APPENDIX A
APPENDIX: ARTIFACT DESCRIPTION/ARTIFACT EVALUATION

A. SUMMARY OF THE EXPERIMENTS REPORTED

We ran our experiment on NERSC's Cori supercomputer with the Cray Programming Environment Mission.

B. ARTIFACT AVAILABILITY

Software Artifact Availability: Some author-created software artifacts are NOT maintained in a public repository or are NOT available under an OSI-approved license.

Hardware Artifact Availability: There are no author-created hardware artifacts.

Data Artifact Availability: There are no author-created data artifacts.

Proprietary Artifacts: No author-created artifacts are proprietary.

C. BASELINE EXPERIMENTAL SETUP, AND MODIFICATIONS MADE FOR THE PAPER

Output from scripts that gathers execution environment information.

PE_FFTW_TARGET_x86_cascadelake=x86_cascadelake
PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAY_x86_64
=9.0
PE_TPSL_DEFAULT_GENCOMPILERS_GNU_x86_skylake
=8.2 7.1
PE_TPSL_64_DEFAULT_GENCOMPS_CRAY_haswell=90
LD_LIBRARY_PATH=/opt/cray/job/2.2.4−7.0.1.1_3.47
__g36b56f4.ari/lib64:/opt/ intel /
compilers_and_libraries_2019 .3.199/ linux /compiler/
lib / intel64 :/ opt/ intel / compilers_and_libraries_2019
.3.199/ linux /mkl/lib / intel64 :/ usr /common/software/
darshan /3.2.1/ lib
LS_COLORS=no=00:fi=00:di=01;34:ln=01;36:pi=40;33:so
=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:ex
=01;32:∗.tar=01;31:∗.tgz=01;31:∗. arj =01;31:∗. taz
=01;31:∗. lzh =01;31:∗. zip =01;31:∗.z=01;31:∗.Z
=01;31:∗.gz=01;31:∗.bz2=01;31:∗.deb=01;31:∗.i386.
rpm=01;31:∗.src .rpm=01;30:∗.jpg=01;35:∗. gif
=01;35:∗.bmp=01;35:∗.ppm=01;35:∗.tga=01;35:∗.xbm
=01;35:∗.xpm=01;35:∗.tif=01;35:∗.png=01;35:
PE_ATP_PKGCONFIG_VARIABLES=
ATP_CFLAGS_@prgenv@_@language@
PE_LIBSCI_DEFAULT_VOLATILE_PRGENV=CRAY
CRAYCLANG GNU INTEL
CSHRCREAD=true
PE_TPSL_64_DEFAULT_GENCOMPILERS_GNU_
sandybridge=8.2 7.1
PE_TPSL_64_DEFAULT_GENCOMPS_CRAYCLANG
_x86_64=90
HOSTTYPE=x86_64
XTPE_NETWORK_TARGET=aries
ATP_IGNORE_SIGTERM=1
PE_TPSL_64_DEFAULT_GENCOMPILERS_GNU_x86
_skylake=8.2 7.1

CRAY_UDREG_POST_LINK_OPTS=−L/opt/cray/udreg
/2.3.2−7.0.1.1_3.47__g8175d3d.ari/lib64
PE_TPSL_DEFAULT_GENCOMPS_CRAYCLANG_
haswell=90
PE_FFTW_DEFAULT_TARGET_ivybridge=ivybridge
PE_FFTW_DEFAULT_TARGET_share=share
PE_TPSL_DEFAULT_GENCOMPILERS_CRAY_x86_
skylake=9.0
PE_TRILINOS_DEFAULT_GENCOMPS_CRAYCLANG
_x86_64=90
PRGENVMODULES=PrgEnv−cray:PrgEnv−gnu:PrgEnv−
intel:PrgEnv−pgi
PKG_CONFIG_PATH_DEFAULT=/opt/cray/pe/papi/5.7.0.2/
lib64/pkgconfig
PE_TPSL_64_DEFAULT_GENCOMPILERS_INTEL
_sandybridge=19.0
PE_LIBSCI_OMP_REQUIRES=
PE_TRILINOS_DEFAULT_GENCOMPS_GNU_x86_64=82
71
SSH_CONNECTION=114.214.201.199 2075 128.55.209.23
22
PE_MPICH_NV_LIBS_nvidia35=−lcudart
PE_TPSL_64_DEFAULT_GENCOMPS_CRAY_x86_64=90
LESSCLOSE=lessclose.sh %s %s
CRAY_LD_LIBRARY_PATH=/opt/cray/pe/fftw/3.3.8.4/
haswell/lib:/opt/cray/pe/mpt/7.7.10/ gni /mpich−intel
/16.0/ lib :/ opt /cray/ rca /2.2.20−7.0.1.1 _4.61
__g8e3fb5b. ari / lib64 :/ opt /cray/ alps /6.6.58−7.0.1.1
_6.19__g437d88db.ari/ lib64 :/ opt /cray/xpmem
/2.2.20−7.0.1.1_4.20__g0475745.ari/lib64 :/ opt /cray/
dmapp/7.1.1−7.0.1.1 _4.61__g38cf134. ari / lib64 :/ opt/
cray /pe/pmi /5.0.14/ lib64 :/ opt /cray/ ugni
/6.0.14.0−7.0.1.1 _7.49__ge78e5b0.ari / lib64 :/ opt/
cray /udreg /2.3.2−7.0.1.1 _3.47__g8175d3d.ari/ lib64 :/
opt /cray/pe/ libsci /19.06.1/ INTEL/16.0/x86_64/lib
PE_SMA_DEFAULT_DIR_PGI_DEFAULT64=64
PE_MPICH_DEFAULT_DIR_CRAY_DEFAULT64=64
PE_PETSC_DEFAULT_GENCOMPS_CRAY_haswell=90
PE_PAPI_DEFAULT_ACCEL_FAMILY_LIBS_nvidia=,−
lcupti,−lcudart,−lcuda
PE_PETSC_DEFAULT_GENCOMPILERS_CRAY
_sandybridge=9.0
XKEYSYMDB=/usr/X11R6/lib/X11/XKeysymDB
PE_TRILINOS_DEFAULT_VOLATILE_PKGCONFIG
_PATH=/opt/cray/pe/trilinos/12.14.1.0/@PRGENV@/
@PE_TRILINOS_DEFAULT_GENCOMPS@/
@PE_TRILINOS_DEFAULT_TARGET@/lib/pkgconfig
PE_ENV=INTEL
PE_FFTW_TARGET_mic_knl=mic_knl
PE_NETCDF_DEFAULT_VOLATILE_PRGENV=GNU
PE_TPSL_64_DEFAULT_GENCOMPS_INTEL_x86_skylake
=190
CRAY_MPICH2_DIR=/opt/cray/pe/mpt/7.7.10/gni/mpich−
intel/16.0
PE_LIBSCI_DEFAULT_GENCOMPS_GNU_x86_64=81 71
PE_PETSC_DEFAULT_GENCOMPS_GNU_x86_skylake
=82 71

