

## SUMMARY OF TRILINOS WARNINGS FIXES (Tech-X Corporation Subcontract Work August/September 2015)

There were 13 packages that showed compiler errors with the flags of warnings as errors. A package-by-package set of fixes is described below.

### **Amesos (Patch 0002)**

Fixed all warnings.

Changed files:

```
amesos/example/example_AmesosFactory.cpp | 25 ++++++-----  
amesos/example/example_AmesosFactory_HB.cpp | 22 ++++++-----  
amesos/test/TestOptions/PartialFactorization.cpp | 31 +++-----  
amesos/test/TestOptions/TestOptions.cpp | 3 --  
amesos/test/Test_Basic/Amesos_TestMrhsSolver.cpp | 24 -----  
amesos/test/Test_Detailed/cxx_main.cpp | 26 ++++++-----  
6 files changed, 49 insertions(+), 82 deletions(-)
```

Summary of Changes:

- Removed unused timing code.
- Removed unused variables.

### **Didasko (Patch 0003)**

Fixed all warnings.

Changed files:

```
didasko/examples/teuchos/ex1.cpp | 22 ++++++-----  
didasko/examples/teuchos/ex4.cpp | 40 ++++++-----  
didasko/examples/teuchos/ex5.cpp | 4 +-  
didasko/examples/teuchos/ex6.cpp | 16 ++++++-----  
4 files changed, 41 insertions(+), 41 deletions(-)
```

Summary of Changes:

- Removed unused variables.
- There were some example programs that called some functions to show how, but did not do anything with the return variables. These snippets were commented out to remove the compiler warning, but still show as examples. Execution of the example would have given empty output anyway. I'm not sure if that was ok.

## **Epetra (Patch 0001)**

Fixed all warnings.

Changed files:

```
epetra/test/BasicPerfTest_LL/cxx_main.cpp      |    2 +-
epetra/test/Bugs/Bug_6079_DistObject_CombineMode_flags/cxx_main.cpp
                                                |    2 +-
epetra/test/FusedImportExport/cxx_main.cpp     |   17 ++++++-----
epetra/test/FusedImportExport_LL/cxx_main.cpp  |   17 ++++++-----
epetra/test/IntSerialDense/cxx_main.cpp        |   20 ++++++-----
5 files changed, 27 insertions(+), 31 deletions(-)
```

Summary of Changes:

- Removed unused variables.
- Changed functions to return void instead of int, when the int was superfluous

## **FEI (Patch 004)**

Fixed all warnings.

Changed files:

```
fei/base/fei_FillableMat.cpp |    4 +---
1 files changed, 1 insertions(+), 3 deletions(-)
```

Summary of Changes:

- Removed unused variables.

## **Intrepid (Patch 005)**

Fixed all warnings.

Changed files:

```
intrepid/core/src/Discretization/Basis/Intrepid_BasisDef.hpp      | 26 ++++++-----
intrepid/core/src/Discretization/Basis/Intrepid_HCURL_HEX_I1_FEMDef.hpp      |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HCURL_QUAD_I1_FEMDef.hpp      |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HCURL_TET_I1_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HCURL_TRI_I1_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HDIV_HEX_I1_FEMDef.hpp        |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HDIV_TET_I1_FEMDef.hpp        |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_HEX_C1_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_HEX_C2_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_HEX_I2_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_QUAD_C1_FEMDef.hpp      |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_QUAD_C2_FEMDef.hpp      |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_TET_COMP12_FEMDef.hpp   |    4 +-
intrepid/core/src/Discretization/Basis/Intrepid_HGRAD_TRI_C1_FEMDef.hpp       |    4 +-
intrepid/core/src/Discretization/FunctionSpaceTools/Intrepid_FunctionSpaceToolsDef.hpp | 19 ++++++-----
intrepid/core/src/Shared/Intrepid_RealSpaceToolsDef.hpp           |    2 +-
16 files changed, 51 insertions(+), 48 deletions(-)
```

Summary of Changes:

- Added Teuchos::as<int>() for comparison of signed/unsigned int variables in TEUCHOS\_TEST\_FOR\_EXCEPTION calls
- Converted unsigned int variables to int. These variables were used in comparisons to int loop variable so clearly never intended to be unsigned. Used Teuchos::as<int>() for conversion.

## **Mesquite (Patch 0006)**

Fixed all warnings.

