

GROMACS - Bug #3380

IBM VSX checks fail with gcc-10

02/14/2020 11:38 PM - Christoph Junghans

Status:	Resolved	
Priority:	Low	
Assignee:	Erik Lindahl	
Category:		
Target version:	2020.2	
Affected version - extra info:	2019.5	Difficulty: uncategorized
Affected version:	2019.4	

Description

This is part of https://bugzilla.redhat.com/show_bug.cgi?id=1799473

```
-- Flag was accepted, but it did not build test source (this could be due to either the compiler or binutils)
-- Performing Test CXX_maltivec_mabi_altivec_FLAG_ACCEPTED
-- Performing Test CXX_maltivec_mabi_altivec_FLAG_ACCEPTED - Success
-- Performing Test CXX_maltivec_mabi_altivec_COMPILE_WORKS
-- Performing Test CXX_maltivec_mabi_altivec_COMPILE_WORKS - Failed
-- Flag was accepted, but it did not build test source (this could be due to either the compiler or binutils)
-- Performing Test CXX_qarch_auto_qaltivec_FLAG_ACCEPTED
-- Performing Test CXX_qarch_auto_qaltivec_FLAG_ACCEPTED - Failed
-- Performing Test CXX_COMPILE_WORKS_WITHOUT_SPECIAL_FLAGS
-- Performing Test CXX_COMPILE_WORKS_WITHOUT_SPECIAL_FLAGS - Failed
-- Could not find any flag to build test source (this could be due to either the compiler or binutils)
CMake Error at cmake/gmxManageSimd.cmake:51 (message):
  Cannot find IBM VSX compiler flag. Use a newer compiler, or disable SIMD support (slower).
Call Stack (most recent call first):
  cmake/gmxManageSimd.cmake:265 (gmx_give_fatal_error_when_simd_support_not_found)
  CMakeLists.txt:719 (gmx_manage_simd)

-- Configuring incomplete, errors occurred!
```

looking at CMakeOutput.log (attached):

```
Run Build Command(s): /usr/bin/gmake cmTC_90725/fast && /usr/bin/gmake -f CMakeFiles/cmTC_90725.dir/build.make CMakeFiles/cmTC_90725.dir/build
gmake[1]: Entering directory '/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp'
Building CXX object CMakeFiles/cmTC_90725.dir/src.cxx.o
/usr/bin/c++ -O2 -g -pipe -Wall -Werror=format-security -Wp,-D_FORTIFY_SOURCE=2 -Wp,-D_GLIBCXX_ASSERTIONS -fexceptions -fstack-protector-strong -grecord-gcc-switches -specs=/usr/lib/rpm/redhat/redhat-hardened-cc1 -specs=/usr/lib/rpm/redhat/redhat-annobin-cc1 -m64 -mcpu=power8 -mtune=power8 -fasynchronous-unwind-tables -fstack-clash-protection -std=c++11 -DCXX_qarch_auto_qaltivec_FLAG_ACCEPTED -mcpu=power8 -mpower8-vector -qarch=auto -qaltivec -o CMakeFiles/cmTC_90725.dir/src.cxx.o -c /builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx
c++: error: unrecognized command-line option '-qarch=auto'
c++: error: unrecognized command-line option '-qaltivec'; did you mean '-maltivec'?
gmake[1]: *** [CMakeFiles/cmTC_90725.dir/build.make:66: CMakeFiles/cmTC_90725.dir/src.cxx.o] Error 1
gmake[1]: Leaving directory '/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp'
gmake: *** [Makefile:121: cmTC_90725/fast] Error 2
```

Source file was:

```
int main() { return 0;}
```

Performing C++ SOURCE FILE Test CXX_COMPILE_WORKS_WITHOUT_SPECIAL_FLAGS failed with the following output:

Change Dir: /builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp

Run Build Command(s): /usr/bin/gmake cmTC_5ed9c/fast && /usr/bin/gmake -f CMakeFiles/cmTC_5ed9c.dir/build.make CMakeFiles/cmTC_5ed9c.dir/build

gmake[1]: Entering directory '/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp'

Building CXX object CMakeFiles/cmTC_5ed9c.dir/src.cxx.o

```
/usr/bin/c++ -O2 -g -pipe -Wall -Werror=format-security -Wp,-D_FORTIFY_SOURCE=2 -Wp,-D_GLIBCXX_ASSERTIONS -fexceptions -fstack-protector-strong -grecord-gcc-switches -specs=/usr/lib/rpm/redhat/redhat-hardened-cc1 -specs=/usr/lib/rpm/redhat/redhat-annobin-cc1 -m64 -mcpu=power8 -mtune=power8 -fasynchronous-unwind-tables -fstack-clash-protection -std=c++11 -DCXX_COMPILE_WORKS_WITHOUT_SPECIAL_FLAGS -mcpu=power8 -mpower8-vector -o CMakeFiles/cmTC_5ed9c.dir/src.cxx.o -c /builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx
```