PE_PETSC_DEFAULT_GENCOMPILERS_CRAYCLANG
_haswell=9.0

FFTW_VERSION=3.3.8.4

PE_PETSC_DEFAULT_VOLATILE_PRGENV=CRAY
CRAY64 CRAYCLANG CRAYCLANG64 GNU
GNU64 INTEL INTEL64

PE_PRODUCT_LIST=CRAYPE_HASWELL:CRAY_RCA:
CRAY_ALPS:DVS:CRAY_XPMEM:CRAY_DMAPP:
CRAY_PMI:CRAY_UGNI:CRAY_UDREG:
CRAY_LIBSCI:CRAYPE:INTEL:HUGETLB2M

PE_TPSL_64_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH:PE_LIBSCI

CRAY_DMAPP_INCLUDE_OPTS=−I/opt/cray/dmapp
/7.1.1−7.0.1.1_4.61__g38cf134.ari/include −I/opt/cray/
gni−headers/5.0.12.0−7.0.1.1_6.34__g3b1768f.ari/
include

LIBGL_ALWAYS_INDIRECT=1

PE_TPSL_DEFAULT_GENCOMPILERS_GNU_x86_64=8.2
7.1

HUGETLB_DEFAULT_PAGE_SIZE=2M

PE_FFTW_PKGCONFIG_LIBS=fftw3_mpi:libfftw3_threads:
fftw3:fftw3f_mpi:libfftw3f_threads:fftw3f

PE_NETCDF_DEFAULT_GENCOMPILERS_GNU=8.2 7.1
_=/usr/bin/env

PE_LIBSCI_MODULE_NAME=cray−libsci/19.06.1

PE_TPSL_64_DEFAULT_GENCOMPS_GNU_x86_skylake
=82 71

PE_LIBSCI_GENCOMPILERS_CRAY_x86_64=9.0

TZ=US/Pacific

PE_MPICH_DEFAULT_DIR_CRAYCLANG_DEFAULT64
=64

PE_TPSL_DEFAULT_GENCOMPS_CRAYCLANG_x86
_skylake=90

PE_MPICH_CXX_PKGCONFIG_LIBS=mpichcxx

PE_PETSC_DEFAULT_GENCOMPS_CRAY_x86_skylake
=90

PE_TPSL_DEFAULT_GENCOMPILERS_INTEL_x86
_skylake=19.0

PE_TPSL_64_DEFAULT_GENCOMPS_GNU_haswell=82
71

WINDOWMANAGER=/usr/bin/gnome

PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_skylake=9.0

LESS=−M −I −R

PE_LIBSCI_DEFAULT_GENCOMPS_CRAYCLANG
_x86_64=90

PE_PETSC_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/petsc/3.11.2.0/complex/@PRGENV@/
@PE_PETSC_DEFAULT_GENCOMPS@/
@PE_PETSC_DEFAULT_TARGET@/lib/pkgconfig

DISPLAY=cori02:16.0

JAVA_ROOT=/usr/lib64/jvm/java

HOSTNAME=cori02

PE_TPSL_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_skylake=9.0

PE_FFTW_TARGET_sandybridge=sandybridge

PE_FFTW_VOLATILE_PKGCONFIG_PATH=/opt/cray/pe/
fftw/3.3.8.4/@PE_FFTW_TARGET@/lib/pkgconfig

PE_NETCDF_HDF5PARALLEL_DEFAULT_VOLATILE
_PKGCONFIG_PATH=/opt/cray/pe/netcdf−hdf5parallel
/4.6.3.2/@PRGENV@/
@PE_NETCDF_HDF5PARALLEL_DEFAULT
_GENCOMPS@/lib/pkgconfig

PE_TPSL_DEFAULT_GENCOMPILERS_CRAYCLANG
_sandybridge=9.0

OLDPWD=/global/homes/w/USER/project_USER

PE_PETSC_DEFAULT_GENCOMPILERS_CRAY_x86
_skylake=9.0

XCRYSDEN_TOPDIR=/global/homes/w/USER/Program/
xcrysden−1.5.53−bin−semishared

PE_TPSL_DEFAULT_GENCOMPS_GNU_haswell=82 71

CSHEDIT=emacs

PE_FFTW_TARGET_broadwell=broadwell

PE_TPSL_DEFAULT_GENCOMPILERS_GNU_haswell=8.2
7.1

CRAY_RCA_INCLUDE_OPTS=−I/opt/cray/rca
/2.2.20−7.0.1.1_4.61__g8e3fb5b.ari/include −I/opt/cray/
krca/2.2.6−7.0.1.1_5.45__gb641b12.ari/include −I/opt/
cray−hss−devel /9.0.0/ include

PE_TPSL_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/tpsl/19.06.1/@PRGENV@/
@PE_TPSL_DEFAULT_GENCOMPS@/
@PE_TPSL_DEFAULT_TARGET@/lib/pkgconfig

GPG_TTY=/dev/pts/36

LESS_ADVANCED_PREPROCESSOR=no

PE_FFTW_TARGET_x86_64=x86_64

PE_MPICH_DIR_CRAY_DEFAULT64=64

PE_MPICH_GENCOMPS_CRAY=90

PE_FFTW_DEFAULT_TARGET_x86_64=x86_64

PE_PETSC_DEFAULT_GENCOMPILERS_INTEL_x86_64
=19.0

PE_PETSC_DEFAULT_GENCOMPS_CRAYCLANG_x86
_skylake=90

COLORTERM=1

ZAP_LIBPATH=/opt/ovis/lib64/ovis−ldms

DVS_MAXNODES=1__

PE_PARALLEL_NETCDF_DEFAULT_VOLATILE
_PRGENV=GNU

PE_HDF5_DEFAULT_VOLATILE_PRGENV=GNU

FPATH=:/opt/cray/pe/modules /3.2.11.4/ init /sh_funcs/
no_redirect :/ opt/ cray /pe/modules /3.2.11.4/ init /
sh_funcs/ no_redirect

