

AMD Opteron™ 6300 Series Processors

AMD Opteron™ 4300 Series Processors

Compiler Options Quick Reference Guide

Open64 compilers (openc, openCC, openf95)

Latest release: 4.5.2, August 2012

<http://developer.amd.com/open64>

Architecture	
Generate instructions that run on 6300/4300	-march=bdver2
Generate instructions for the local machine	-march=auto
Optimization Levels	
Disable all optimizations	-O0
Local optimizations	-O1
Global optimizations (default)	-O2
Additional aggressive optimizations	-O3
Maximize performance	-Ofast
Additional Optimizations	
Autoparallelization	-apo
Feedback directed optimization	-fb-create, -fb-opt
Huge pages	-HP
Interprocedural Analysis and Optimizations	-ipa
Link to ACML 5.2.0	-L/opt/acml5.2.0/ open64_64_fma4/lib -lacml
Loop nest optimizations, vectorization, prefetch, fission, fusion	-LNO:fission=n -LNO:fusion=n
Multicore scalability	-mso
OpenMP	-mp
Prefetch (disabled by default)	-LNO:prefetch, -LNO:prefetch_ahead
Other options	
Floating point accuracy tuning	-fp-accuracy
Compile free form FORTRAN	-freeform
OpenMP threads and affinity	export OMP_NUM_THREADS=4 export O64_OMP_SET_AFFINITY=TRUE export O64_OMP_AFFINITY_MAP=0-3

GNU compiler collection (gcc, g++, gfortran)

Latest release: 4.7.2, Sept 2012

<http://gcc.gnu.org>

Architecture	
Generate instructions that run on 6300/4300	-march=bdver2
Generate instructions for the local machine	-march=native
Optimization Levels	
Disable all optimizations (default)	-O0
Local optimizations	-O1
Global optimizations	-O2
Additional aggressive optimizations	-O3
Maximize performance	-Ofast
Additional Optimizations	
Schedule instructions	-fschedule-insns -fschedule-insns2 -fsched-pressure
Link time optimization	-flto
Enable unrolling	-funroll-all-loops
Generate prefetch instructions for loops	-fprefetch-loop-arrays --param prefetch-latency=300 (300-700)
Inline string operations	-minline-all-stringops
Link to ACML 5.2.0	-L/opt/acml5.2.0/ gfortran64_fma4/lib -lacml
OpenMP	-fopenmp
Profile guided optimization	-fprofile-generate and -fprofile-use
Turn off partial redundancy elimination	-fno-tree-pre
Vectorization	-ftree-vectorize
Other options	
Enable generation of code that follows IEEE arithmetic	-mieee-fp
Enable faster, less precise math operations	-ffast-math
Compile free form FORTRAN	-ffree-form
OpenMP threads and affinity	export OMP_NUM_THREADS=4 export GOMP_CPU_AFFINITY="0-3"

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Intel compilers (icc, icpc, ifort)

Latest release: 13.0, July 2012

<http://software.intel.com>

Architecture	
Generate instructions that run on 6300/4300	-msse4.2
Optimization Levels	
Disable all optimizations	-O0
Speed optimization without code growth	-O1
Enable optimization including vectorization	-O2
Aggressive optimization	-O3
Maximize performance	-fast
Additional Optimizations	
Aggressive unrolling	-unroll-aggressive
Disable improved precision floating divides	-no-prec-div
Enable vectorization	-vec
Inter procedural Optimization	-ipo
Link to ACML to 5.2.0	-L/opt/acml5.2.0/ifort64_fma4/lib -lacml
OpenMP	-openmp
Prefetch optimization	-opt-prefetch
Profile generated optimization	-prof-gen and -prof-use
Use optimized header definitions	-use-intel-optimized-headers
Other options	
Floating point accuracy tuning	-fp-model
Compile free form FORTRAN	-free
OpenMP threads and affinity	Use likwid to pin threads to cores: http://code.google.com/p/likwid Example OpenMP usage with likwid: export OMP_NUM_THREADS=4 export KMP_AFFINITY=disabled likwid-pin -t intel -c 0,2,4,12 ./a.out [options]

PGI compilers (pgcc, pgcpp, pgf95)

Latest release: 12.10, Oct 2012

<http://www.pgroup.com>

Architecture	
Generate instructions that run on 6300/4300	-tp bulldozer
Optimization Levels	
Disable all optimizations	-O0
Local optimization	-O1
Global optimization	-O2
Aggressive global optimization	-O3
Hoist guarded invariant floating point expressions	-O4
Maximize performance	-fast
Additional Optimizations	
Huge pages	-Msmartalloc=huge
Enable vectorization	-Mvect
Interprocedural Optimization	-Mipa=fast,inline
Link to ACML to 5.2.0	-L/opt/acml5.2.0/pgi64_fma4/lib -lacml
OpenMP	-mp
Prefetch instructions	-Mvect=prefetch
Profile guided optimization	-Mphi and -Mpfo
Unroll loops	-Munroll
Other options	
Generate relaxed precision code	-Mfprelaxed
Perform floating point operations in conformance with IEEE standard	-Kieee
Compile free form FORTRAN	-Mfreeform
OpenMP threads and affinity	export OMP_NUM_THREADS=4 export MP_BIND=yes export MP_BLIST="0,1,2,3"

For more information, visit <http://developer.amd.com>