

OpenMP 5.2 is Here!

Bronis R. de Supinski
Chair
OpenMP Language Committee

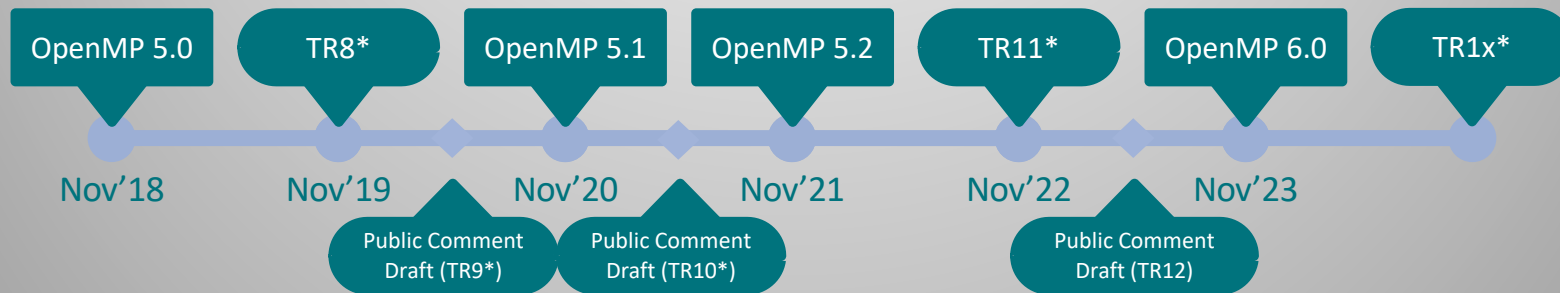
November 2021



OpenMP Roadmap

■ OpenMP has a well-defined roadmap:

- 5-year cadence for major releases
- One minor release in between
- OpenMP 5.2 was added as a second minor release before OpenMP version 6.0
- (At least) one Technical Report (TR) with feature previews in every year



* Numbers assigned to TRs may change if additional TRs are released.

Development Process of the Specification

- Modifications to the OpenMP specification follow a (strict) process:



- Release process for specifications:



OpenMP 5.2 was released earlier this month

- OpenMP ARB adopted on November 11, 2021
- Large portions of specification now generated from JSON-based database
 - Section headers and directive and clause format
 - Cross references, index entries, hyperlinks and many other document details
 - Long-term plan will capture sufficient information in database to generate much more, including grammar, quick reference guide, and header and runtime library routine stub files
- Improves specification of OpenMP syntax
 - Ensuring syntax of directives and clauses is well-specified and consistent
 - Ensuring restrictions are consistent and not just implied by syntax
 - Deprecating one-off syntax choices, many other inconsistencies (12 new deprecation entries)
 - Makes C++ attribute syntax a first-class citizen
- Many other minor improvements
- ~125 passed issues

A deeper dive into OpenMP 5.2 changes

- Defined directive, clause and modifier properties to consolidate common restrictions
- Defined common base-language code associations to consolidate syntax specification
- Replaced deprecated Fortran use of `allocate` directive with `allocators` construct
- Replaced deprecated use of `depend` clause on `ordered` construct with `doacross`
- Replaced deprecated use of `to` clause on `declare target` directives with `enter` clause
- Replaced deprecated use of `default` clause on metadirectives with `otherwise` clause
- Allowed use of iterators and `present` for `map` clauses on `declare mapper`
- Updated default map types on `target enter data` and `target exit data`
- Allowed `allocate` and `firstprivate` clauses on `scope` construct
- Updated syntax of `linear` clause to be more consistent with other clauses
- Extended set of directives allowed in a Fortran pure procedure
- Allowed clauses that can appear on corresponding end directive to appear on directive
- Reserved `omp`, `ompx` and `omx` directive sentinels, `omp_` and `ompx_` prefixes
- Deprecated minus (`-`) reduction operator

OpenMP 6.0 will be released in November 2023

- Removal of features that were deprecated in 5.0, 5.1 or 5.2
- Further adoption of the database-specification approach
- Dependences and affinity for the `taskloop` construct
- Task-only or free-agent threads
- Spawning tasks for other teams (event-driven parallelism and more)
- Continued improvements to device support
 - True support for using multiple devices
 - Extensions of deep copy support (serialize/deserialize functions)
- More support for memory affinity and complex hierarchies
- Deeper support for descriptive and prescriptive control
- Support for pipelining, other computation/data associations; data-flow?
- 161 issues already created for/deferred to 6.0

Help Us Shape the Future of OpenMP

- OpenMP continues to grow

- 33 members currently

- You can contribute to our annual releases

- Attend IWOMP, become a cOMPunity member

- OpenMP membership types now include less expensive memberships

- Please let us know if you would be interested

