



AOCL 4.0 Release Notes

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Release Highlights

In this release, all the AOCL libraries support AMD “Zen4” configuration.

AOCL-LibM

- Black-Scholes support improved with optimizations for scalar and vector versions of `logf`, `expf`, and `erff` functions
- WRF support improved with speed benchmarks
- Geekbench support improved with optimized `sincos` and `sincosf` scalar functions
- AVX-512 logarithmic, exponentials, and trigonometric variants optimized for the following vector functions:
 - `vrs16_expf` and `vrs16_exp2f`
 - `vrs16_logf`, `vrs16_log2f`, and `vrs16_log10f`
 - `vrs16_sinf`, `vrs16_cosf`, and `vrs16_tanf`
 - `vrs16_asinf`, `vrs16_acosf`, and `vrs16_atanf`
 - `vrs16_tanhf`
 - `vr8_exp` and `vr8_exp2`
 - `vr8_log` and `vr8_log2`
 - `vr8_pow`
 - `vr8_sin`, `vr8_cos`, and `vr8_tan`
 - `vr8_asin` and `vr8_atan`
- Fast scalar variants:
 - `powf_fast`, `logf_fast`, and `expf_fast`
 - `asinf_fast` and `acosf_fast`
 - `sinf_fast`, `cosf_fast`, and `tanf_fast`
 - `exp_fast` and `log_fast`
 - `asin_fast`, `acos_fast`, and `atan_fast`
 - `cos_fast`, `sin_fast`, and `tan_fast`

Note: For more information on fast scalar variants, refer to AOCC 4.0 user guide.

AOCL-FFTW

- AVX-512 enablement of DFT kernels
- AVX-512 optimization of copy and transpose routines

AOCL-BLIS

- Following MatMul APIs for INT8 and Brain Floating Point (bfloat16) types are added with post-ops support:
 - `aocl_gemm_u8s8s32o32` AVX-512-VNNI optimized
 - `aocl_gemm_u8s8s16o16` AVX2 optimized
 - `aocl_gemm_bf16bf16bf16` and `aocl_gemm_bf16bf16f32` AVX-512 optimized
- SGEMM with packed/reorder buffer support (`aocl_gemm_f32f32f32f32`)
- Dynamic dispatch supports AMD “Zen4” configuration
- Optimizations and performance improvements for DGEMM, DGEMMT, SGEMM, ZGEMM and DTRSM

AOCL-libFLAME

- Update to LAPACK 3.10.1 specification that includes several bug fixes from Netlib LAPACK
- Improved performance of the following APIs:
 - Eigen Value routine (`ZGGEV`)
 - SVD routines (`DGESDD`, `CGESDD`, and `ZGESDD`)
- Logging feature supports timing for real double precision libFLAME APIs
- AOCL-Progress feature that provides progress update on API computations running for a long time is extended for more APIs: `{S/C/Z}GETRF`, `{S/D}POTRF`, `{S/D}GEQRF`, `{S/C/D/Z}GBTRF`

AOCL-ScaLAPACK

- Upgrade to Netlib ScaLAPACK 2.2.0
- AOCL-Progress feature that provides progress update on API computations running for a long time is extended for more APIs: LU, QR, and Cholesky factorization
- Tracing and logging support for LU Factorization APIs

AOCL-Sparse

- New Iterative Solver APIs: CG, GMRES, and Gauss-Seidel (pre-conditioner)
- AVX-512 implementation for SPMV API
- Improved performance of the following:
 - TRSV
 - Multi-thread SPMV

AOCL-RNG

- Improved performance of the SFMT generator
- Windows support

AOCL-Cryptography

- AES modes optimized for AVX-512
- AES mode support extended to include CTR, XTS, and GCM
- API plugin for compatibility with Intel[®] Integrated Performance Primitives (IPP) library

AOCL-LibMem

AVX-512 support for mem* functions:

- Memcpy
- Mempcpy
- Memmove
- Memset
- Memcmp

AOCL-Compression

- Software stack support for Linux and Windows
- Standardized API set
- Test framework
- Optimization of LZ4, SNAPPY, and ZLIB compression algorithms
- ZLIB API plugin support
- Benchmarking support for IPP library in the test framework
- Dynamic dispatcher for creating a single optimized portable library