/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx: In function 'int main()':
/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx:2:21: error: 'vector' was not declared in this scope; did you mean 'vec_or'?

```
 2 |         int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

```
    |                                     ^~~~~~  
    |                                     vec_or
```

/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx:2:55: error: 'x' was not declared in this scope

```
 2 |         int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

```
    |                                     ^  
/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx:2:66: error: 'y' was not declared in this scope
```

```
 2 |         int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

```
    |                                     ^  
In file included from /builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx:1:  
/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp/src.cxx:2:80: error: invalid parameter combination for Altivec intrinsic '__builtin_vec_vcmpge_p'
```

```
 2 |         int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

```
    |                                     ^~~~~~  
gmake[1]: *** [CMakeFiles/cmTC_5ed9c.dir/build.make:66: CMakeFiles/cmTC_5ed9c.dir/src.cxx.o] Error 1
```

gmake[1]: Leaving directory '/builddir/build/BUILD/gromacs-2019.5/serial/CMakeFiles/CMakeTmp'

gmake: *** [Makefile:121: cmTC_5ed9c/fast] Error 2

Source file was:

```
#include<altivec.h>  
int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

With gcc-9 this check still works.

Associated revisions

Revision 60a138c5 - 04/30/2020 12:45 PM - Paul Bauer

Disallow combination of gcc > 9 and IBM_VSX

The compiler flag is not detected for newer versions of gcc and can lead to confusing error messages.

Fixes #3380

Change-Id: I0c5311325b2bf2bc08ab727eabd670115720b4a6

Revision 9baf5dcc - 10/20/2020 04:42 PM - Szilárd Páll

Allow gcc-9 on Power 9

Previous restriction ended up blacklisting gcc 9 and later whereas the intent was to only do so for version 10 and later. Worked around the version comparison quirk (and lack of >= operator).

Refs #3380

History

#1 - 02/15/2020 12:27 AM - Christoph Junghans

Ok, if I have a code like:

```
#include<altivec.h>
int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}
```

With gcc-9 will "g++ -std=c++11 code.c" will compile while it fails with gcc-10. Without "-std=c++11" gcc-10 will compile as well.

#2 - 02/15/2020 12:39 AM - Christoph Junghans

Report to gcc here: https://gcc.gnu.org/bugzilla/show_bug.cgi?id=93750

Using "-std=gnu++11" instead of "-std=c++11" helps.

#3 - 02/15/2020 03:54 AM - Christoph Junghans

- File *build_ppc64le.log.txt* added

Adding

```
diff --git a/cmake/gmxSimdFlags.cmake b/cmake/gmxSimdFlags.cmake
index 83b3e97ffb..f739628557 100644
--- a/cmake/gmxSimdFlags.cmake
+++ b/cmake/gmxSimdFlags.cmake
@@ -398,7 +398,7 @@ function(gmx_find_simd_ibm_vsx_flags C_FLAGS_RESULT CXX_FLAGS_RESULT C_FLAGS_VAR
    int main(){vector double x,y=vec_splats(1.0);x=vec_madd(y,y,y);return vec_all_ge(y,x);}"
    TOOLCHAIN_C_FLAGS TOOLCHAIN_CXX_FLAGS
    SIMD_IBM_VSX_C_FLAGS SIMD_IBM_VSX_CXX_FLAGS
-   "-mvsx" "-maltivec -mabi=altivec" "-qarch=auto -qaltivec")
+   "-mvsx" "-maltivec -mabi=altivec" "-qarch=auto -qaltivec" "-maltivec -std=gnu++11")

    if(${SIMD_IBM_VSX_C_FLAGS_RESULT})
        set(${C_FLAGS_VARIABLE} "${TOOLCHAIN_C_FLAGS} ${SIMD_IBM_VSX_C_FLAGS}" CACHE INTERNAL "C flags required for IBM VSX instructions")
```

helps with the CMake check, but then it fails down the road with:

```
[ 40%] Building CXX object src/gromacs/CMakeFiles/libgromacs.dir/awh/biasstate.cpp.o
cd /builddir/build/BUILD/gromacs-2019.5/serial/src/gromacs && /usr/bin/c++ -DGMX_DOUBLE=0 -DHAVE_CONFIG_H -DUSE_STD_INTTYPES_H -Dlibgromacs_EXPORTS -I/builddir/build/BUILD/gromacs-2019.5/serial/src -I/builddir/build/BUILD/gromacs-2019.5/src -isystem /builddir/build/BUILD/gromacs-2019.5/src/external/thread_mpi/include -mcpu=power9 -mtune=power9 -maltivec -std=gnu++11 -O2 -g -pipe -Wall -Werror=format-security -Wp,-D_FORTIFY_SOURCE=2 -Wp,-D_GLIBCXX_ASSERTIONS -fexceptions -fstack-protector-strong -grecord-gcc-switches -specs=/usr/lib/rpm/redhat/redhat-hardened-cc1 -specs=/usr/lib/rpm/redhat/redhat-annobin-cc1 -m64 -mcpu=power8 -mtune=power8 -fasynchronous-unwind-tables -fstack-clash-protection -std=c++11 -DNDEBUG -funroll-all-loops -fexcess-precision=fast -fPIC -fopenmp -o CMakeFiles/libgromacs.dir/awh/biasstate.cpp.o -c /builddir/build/BUILD/gromacs-2019.5/src/gromacs/awh/biasstate.cpp
In file included from /builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/impl_ibm_vsx/impl_ibm_vsx.h:51,
                 from /builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/simd.h:147,
                 from /builddir/build/BUILD/gromacs-2019.5/src/gromacs/awh/biasstate.cpp:64:
/builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/impl_ibm_vsx/impl_ibm_vsx_simd_double.h: In member function 'double gm::BiasState::updateProbabilityWeightsAndConvolvedBias(const std::vector<gm::DimParams>&, const gm::Grid&, std::vector<double, gm::Allocator<double, gm::AlignedAllocationPolicy> >&) const':
/builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/impl_ibm_vsx/impl_ibm_vsx_simd_double.h:414:5: error: impossible constraint in 'asm'
  414 |     __asm__ ("xvrdpi %x0,%x1" : "=wd" (res) : "wd" (x.simdInternal_));
      |           ^~~~~~
/builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/impl_ibm_vsx/impl_ibm_vsx_simd_double.h:742:5: error: impossible constraint in 'asm'
  742 |     __asm__ ("xvcvdpsxws %x0,%x1" : "=wa" (ix) : "wd" (a.simdInternal_));
      |           ^~~~~~
/builddir/build/BUILD/gromacs-2019.5/src/gromacs/simd/impl_ibm_vsx/impl_ibm_vsx_simd_double.h:414:5: error: impossible constraint in 'asm'
  414 |     __asm__ ("xvrdpi %x0,%x1" : "=wd" (res) : "wd" (x.simdInternal_));
      |           ^~~~~~
make[2]: *** [src/gromacs/CMakeFiles/libgromacs.dir/build.make:2231: src/gromacs/CMakeFiles/libgromacs.dir/awh/biasstate.cpp.o] Error 1
```

#4 - 02/24/2020 05:23 PM - Christoph Junghans

- Target version set to 2019.6

#5 - 02/26/2020 05:47 PM - Erik Lindahl

- Assignee changed from Paul Bauer to Erik Lindahl

- Priority changed from Normal to Low

IBM: If you read this, when you have <1% of the market it is NOT a good idea to keep changing your ABI, change the recommended way of using SIMD, change the flags to support the SIMD instructions, and then change the way we can access the instructions you didn't yet add as intrinsics - combined with not bothering to write much documentation for it.

There might in fact be some correlation between that and the fact that virtually nobody but us has bothered supporting VSX ;-)

#6 - 02/26/2020 05:50 PM - Erik Lindahl

Christoph: We actually have a power9 node now since we wanted to be able to debug, so I'll see if we can fix it (no thanks to IBM, which suddenly pulled the loaner node in Stockholm 1.5 years ago ;-)

#7 - 02/28/2020 08:21 AM - Paul Bauer

- Target version changed from 2019.6 to 2020.2

not high priority, so more likely to be fixed in 2020 branch
sorry IBM :)

#8 - 02/28/2020 03:10 PM - Christoph Junghans

I just disabled VSX in fedora for the time being.

#9 - 04/30/2020 01:30 PM - Paul Bauer

- Status changed from New to Resolved

Applied in changeset [60a138c51ab4bceec063cb78dea55fafceca07e9a](#).

Files

CMakeError.log	23 KB	02/14/2020	Christoph Junghans
build_ppc64le.log.txt	522 KB	02/15/2020	Christoph Junghans