)	AP-TEE	Q1'23	Q3'23	Q4'23	complete	spec development - stable		30 Oct 2023	Sp be i up t o t lan cor wtl Suj Do
IOPMP blocked URL blocked URL blocked URL	05 Jul 2022	New	Security HC (Paul Ku)	IOPMP	Q3'23	Q3'23	Q4'23	review by chairs			10 May 2023	Firs Mil pre on Ma wtl foll req for
Nexus Trace blocked URL blocked URL blocked URL	25 Dec 2019	Stable	SOC Infrastructure HC (Robert Chyla)	Nexus Trace	Q1'23	Q2'23	Q3'23	complete	AR approval		19 Apr 2023	
RVV C Intrinsic blocked URL blocked URL blocked URL	19 Dec 2022	Plan Complete	Applications & Tools HC (eop Chen)	RISC-V Vector C Intrinsic				complete	spec development - stable		04 Apr 2023	
SBI V2 blocked URL blocked URL blocked URL	07 Oct 2022	Public Review Complete	Privileged Software HC (Atish Patra & Sunil VL)	Platform Runtime Services	Q2'23	Q3'23	Q4'23	complete	complete	TSC approval	20 Dec 2023	
Security Model blocked URL blocked URL blocked URL	27 Jul 2022	New	Security HC (Paul Elliot, Xueyang "Terry" Wang)	Security Model				plan review by chairs			22 Aug 2022	
Unified Discovery (Config) blocked URL blocked URL blocked URL	31 May 2022	Plan Complete	Privileged Software HC (Irma Flores-Mendoza)	Unified Discovery		Q3'22		complete			29 Aug 2023	

[illegible]

Non Temporal Locality Hint	Zihintntl	17 Oct 2022	Ratified	Approved	Y	U	Priv IC (Andrew Waterman)	N/A	N/A	Q2'23		N/A
blocked URL												
Code Size Reduction	Zca, Zcb, Zcd, Zce, Zcf, Zcmp, Zcmt	2021	Ratified	Approved	N	U	Unpriv IC (Tariq Kurd)	Code Size Reduction	N/A	Q1'23	Q2'23	N/A
blocked URLblocked URLblocked URL												
Counters	Zicntr, Zihpmm	12 Jul 2022	Ratified	Approved	Y	U	Unpriv IC (Earl Killian)	N/A	N/A	Q4'22	Q1'23	N/A
blocked URL												
Profiles	Shcounterenw, Shvstvala, Shitvala, Shvstvecd, Shvstpa, Shgatpa, Sscounterenw, Ssstateen, Sstvala, Sstvecd, Sstvecv, Ssu64xl, Svade, Svbare, Za128rs, Za64rs, Ziccamoa, Ziccoif, Zicclsm, Ziccrse, Zic64b	26 Apr 2022	Ratified	Approved	N	U	TSC (Krsteg/Greg)	Profiles TG	Q2'22	Q4'22	Q1'23	complete
Reduced integer bases	RV32E/RV64E	01 Jan 2022	Ratified		Y	U	Unpriv IC (krste)	N/A	N/A	Q3'22	Q4'22	N/A
blocked URLblocked URL												
Total Store Ordering	Ztso	24 Jun 2022	Ratified		Y	U	Unpriv IC (Earl Killian)	N/A	N/A	Q3'22	Q4'22	N/A
blocked URL												

Non-ISA Specifications

Ratification Package	Task group approved by TSC date	Specification State****	Committee (Owner)	Task Group	Plan Milestone Target Date	Freeze Milestone Target Date	Ratification Milestone Target Date	Plan Milestone next step*	Freeze Milestone next step**	Ratification Milestone next step ***	Last Updated	
blocked URL : Project repo blocked URL: Plan doc blocked URL: Status chklist												
IOMMU	07 Apr 2022	Ratified	SOC Infrastructure HC (Ved Shanbhogue, Perrine Peresse)	IOMMU	2Q'22	Q1'23		complete	complete	complete	29 Jun 2023	
blocked URL blocked URL blocked URL												
PLIC	2020	Ratified	Privileged Software HC (Abner Chang)			Q3'22	Q4'22	complete	complete	complete	24 Jan 2023	No wa
blocked URL blocked URL blocked URL												