PE_TPSL_64_DEFAULT_GENCOMPS_CRAYCLANG
_x86_skylake=90

PE_TPSL_64_DEFAULT_VOLATILE_PKGCONFIG_PATH
=/opt/cray/pe/tpsl/19.06.1/@PRGENV@64/
@PE_TPSL_64_DEFAULT_GENCOMPS@/
@PE_TPSL_64_DEFAULT_TARGET@/lib/pkgconfig

PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAYCLANG
_sandybridge=9.0

PE_PKGCONFIG__PRODUCTS=PE_ATP

PE_PETSC_DEFAULT_GENCOMPS_GNU_sandybridge=82
71

PE_NETCDF_HDF5PARALLEL_DEFAULT_REQUIRED
_PRODUCTS=PE_HDF5_PARALLEL

PE_TPSL_DEFAULT_GENCOMPILERS_CRAY_x86_64
=9.0
ATP_CFLAGS=
JAVA_HOME=/usr/lib64/jvm/java
PE_LIBSCI_GENCOMPILERS_CRAYCLANG_x86_64=9.0
PE_FFTW_DEFAULT_TARGET_x86_skylake=x86_skylake
PE_PETSC_DEFAULT_GENCOMPILERS_INTEL
_x86_skylake=19.0
PE_MPICH_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/mpt/7.7.10/gni/mpich−
@PRGENV@@PE_MPICH_DEFAULT
_DIR_DEFAULT64@/
@PE_MPICH_DEFAULT_GENCOMPS@/lib/pkgconfig
MACHTYPE=x86_64−suse−linux
PE_FFTW_DEFAULT_TARGET_broadwell=broadwell
ALTD_WORKDIR=/global/cscratch1/altd/logs
PE_PAPI_DEFAULT_ACCEL_LIBS=
PE_TRILINOS_DEFAULT_GENCOMPILERS
_CRAYCLANG_x86_64=9.0
PE_HDF5_DEFAULT_GENCOMPILERS_GNU=8.2 7.1
PE_SMA_DEFAULT_COMPFLAG=
FFTW_INC=/opt/cray/pe/fftw/3.3.8.4/haswell/include
PE_PKGCONFIG_PRODUCTS=PE_FFTW:
PE_HUGEPAGES:PE_MPICH:PE_LIBSCI
PE_CRAY_DEFAULT_FIXED_PKGCONFIG_PATH=/opt/
cray/pe/parallel−netcdf/1.11.1.1/CRAY/9.0/lib/pkgconfig
:/opt/cray/pe/netcdf−hdf5parallel/4.6.3.2/CRAY/9.0/lib/
pkgconfig:/opt/cray/pe/netcdf/4.6.3.2/ CRAY/9.0/lib/
pkgconfig :/ opt/cray/pe/hdf5− parallel /1.10.5.2/
CRAY/9.0/lib/pkgconfig :/ opt/cray/pe/hdf5 /1.10.5.2/
CRAY/9.0/lib/pkgconfig :/ opt/cray/pe/ga /5.3.0.10/
CRAY/8.6/lib/pkgconfig
PE_PETSC_DEFAULT_GENCOMPS_CRAYCLANG
_x86_64=90
FFTW_DIR=/opt/cray/pe/fftw/3.3.8.4/ haswell/ lib
CRAY_MPICH_BASEDIR=/opt/cray/pe/mpt/7.7.10/gni
PE_TPSL_64_DEFAULT_GENCOMPS_CRAY_x86_skylake
=90
HUGETLB_VERBOSE=0
PE_PETSC_DEFAULT_GENCOMPS_INTEL_sandybridge
=190
PE_TPSL_64_DEFAULT_GENCOMPS_INTEL_sandybridge
=190
PE_LIBSCI_GENCOMPILERS_GNU_x86_64=8.1 7.1
MINICOM=−c on
DVS_VERSION=0.9.0
HUGETLB_MORECORE_HEAPBASE=10000000000
PE_NETCDF_HDF5PARALLEL_DEFAULT
_GENCOMPS_GNU=
PE_FFTW_OMP_REQUIRES=
PE_MPICH_PKGCONFIG_VARIABLES=
PE_MPICH_NV_LIBS_@accelerator@:
PE_MPICH_ALTERNATE_LIBS_@multithreaded@:
PE_MPICH_ALTERNATE_LIBS_@dpm@
PE_MPICH_PKGCONFIG_LIBS=mpich
PE_PARALLEL_NETCDF_DEFAULT_FIXED_PRGENV=
CRAY CRAYCLANG INTEL
QT_SYSTEM_DIR=/usr/share/desktop−data