Changed files:

```

mesquite/src/Control/Mesquite_InstructionQueue.cpp          |    6 ++++
mesquite/src/Control/Mesquite_TerminationCriterion.cpp     |    2 +-
mesquite/src/Mesh/Mesquite_ParallelHelper.cpp              |   27 ++++++-----
mesquite/src/QualityImprover/Mesquite_VertexMover.cpp      |    2 +-
mesquite/src/QualityImprover/OptSolvers/Mesquite_ConjugateGradient.cpp |    5 +-
mesquite/src/QualityImprover/OptSolvers/Mesquite_NonGradient.cpp |   14 +++++-----
mesquite/src/QualityImprover/OptSolvers/Mesquite_QuasiNewton.cpp |    4 +-
mesquite/src/QualityMetric/Debug/Mesquite_CompareQM.cpp   |    5 +-
mesquite/testSuite/parallel_untangle_shape/par_hex_untangle_shape.cpp |    4 +-
  9 files changed, 37 insertions(+), 32 deletions(-)

```

Summary of Changes:

- Added #ifndef NDEBUG around Mesh object used in assert
- Adjusting order of constructor initialization list to match order of definition of variables in header
- Fixing comparison of signed/unsigned int variables
- Moving some variables inside assert statements so that they are not unused if assert is removed by compiler

## **ML (mlPartial.patch)**

Fixed:

```

ml/examples/Advanced/ml_user_aggr.cpp
ml/examples/MatrixFormats/ml_AztecMsr.cpp
ml/src/MLAPI/MLAPI_Eig.cpp
ml/src/MLAPI/MLAPI_LoadBalanceOperator.h
ml/test/ValidateParams/cxx_main.cpp

```

4 instances of error: ISO C++ forbids casting between pointer-to-function and pointer-to-object not fixed. They are at:

```

ml/src/Utils/ml_MultiLevelPreconditioner.cpp:241
ml/src/Utils/ml_MultiLevelPreconditioner.cpp:2423
ml/src/Utils/ml_MultiLevelPreconditioner.cpp:2435
ml/src/Utils/ml_MultiLevelPreconditioner.cpp:2440

```

Summary of Changes:

- Removed unused variables.
- Fixed implicit conversion between static string and char\*

## Muelu (no patch)

Issues no longer seen. Probably fixed by recent commits.

## Pamgen (Patch 0010)

Fixed all warnings.

Changed files:

```
.../mesh_spec_lt/pamgen_element_dictionary.C | 2 +-  
1 files changed, 1 insertions(+), 1 deletions(-)
```

Summary of Changes:

- Removed second extern in C file that was already in h.

## Panzer (Patch 0008)

Fixed all warnings.

Changed files:

```
packages/panzer/src/Panzer_BasisValues2.cpp | 68 ++++++++-----  
.../panzer/src/Panzer_ModelEvaluator_Epetra.cpp | 4 +-  
packages/panzer/src/Panzer_ModelEvaluator_impl.hpp | 2 +-  
.../panzer/src/dofmnggr/Panzer_DOFManager_impl.hpp | 6 +-  
.../src/dofmnggr/Panzer_UniqueGlobalIndexer.hpp | 5 +-  
.../src/evaluators/Panzer_ConstantFlux_impl.hpp | 12 ++-  
.../src/evaluators/Panzer_ConstantVector_impl.hpp | 9 +-  
.../Panzer_CoordinatesEvaluator_impl.hpp | 6 +-  
.../src/evaluators/Panzer_DOF_PointField_impl.hpp | 6 +-  
.../Panzer_Dirichlet_Residual_EdgeBasis_impl.hpp | 29 +++++-----  
.../Panzer_Dirichlet_Residual_FaceBasis_impl.hpp | 13 +++-  
.../Panzer_GatherBasisCoordinates_impl.hpp | 9 +-  
.../Panzer_GatherIntegrationCoordinates_impl.hpp | 9 +-  
.../Panzer_Integrator_BasisTimesScalar_impl.hpp | 11 +-  
.../Panzer_Integrator_BasisTimesVector_impl.hpp | 11 +-  
.../Panzer_Integrator_CurlBasisDotVector_impl.hpp | 20 +++++-  
.../Panzer_Integrator_GradBasisDotVector_impl.hpp | 9 +-  
.../evaluators/Panzer_Integrator_Scalar_impl.hpp | 3 +-  
packages/panzer/src/evaluators/Panzer_Sum_impl.hpp | 10 +-  
packages/panzer/test/core_tests/basis.cpp | 24 +++++-----  
packages/panzer/test/core_tests/basis_values2.cpp | 30 +++++-----  
.../panzer/test/core_tests/cell_topology_info.cpp | 16 +++-  
packages/panzer/test/core_tests/point_values.cpp | 36 +++++-----  
packages/panzer/test/core_tests/point_values2.cpp | 36 +++++-----  
.../panzer/test/core_tests/zero_sensitivities.cpp | 10 +-  
.../test/epetra_gatherscatter/tEpetraGather.cpp | 16 +++-  
.../test/epetra_gatherscatter/tEpetraScatter.cpp | 16 +++-  
.../tEpetraScatterDirichlet.cpp | 16 +++-  
.../test/evaluator_tests/UnitValueEvaluator.hpp | 6 +-  
.../panzer/test/evaluator_tests/dof_pointfield.cpp | 18 +++++-  
.../test/evaluator_tests/gather_coordinates.cpp | 18 +++++-  
packages/panzer/test/evaluator_tests/normals.cpp | 2 +-  
.../test/la_factory/tEpetraLinearObjFactory.cpp | 48 +++++-----  
.../test/la_factory/tTpetraLinearObjFactory.cpp | 48 +++++-----  
34 files changed, 328 insertions(+), 254 deletions(-)
```