2022

ISA Specifications

Ratification Package (Extension names)	Extension (s)	Fast Track	Priv / Unpriv	Committee (Owner)	Task Group	Plan Milestone Target Date	Freeze Milestone Target Date	Ratification Milestone Target Date	Plan Milestone Status*	Freeze Milestone Status**	Ratification Milestone Status***	Last Updated
blocked URL : Project repo blocked URL : Plan doc blocked URL : Status chklst												
Multiply without Divide blocked URL blocked URL	Zmmul	Y	U	Unpriv HC (Allen Baum)			Q1'22	Q2'22	N/A	Freeze Complete	Ratification Complete	
Wait on Reservation Set blocked URL blocked URL	Zawrs	Y	U	Unpriv HC (Ved Shanbhogue)	N/A		Q2'22	Q3'22	N/A	complete	complete	11/7/22

Non-ISA Specifications

Specification blocked URL : Project repo blocked URL : Plan doc blocked URL : Status chklst	Committee (Owner)	Task Group	Plan Milestone Target Date	Freeze Milestone Target Date	Ratification Milestone Target Date	Plan Milestone Status*	Freeze Milestone Status**	Ratification Milestone Status***	Last Updated	Notes
Efficient Trace (E-Trace) blocked URL blocked URL blocked URL	SOC Infrastructure HC (Gajinder Panesar)				Q2'22	Plan Complete	Freeze Complete	Ratification Complete		- No waivers - Need s copyr ight update
psABI blocked URL blocked URL blocked URL	Privileged Software HC (Kito Cheng, Jessica Clarke)	psABI		Q2'22	Q3'22	complete	complete	complete	11/7/22	No waivers
Supervisor Binary Interface (SBI) blocked URL blocked URL blocked URL	Privileged Software HC (Atish Patra)				Q2'22	Plan Complete	Freeze Complete	Ratification Complete		No waivers
UEFI Protocol blocked URL blocked URL blocked URL	Privileged Software HC (Sunil VL)				Q2'22	Plan Complete	Freeze Complete	Ratification Complete		No waivers

2021

Ratification Package	Fast Track	Priv Unpriv	Extension Names	Owner	Arch Review	Status Checklist	Public Review
Vector	N	U	V, Zve32x, Zve32f, Zve64x, Zve64f, Zve64d	Krste	Complete	Complete	Y
Bit-Manipulation	N	U	Zba, Zbb, Zbc, Zbs	Ken / Krste	Complete	Complete	Y
FP in INT regs	N	U	Zflnx	Tariq	Complete	Complete	Y
Half Width FP	Y	U	Zfh, Zfhmin	Andrew	Complete	Complete	Y
ePMP	N	P	Smepmp	Nick	Complete	Complete	Y
Crypto Scalar	N	U	Zbkb, Zbkc, Zbkx, Zknd, Zkne, Zknh, Zksed, Zksh, Zkn, Zks, Zkt, Zk, Zkr	Ben	Complete	Complete	Y
Priv 1.12	N	P	Sm1p12, Ss1p12, Sv57	Greg	Complete	Complete	Y
CMO base	N	P	Zicbom, Zicbop, Zicboz	DavidK	Complete	Complete	Y
hypervisor	N	P	H	JohnH	Complete	Complete	Y
state enable	Y	P	Smstateen	JohnH	Complete	Complete	Y
time cmp	Y	P	Sstc	Greg	Complete	Complete	Y
Count overflow & Filtering	Y	P	Sscofpmf	Greg	Complete	Complete	Y
Fast TLB invalidation	N	P	Svinval	Dan	Complete	Complete	Y
NAPOT pages	N	P	Svnapot	Dan	Complete	Complete	Y
Page-based memory types	N	P	Svpbmt	Dan	Complete	Complete	Y
Pause Hint	Y	U	Zhintpause	Greg	Complete	Complete	Y