OSTYPE=linux
ATP_MRNET_COMM_PATH=/opt/cray/pe/atp/2.1.3/libexec/
atp_mrnet_commnode_wrapper
PE_MPICH_NV_LIBS=
PE_NETCDF_DEFAULT_REQUIRED_PRODUCTS=
PE_HDF5
CRAY_PRGENVINTEL=loaded
PE_FFTW2_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH
PE_PETSC_DEFAULT_GENCOMPS_GNU_x86_64=82 71
XDG_SESSION_ID=80039
PE_TPSL_DEFAULT_GENCOMPS_GNU_sandybridge=82
71
PE_TPSL_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH:PE_LIBSCI
USER=USER
PAGER=less
PE_NETCDF_DEFAULT_GENCOMPS_GNU=
MODULE_VERSION=3.2.11.4
PE_HDF5_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/hdf5/1.10.5.2/@PRGENV@/
@PE_HDF5_DEFAULT_GENCOMPS@/lib/pkgconfig
PE_FFTW_TARGET_x86_skylake=x86_skylake
CRAY_ALPS_POST_LINK_OPTS=−L/opt/cray/alps
/6.6.58−7.0.1.1_6.19__g437d88db.ari/lib64
PE_TPSL_DEFAULT_GENCOMPS_CRAYCLANG_x86_64
=90
MAN_POSIXLY_CORRECT=1
SHMEM_ABORT_ON_ERROR=1
PE_PKG_CONFIG_PATH=/opt/cray/pe/valgrind4hpc/2.8.1/
lib/pkgconfig:/opt/cray/pe/ cti /1.0.9/ lib /pkgconfig :/
opt/cray/pe/ cti /1.0.7/ lib /pkgconfig :/ opt/cray/pe/
cti /2.8.1/ lib /pkgconfig :/ opt/cray/pe/ atp /3.8.1/ lib /
pkgconfig
PE_CRAYCLANG_DEFAULT_FIXED_PKGCONFIG_PATH
=/opt/cray/pe/parallel−netcdf/1.11.1.1/CRAYCLANG
/9.0/lib/pkgconfig:/opt/cray/pe/netcdf−hdf5parallel
/4.6.3.2/CRAYCLANG/9.0/lib/pkgconfig:/opt/cray/pe/
netcdf/4.6.3.2/CRAYCLANG/9.0/lib/pkgconfig:/opt/cray/
pe/hdf5−parallel/1.10.5.2/CRAYCLANG/9.0/lib/
pkgconfig:/opt/cray/pe/hdf5/1.10.5.2/CRAYCLANG/9.0/
lib/pkgconfig
PE_MPICH_DEFAULT_GENCOMPILERS_CRAY=9.0
TOOLMODULES=apprentice:apprentice2:atp:chapel:cray−
lgdb:cray−snplauncher:craypat:craypkg−gen:ddt:gdb:
iobuf: papi: perftools : perftools − lite : stat : totalview :
xt−craypat: xt−lgdb: xt−papi: xt−totalview
DVS_INCLUDE_OPTS=−I/opt/cray/dvs/2.12_2
.2.165−7.0.1.1_14.4__ge967908e/include
PE_LIBSCI_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH
PE_LIBSCI_GENCOMPILERS_INTEL_x86_64=16.0
PE_TPSL_64_DEFAULT_GENCOMPILERS_GNU_x86_64
=8.2 7.1
CRAY_CPU_TARGET=haswell
PE_GA_DEFAULT_GENCOMPS_GNU=82 73
PE_INTEL_DEFAULT_FIXED_PKGCONFIG_PATH=/opt/
cray/pe/parallel−netcdf/1.11.1.1/INTEL/19.0/lib/

pkgconfig:/opt/cray/pe/netcdf−hdf5parallel/4.6.3.2/ INTEL/19.0/lib/pkgconfig:/opt/cray/pe/ netcdf /4.6.3.2/ INTEL/19.0/lib/pkgconfig :/ opt/cray/pe/mpt /7.7.10/ gni /mpich−INTEL/16.0/lib/pkgconfig :/ opt/cray /pe/hdf5− parallel /1.10.5.2/ INTEL/19.0/lib/ pkgconfig :/ opt/cray/pe/hdf5 /1.10.5.2/ INTEL/19.0/lib/ pkgconfig :/ opt/cray/pe/ga /5.3.0.10/ INTEL/18.0/lib/ pkgconfig

KSH_AUTOLOAD=1

PE_LIBSCI_VOLATILE_PRGENV=CRAY CRAYCLANG GNU INTEL

PE_SMA_DEFAULT_PKGCONFIG_VARIABLES= PE_SMA_COMPFLAG_@prgenv@

PE_TPSL_64_DEFAULT_GENCOMPS_CRAYCLANG _sandybridge=90

PE_PETSC_DEFAULT_GENCOMPILERS_CRAYCLANG _sandybridge=9.0

PKGCONFIG_ENABLED=1

CRAY_UGNI_POST_LINK_OPTS=−L/opt/cray/ugni /6.0.14.0−7.0.1.1_7.49__ge78e5b0.ari/lib64

MORE=−sl

PE_MPICH_GENCOMPS_GNU=82 81 71

PE_PAPI_DEFAULT_ACCEL_LIBS_nvidia35=,−lcupti,− lcudart,−lcuda

PE_FORTRAN_PKGCONFIG_LIBS=mpichf90

PE_MPICH_DEFAULT_GENCOMPILERS_CRAYCLANG =9.0

PE_TRILINOS_DEFAULT_GENCOMPILERS _INTEL_x86_64=19.0

PE_TPSL_64_DEFAULT_GENCOMPS_CRAYCLANG _haswell=90

PE_FFTW_TARGET_haswell=haswell

PE_MPICH_GENCOMPILERS_CRAY=9.0

INTEL_MAJOR_VERSION=19

CRAY_LIBSCI_BASE_DIR=/opt/cray/pe/libsci/19.06.1

PE_NETCDF_HDF5PARALLEL_DEFAULT_FIXED _PRGENV=CRAY CRAYCLANG INTEL

PE_SMA_DEFAULT_DIR_CRAY_DEFAULT64=64

PWD=/global/homes/w/USER/project_USER/jielanli

TARGETMODULES=craype−abudhabi:craype−abudhabi−cu: craype−accel−host:craype−accel−nvidia20:craype−accel −nvidia30:craype−accel−nvidia35:craype−barcelona: craype−broadwell:craype−haswell:craype− hugepages128K:craype−hugepages128M:craype− hugepages16M:craype−hugepages256M:craype− hugepages2M:craype−hugepages32M:craype− hugepages4M:craype−hugepages512K:craype− hugepages512M:craype−hugepages64M:craype− hugepages8M:craype−intel−knc:craype−interlagos: craype−interlagos−cu:craype−istanbul:craype−ivybridge: craype−mc12:craype−mc8:craype−mic−knl:craype− network−aries:craype−network−gemini:craype−network− infiniband:craype−network−none:craype−network− seastar:craype−sandybridge:craype−shanghai:craype− target−compute_node:craype−target−local_host:craype− target−native:craype−xeon:xtpe−barcelona:xtpe− interlagos:xtpe−interlagos−cu:xtpe−istanbul:xtpe−mc12: xtpe−mc8:xtpe−network−gemini:xtpe−network−seastar:

xtpe−shanghai:xtpe−target−native:xtpe−xeon

PE_MPICH_NV_LIBS_nvidia20=−lcudart

HOME=/global/homes/w/USER

CRAY_PMI_INCLUDE_OPTS=−I/opt/cray/pe/pmi/5.0.14/ include

PE_HUGEPAGES_PKGCONFIG_VARIABLES= PE_HUGEPAGES_TEXT_SEGMENT: PE_HUGEPAGES_PAGE_SIZE

PE_TPSL_DEFAULT_GENCOMPILERS_CRAY_haswell =9.0

PE_TPSL_DEFAULT_GENCOMPILERS_INTEL _sandybridge=19.0

PE_TPSL_64_DEFAULT_GENCOMPILERS_GNU_haswell =8.2 7.1

PE_PETSC_DEFAULT_GENCOMPILERS_CRAYCLANG _x86_skylake=9.0

PELOCAL_PRGENV=true

PE_PETSC_DEFAULT_GENCOMPS_CRAYCLANG _haswell=90

PE_TPSL_DEFAULT_GENCOMPS_CRAYCLANG _sandybridge=90

PE_TPSL_64_DEFAULT_GENCOMPS_GNU_sandybridge =82 71

NERSC_HOST=cori

PE_LIBSCI_REQUIRED_PRODUCTS=PE_MPICH

craype_already_loaded=0

PE_FFTW_REQUIRED_PRODUCTS=PE_MPICH

ATP_HOME=/opt/cray/pe/atp/2.1.3

intel_already_loaded =0

HOST=cori02

SSH_CLIENT=114.214.201.199 2075 22

ALT_LINKER=/global/common/cori/software/altd/2.0/bin/ld

ALTD_VERBOSE=0

PE_PETSC_DEFAULT_REQUIRED_PRODUCTS= PE_MPICH:PE_LIBSCI:PE_HDF5_PARALLEL: PE_TPSL

PE_TPSL_64_DEFAULT_GENCOMPILERS_INTEL _haswell=19.0

XNLSPATH=/usr/share/X11/nls

PE_PETSC_DEFAULT_GENCOMPILERS_CRAY_x86_64 =9.0

CPATH=/opt/intel/ compilers_and_libraries_2019 .3.199/ linux /mkl/include

PE_MPICH_FORTRAN_PKGCONFIG_LIBS=mpichf90

PE_TPSL_64_DEFAULT_GENCOMPILERS_INTEL _x86_64=19.0

PE_LIBSCI_PKGCONFIG_LIBS=libsci_mpi:libsci

PE_PARALLEL_NETCDF_DEFAULT_ GENCOMPILERS_GNU=8.2 7.3

HUGETLB_MORECORE=yes

PE_TPSL_64_DEFAULT_GENCOMPS_CRAY_sandybridge =90

PE_MPICH_DEFAULT_GENCOMPS_CRAY=90

PE_TPSL_DEFAULT_GENCOMPILERS_INTEL_haswell =19.0

SDK_HOME=/usr/lib64/jvm/java

PE_LIBSCI_OMP_REQUIRES_openmp=_mp

BASH_ENV=/global/homes/w/USER/.bashrc

XDG_DATA_DIRS=/usr/share
PE_CXX_PKGCONFIG_LIBS=mpichcxx
INTEL_MINOR_VERSION=19
PE_FFTW_OMP_REQUIRES_openmp=_mp
PE_NETCDF_HDF5PARALLEL_DEFAULT
 _GENCOMPILERS_GNU=8.2 7.1
PE_TPSL_64_DEFAULT_GENCOMPS_INTEL_haswell
 =190
CRAY_RCA_POST_LINK_OPTS=−L/opt/cray/rca
 /2.2.20−7.0.1.1_4.61__g8e3fb5b.ari/lib64 −lrca
PE_MPICH_MODULE_NAME=cray−mpich
PE_TPSL_DEFAULT_GENCOMPS_CRAY_sandybridge=90
LIBGL_DEBUG=quiet
CRAY_LIBSCI_DIR=/opt/cray/pe/libsci/19.06.1
NLSPATH=/opt/intel/compilers_and_libraries_2019 .3.199/
 linux /compiler/ lib / intel64 /locale /%l_%t/%N:/opt/
 intel / compilers_and_libraries_2019 .3.199/ linux /mkl/
 lib / intel64 / locale /%l_%t/%N
PE_HDF5_PARALLEL_DEFAULT_GENCOMPS_GNU=
PE_LIBSCI_DEFAULT_OMP_REQUIRES=
PE_LIBSCI_VOLATILE_PKGCONFIG_PATH=/opt/cray/pe/
 libsci/19.06.1/@PRGENV@/
 @PE_LIBSCI_GENCOMPS@/
 @PE_LIBSCI_TARGET@/lib/pkgconfig
JDK_HOME=/usr/lib64/jvm/java
PE_HDF5_PARALLEL_DEFAULT_VOLATILE_PRGENV=
 GNU
PE_MPICH_TARGET_VAR_nvidia35=−lcudart
PE_HDF5_DEFAULT_GENCOMPS_GNU=
PE_TPSL_DEFAULT_GENCOMPILERS_GNU_sandybridge
 =8.2 7.1
LIBSCI_VERSION=19.06.1
CRAY_UDREG_INCLUDE_OPTS=−I/opt/cray/udreg
 /2.3.2−7.0.1.1_3.47__g8175d3d.ari/include
PE_NETCDF_DEFAULT_VOLATILE_PKGCONFIG_PATH
 =/opt/cray/pe/netcdf/4.6.3.2/@PRGENV@/
 @PE_NETCDF_DEFAULT_GENCOMPS@/lib/
 pkgconfig
PROFILEREAD=true
TMPDIR=/tmp
PE_TRILINOS_DEFAULT_VOLATILE_PRGENV=
 CRAYCLANG GNU INTEL
LIBRARY_PATH=/opt/intel/compilers_and_libraries_2019
 .3.199/linux /compiler/ lib / intel64 :/ opt/ intel /
 compilers_and_libraries_2019 .3.199/ linux /mkl/lib /
 intel64
PE_MPICH_DEFAULT_GENCOMPILERS_GNU=8.2 8.1
 7.1
PE_LIBSCI_DEFAULT_OMP_REQUIRES_openmp=_mp
PE_PKGCONFIG_LIBS=craype−hugepages:mpich:
 AtpSigHandler:cray−rca:libsci_mpi:libsci:darshan−
 runtime
RCLOCAL_PRGENV=true
PE_TPSL_DEFAULT_GENCOMPS_GNU_x86_skylake=82
 71
USERMODULES=PrgEnv−cray:PrgEnv−gnu:PrgEnv−intel:
 PrgEnv−pathscale:PrgEnv−pgi:acml:alps:apprentice:
 apprentice2:atp:blcr:cce:chapel:cray−ccdb:cray−fftw:

cray−ga:cray−hdf5:cray−hdf5− parallel :cray−lgdb:cray
 − libsci : cray− libsci_acc : cray−mpich:cray−mpich−
 compat:cray−mpich2:cray−netcdf:cray−netcdf−
 hdf5parallel :cray− parallel −netcdf:cray−petsc :cray−
 petsc−complex:cray−shmem:cray−snplauncher:cray−tpsl
 :cray− trilinos : craypat :craype:craypkg−gen:
 cudatoolkit :ddt: fftw :ga:gcc:hdf5:hdf5− parallel :
 intel : iobuf :java :lgdb: libfast : libsci_acc :mpich1:
 netcdf : netcdf− hdf5parallel : netcdf−nofsync: netcdf−
 nofsync− hdf5parallel :ntk :onesided:papi: parallel −
 netcdf : pathscale : perftools : perftools − lite : petsc :
 petsc−complex:pgi:pmi: stat : totalview : tpsl : trilinos :
 xt−asyncpe:xt−craypat: xt−lgdb: xt− libsci : xt−mpich2:
 xt−mpt:xt−papi:xt−shmem:xt−totalview
LDMSD_PLUGIN_LIBPATH=/opt/ovis/lib64/ovis−ldms
PE_PETSC_DEFAULT_GENCOMPILERS_GNU
 _sandybridge=8.2 7.1
PE_MPICH_VOLATILE_PKGCONFIG_PATH=/opt/cray/pe/
 mpt/7.7.10/gni/mpich−
 @PRGENV@@PE_MPICH_DIR_DEFAULT64@/
 @PE_MPICH_GENCOMPS@/lib/pkgconfig
LOADEDMODULES=modules/3.2.11.4:altd/2.0:darshan
 /3.2.1:craype−network−aries:intel/19.0.3.199:craype
 /2.6.2: cray− libsci /19.06.1: udreg /2.3.2−7.0.1.1 _3.47
 __g8175d3d.ari:ugni /6.0.14.0−7.0.1.1 _7.49
 __ge78e5b0.ari :pmi /5.0.14: dmapp/7.1.1−7.0.1.1 _4.61
 __g38cf134. ari : gni−headers /5.0.12.0−7.0.1.1 _6.36
 __g3b1768f.ari : xpmem/2.2.20−7.0.1.1_4.20__g0475745
 .ari:job /2.2.4−7.0.1.1 _3.47__g36b56f4.ari :dvs/2.12_2
 .2.165−7.0.1.1 _14.4__ge967908e:alps /6.6.58−7.0.1.1
 _6.19__g437d88db.ari:rca /2.2.20−7.0.1.1 _4.61
 __g8e3fb5b. ari : atp /2.1.3: PrgEnv−intel /6.0.5: craype−
 haswell: cray−mpich/7.7.10:craype−hugepages2M:cray−
 fftw/3.3.8.4
PE_TPSL_DEFAULT_GENCOMPILERS_INTEL_x86_64
 =19.0
CRAYPE_NETWORK_TARGET=aries
PE_FFTW_TARGET_ivybridge=ivybridge
PE_GA_DEFAULT_FIXED_PRGENV=CRAY INTEL
CRAY_ALPS_INCLUDE_OPTS=−I/opt/cray/alps
 /6.6.58−7.0.1.1_6.19__g437d88db.ari/include
CRAY_UGNI_INCLUDE_OPTS=−I/opt/cray/ugni
 /6.0.14.0−7.0.1.1_7.49__ge78e5b0.ari/include
PE_TPSL_DEFAULT_GENCOMPS_INTEL_haswell=190
SCRATCH=/global/cscratch1/sd/USER
CFS=/global/cfs/ cdirs
LIBRARYMODULES=acml:alps:cray−dwarf:cray−fftw:cray
 −ga:cray−hdf5:cray−hdf5−parallel:cray−libsci:cray−
 libsci_acc:cray−mpich:cray−mpich−abi:cray−mpich2:
 cray−netcdf:cray−netcdf− hdf5parallel : cray− parallel −
 netcdf : cray−petsc : cray−petsc−complex:cray−shmem:
 cray−tpsl:cray− trilinos : cudatoolkit : fftw :ga:hdf5:hdf5
 − parallel : iobuf : libfast : netcdf : netcdf− hdf5parallel :
 ntk :onesided:papi: petsc : petsc−complex:pmi:tpsl:
 trilinos : xt− libsci : xt−mpich2:xt−mpt:xt−papi
INTEL_LICENSE_FILE=28518@crayintel.licenses.nersc.gov
 :28518@intel.licenses.nersc.gov
PE_MPICH_ALTERNATE_LIBS_dpm=_dpm

PE_FFTW_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/fftw/3.3.8.4/
@PE_FFTW_DEFAULT_TARGET@/lib/pkgconfig
PE_TPSL_DEFAULT_GENCOMPS_INTEL_x86_64=190
SSH_TTY=/dev/pts/36
PE_TRILINOS_DEFAULT_GENCOMPS_INTEL_x86_64
=190
PE_TPSL_DEFAULT_GENCOMPS_CRAY_x86_64=90
MPICH_ABORT_ON_ERROR=1
PE_PAPI_DEFAULT_PKGCONFIG_VARIABLES =
PE_PAPI_ACCEL_LIBS_@accelerator@
PE_PAPI_ACCEL_FAMILY_LIBS
_@accelerator_family@
ATP_POST_LINK_OPTS=−Wl,−L/opt/cray/pe/atp/2.1.3/
libApp/
FROM_HEADER=
PE_LIBSCI_DEFAULT_GENCOMPILERS_INTEL_x86_64
=16.0
PE_LIBSCI_GENCOMPS_INTEL_x86_64=160
CRAY_MPICH_ROOTDIR=/opt/cray/pe/mpt/7.7.10
MAIL=/var/spool/mail/USER
PE_HDF5_PARALLEL_DEFAULT_FIXED_PRGENV=
CRAY CRAYCLANG INTEL
PE_MPICH_VOLATILE_PRGENV=GNU CRAYCLANG
CRAY
PE_PETSC_DEFAULT_GENCOMPS_CRAYCLANG
_sandybridge=90
PE_INTEL_FIXED_PKGCONFIG_PATH=/opt/cray/pe/mpt
/7.7.10/gni/mpich−INTEL/16.0/lib/pkgconfig
PE_HDF5_DEFAULT_FIXED_PRGENV=CRAY
CRAYCLANG INTEL
PE_MPICH_ALTERNATE_LIBS_multithreaded=_mt
PE_TPSL_DEFAULT_GENCOMPS_INTEL_sandybridge
=190
PE_TPSL_DEFAULT_GENCOMPS_GNU_x86_64=82 71
PE_LIBSCI_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_64=9.0
PE_LIBSCI_GENCOMPS_CRAYCLANG_x86_64=90
PE_TPSL_DEFAULT_GENCOMPILERS_CRAY
_sandybridge=9.0
PE_PETSC_DEFAULT_GENCOMPILERS_GNU
_x86_skylake=8.2 7.1
PE_FFTW_DEFAULT_TARGET_haswell=haswell
PE_GA_DEFAULT_VOLATILE_PKGCONFIG_PATH=/opt/
cray/pe/ga/5.3.0.10/@PRGENV@/
@PE_GA_DEFAULT_GENCOMPS@/lib/pkgconfig
PE_PETSC_DEFAULT_GENCOMPILERS_INTEL_haswell
=19.0
LESSKEY=/etc/lesskey.bin
CRAY_SITE_LIST_DIR=/etc/opt/cray/pe/modules
PE_PARALLEL_NETCDF_DEFAULT_VOLATILE
_PKGCONFIG_PATH=/opt/cray/pe/parallel−netcdf
/1.11.1.1/@PRGENV@/
@PE_PARALLEL_NETCDF_DEFAULT
_GENCOMPS@/lib/pkgconfig
SHELL=/bin/bash
TERM=xterm

PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAYCLANG
_haswell=9.0
PE_MPICH_GENCOMPILERS_CRAYCLANG=9.0
PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAY
_sandybridge=9.0
CSCRATCH=/global/cscratch1/sd/USER
PE_MPICH_FIXED_PRGENV=INTEL
PE_LIBSCI_DEFAULT_GENCOMPS_CRAY_x86_64=90
PE_FFTW_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH
PE_PARALLEL_NETCDF_DEFAULT_GENCOMPS_GNU=
PE_TPSL_64_DEFAULT_GENCOMPS_GNU_x86_64=82
71
CRAY_LIBSCI_VERSION=19.06.1
ALTD_PATH=/global/common/cori/software/altd/2.0
PE_TPSL_DEFAULT_VOLATILE_PRGENV=CRAY
CRAY64 CRAYCLANG CRAYCLANG64 GNU
GNU64 INTEL INTEL64
LS_OPTIONS=−N −−color=none −T 0
PE_MPICH_DEFAULT_GENCOMPS_GNU=82 81 71
PE_LIBSCI_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/libsci/19.06.1/@PRGENV@/
@PE_LIBSCI_DEFAULT_GENCOMPS@/
@PE_LIBSCI_DEFAULT_TARGET@/lib/pkgconfig
PE_LIBSCI_DEFAULT_PKGCONFIG_VARIABLES=
PE_LIBSCI_DEFAULT_OMP_REQUIRES
_@openmp@:PE_SCI_EXT_LIBPATH:
PE_SCI_EXT_LIBNAME
__INTEL_PRE_CFLAGS=−Qlocation,ld,/global/common/
cori/software/altd/2.0/bin
PE_SMA_DEFAULT_COMPFLAG_GNU=−fcray−pointer
PE_TPSL_DEFAULT_GENCOMPS_CRAY_x86_skylake=90
FFTW_ROOT=/opt/cray/pe/fftw/3.3.8.4/haswell
CRAY_XPMEM_POST_LINK_OPTS=−L/opt/cray/xpmem
/2.2.20−7.0.1.1_4.20__g0475745.ari/lib64
PE_PETSC_DEFAULT_GENCOMPS_GNU_haswell=82 71
ALTD_SELECT_OFF_USERS=
PE_SMA_DEFAULT_VOLATILE_PKGCONFIG_PATH=/
opt/cray/pe/mpt/7.7.10/gni/
sma@PE_SMA_DEFAULT_DIR_DEFAULT64@/lib64/
pkgconfig
PE_HDF5_PARALLEL_DEFAULT_GENCOMPILERS
_GNU=8.2 7.1
ALTD_ON=0
CRAY_FFTW_VERSION=3.3.8.4
PE_MPICH_GENCOMPILERS_GNU=8.2 8.1 7.1
PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAY
_x86_skylake=9.0
CRAY_FFTW_PREFIX=/opt/cray/pe/fftw/3.3.8.4/haswell
CRAY_DMAPP_POST_LINK_OPTS=−L/opt/cray/dmapp
/7.1.1−7.0.1.1_4.61__g38cf134.ari/lib64
PE_LIBSCI_DEFAULT_GENCOMPS_INTEL_x86_64=160
CRAY_MPICH2_VER=7.7.10
__INTEL_PRE_FFLAGS=−Qlocation,ld,/global/common/cori
/software/altd/2.0/bin
PE_GA_DEFAULT_GENCOMPILERS_GNU=8.2 7.3
SHLVL=2

PE_NETCDF_HDF5PARALLEL_DEFAULT_VOLATILE
_PRGENV=GNU
PE_PETSC_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_64=9.0
HUGETLB_FORCE_ELFMAP=yes+
PYTHONPATH=/opt/mods/lib/python3.6/site−packages:/opt/
ovis/lib/python3.6/site−packages
ALTD_SELECT_USERS=
CRAY_LIBSCI_PREFIX_DIR=/opt/cray/pe/libsci/19.06.1/
INTEL/16.0/x86_64
PE_TRILINOS_DEFAULT_REQUIRED_PRODUCTS=
PE_MPICH:PE_HDF5_PARALLEL:
PE_NETCDF_HDF5PARALLEL:PE_LIBSCI:PE_TPSL
PE_FFTW_PKGCONFIG_VARIABLES=
PE_FFTW_OMP_REQUIRES_@openmp@
PE_PAPI_DEFAULT_ACCELL_FAMILY_LIBS=
MANPATH=/opt/cray/pe/fftw/3.3.8.4/share/man:/opt/cray/
pe/mpt/7.7.10/gni/man/mpich:/opt/cray/pe/atp/2.1.3/
man:/opt/cray/alps/6.6.58−7.0.1.1_6.19__g437d88db.
ari/man:/opt/cray/job/2.2.4−7.0.1.1_3.47__g36b56f4.
ari/man:/opt/cray/pe/pmi/5.0.14/man:/opt/cray/pe/
libsci/19.06.1/man:/opt/cray/pe/man/csmlversion:/
opt/cray/pe/craype/2.6.2/man:/opt/intel/
compilers_and_libraries_2019.3.199/linux/man/
common:/usr/common/software/man:/usr/common/nsg/
man:/opt/cray/pe/modules/3.2.11.4/share/man:/usr/
local/man:/usr/share/man:/usr/man:/opt/cray/share/
man:/opt/cray/pe/man:/opt/cray/share/man
PE_FFTW_DEFAULT_TARGET_mic_knl=mic_knl
PE_MPICH_DEFAULT_GENCOMPS_CRAYCLANG=90
PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_64=9.0
PE_PETSC_DEFAULT_GENCOMPS_INTEL_haswell=190
ALTD_SELECT_ON=0
INTEL_PATH=/opt/intel/compilers_and_libraries_2019.3.199
INTEL_VERSION=19.0.3.199
PE_PETSC_DEFAULT_GENCOMPILERS_CRAY_haswell
=9.0
MPICH_DIR=/opt/cray/pe/mpt/7.7.10/gni/mpich−intel/16.0
ATP_CFLAGS_GNU_FORTRAN=−fno−backtrace
PE_FFTW_DEFAULT_TARGET_sandybridge=sandybridge
PE_PETSC_DEFAULT_GENCOMPILERS_INTEL
_sandybridge=19.0
PE_TPSL_DEFAULT_GENCOMPS_CRAY_haswell=90
HUGETLB_ELFMAP=W
MODULEPATH=/opt/cray/pe/craype−targets/default/
modulefiles:/opt/cray/ari/modulefiles:/opt/cray/pe/
modulefiles:/opt/cray/modulefiles:/opt/modulefiles
:/global/common/software/nersc/cle7/modulefiles:/
global/common/software/nersc/cle7/extra_modulefiles
:/usr/common/ftg/modulefiles
CRAY_MPICH_DIR=/opt/cray/pe/mpt/7.7.10/gni/mpich−intel
/16.0
PE_PKGCONFIG_PRODUCTS_DEFAULT=PE_PAPI
LOGNAME=USER
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user
/60532/bus
PE_MPICH_DEFAULT_FIXED_PRGENV=INTEL