#### Summary of Changes:

- Signed int loop variables compared to unsigned int end condition variables. Converted unsigned int with `Teuchos::as<int>()`.
- Made converted int variables const, which should improve performance.
- Converted unsigned to signed int, in `TEUCHOS_ASSERT()` `TEST_EQUALITY()` calls.
- Used `static_cast<int>()` in `KOKKOS_INLINE_FUNCTION` where `Teuchos::as<int>()` may not be ok.
- Converted a `size_t` loop variable to `int`, which should improve performance on most systems where `size_t` is of larger bit size.

### **Phalanx (Patch 0007)**

Fixed all warnings.

#### Changed files:

```
packages/phalanx/src/Phalanx_MDField_Def.hpp | 129 ++++++-----  
1 files changed, 73 insertions(+), 56 deletions(-)
```

#### Summary of Changes:

- Conversion of unsigned int to signed int to use for comparison in loops. Using `Teuchos::as<int>()` to convert them.

### **Pliris (patch 0009)**

Fixed all warnings.

#### Changed files:

```
packages/pliris/src/defines.h | 4 +-  
packages/pliris/src/exchange_pivots.c | 8 ++--  
packages/pliris/src/factor_new.c | 13 +++--  
packages/pliris/src/forwardall.c | 50 ++++++-----  
packages/pliris/src/permute_mat.c | 8 ++--  
packages/pliris/src/permute_rhs.c | 8 ++--  
packages/pliris/src/solve.c | 11 +++++  
packages/pliris/src/x_factor.c | 4 +-  
packages/pliris/src/x_solve.c | 4 +-  
packages/pliris/src/xlu_solve_new.c | 8 ++--  
packages/pliris/test/vector_random/cxx_main.cpp | 12 ++----  
11 files changed, 72 insertions(+), 58 deletions(-)
```

#### Summary of Changes:

- Removed unused variables
- Had to separate out complex and real `DIVIDE` define to eliminate unused variable in the real case.

### **Seacas (Patch seacas.patch)**

Fixed all warnings, but code does not compile automatically as the order `netcdf` and `hdf5` libs need to be swapped on the link line. I reversed the order by hand to check my compile.

#### Changed files:

seacas/libraries/aprepro\_lib/apr\_scanner.cc  
seacas/libraries/aprepro\_lib/aprepro.ll  
seacas/libraries/ioss/src/exo\_par/Iopx\_DatabaseIO.C  
seacas/libraries/ioss/src/exo\_par/Iopx\_DecompositionData.h  
seacas/libraries/ioss/src/main/info\_interface.C

#### Summary of Changes:

- Removed unused integers
- Adjusting order of constructor initialization list to match order of definition of variables in header

### **Shylu (Patch shylu.patch)**

Fixed all warnings, but has dependency on ML, so compile did not finish.

#### Changed files:

shylu/core/src/epetra/shylu.h  
shylu/core/src/epetra/shylu\_factor.cpp  
shylu/core/src/epetra/shylu\_internal.h  
shylu/core/src/epetra/shylu\_solve.cpp

#### Summary of Changes:

- Conversion of functions that returned unused int to void.

### **STK (No Patch, did not compile)**

Compiler error not from warnings. It is from missing include directories, such that headers are not found. It appears that CMake code is not correct. Tried to fix, but it was not trivial following the CMake tribits code without an understanding of the patterns. I also had to configure with BoostLib package (shared version of Boost) as Boost (static version) was not found properly such that the libraries were added to the link line.

### **Other Notes**

A few compiler pragmas were found that would prevent warnings from showing as errors. These are listed below:

```
$grep -R "diagnostic ignored" packages/*  
  
packages/ml/src/Smoother/ml_smoother.c:#pragma GCC diagnostic ignored "-pedantic"  
packages/ml/src/Utils/ml_MultiLevelPreconditioner_Smoother.cpp:#pragma GCC diagnostic ignored "-pedantic"  
packages/ml/src/Utils/ml_MultiLevelPreconditioner.cpp:#pragma GCC diagnostic ignored "-pedantic"  
packages/muelu/src/Utils/MueLu_BoostGraphviz.hpp:#pragma GCC diagnostic ignored "-Wshadow"  
packages/stk/stk_mesh/stk_mesh/base/FindRestriction.cpp:#pragma clang diagnostic ignored "-Wunneeded-internal-declaration"  
packages/zoltan/src/zz/murmur3.c:#pragma GCC diagnostic ignored "-Wattributes"
```