PE_MPICH_NV_LIBS_nvidia60=−lcudart
XDG_RUNTIME_DIR=/run/user/60532
PE_PETSC_DEFAULT_GENCOMPS_INTEL_x86_64=190
MODULE_VERSION_STACK=3.2.11.4
MKLROOT=/opt/intel/compilers_and_libraries_2019.3.199/
linux/mkl
PE_TPSL_DEFAULT_GENCOMPS_INTEL_x86_skylake
=190
PE_HDF5_PARALLEL_DEFAULT_VOLATILE
_PKGCONFIG_PATH=/opt/cray/pe/hdf5−parallel
/1.10.5.2/@PRGENV@/
@PE_HDF5_PARALLEL_DEFAULT_GENCOMPS@/
lib/pkgconfig
PE_PETSC_DEFAULT_GENCOMPS_INTEL_x86_skylake
=190
ALLINEA_QUEUE_DLL=/opt/cray/pe/mpt/7.7.10/gni/mpich
−intel/16.0/lib/libtvmpich.so.3.0.1
JRE_HOME=/usr/lib64/jvm/java
PE_TPSL_DEFAULT_GENCOMPILERS_CRAYCLANG
_x86_64=9.0
PE_LIBSCI_PKGCONFIG_VARIABLES=
PE_LIBSCI_OMP_REQUIRES_@openmp@:
PE_SCI_EXT_LIBPATH:PE_SCI_EXT_LIBNAME
MPICH_MPIIO_DVS_MAXNODES=28
PE_TPSL_64_DEFAULT_GENCOMPILERS_CRAY_haswell
=9.0
XDG_CONFIG_DIRS=/etc/xdg
PE_LIBSCI_DEFAULT_GENCOMPILERS_CRAY_x86_64
=9.0
PE_LIBSCI_GENCOMPS_CRAY_x86_64=90
PE_MPICH_DEFAULT_VOLATILE_PRGENV=GNU
CRAYCLANG CRAY
PE_MPICH_TARGET_VAR_nvidia20=−lcudart
PATH=/opt/cray/pe/fftw/3.3.8.4/haswell/bin:/global/
homes/w/USER/Program/xcrysden−1.5.53−bin−
semishared:/global/homes/w/USER/bin:/opt/cray/pe/mpt
/7.7.10/gni/bin:/opt/cray/rca/2.2.20−7.0.1.1_4.61
__g8e3fb5b.ari/bin:/opt/cray/alps/6.6.58−7.0.1.1_6
.19__g437d88db.ari/sbin:/opt/cray/alps/default/bin
:/opt/cray/job/2.2.4−7.0.1.1_3.47__g36b56f4.ari/bin
:/opt/cray/pe/craype/2.6.2/bin:/opt/intel/
compilers_and_libraries_2019.3.199/linux/bin/
intel64:/usr/common/software/darshan/3.2.1/bin:/
global/common/cori/software/altd/2.0/bin:/usr/
common/software/bin:/usr/common/nsg/bin:/opt/ovis/
bin:/opt/ovis/sbin:/opt/cray/pe/modules/3.2.11.4/
bin:/global/homes/w/USER/bin:/usr/local/bin:/usr/
bin:/bin:/usr/lib/mit/bin:/usr/lib/mit/sbin:/opt/
cray/pe/bin:/global/homes/w/USER/Program/xcrysden
−1.5.53−bin−semishared/scripts:/global/homes/w/USER
/Program/xcrysden−1.5.53−bin−semishared/util:/usr/
local/bin
JAVA_BINDIR=/usr/lib64/jvm/java/bin
PE_TPSL_64_DEFAULT_VOLATILE_PRGENV=CRAY
CRAY64 CRAYCLANG CRAYCLANG64 GNU
GNU64 INTEL INTEL64
LMFILES=/opt/cray/pe/modulefiles/modules/3.2.11.4:/
global/common/software/nersc/cle7/extra_modulefiles

/ altd /2.0:/ global /common/software/nersc/cle7/ extra_modulefiles /darshan /3.2.1:/ opt/cray/pe/craype − targets / default / modulefiles /craype−network−aries :/ opt/ modulefiles / intel /19.0.3.199:/ opt / cray / pe/ modulefiles /craype /2.6.2:/ opt / cray / pe/ modulefiles / cray− libsci /19.06.1:/ opt / cray / ari / modulefiles /udreg /2.3.2−7.0.1.1 _3.47__g8175d3d.ari :/ opt / cray / ari / modulefiles /ugni /6.0.14.0−7.0.1.1 _7.49__ge78e5b0. ari :/ opt / cray/ pe/ modulefiles /pmi /5.0.14:/ opt/cray/ ari / modulefiles /dmapp/7.1.1−7.0.1.1 _4.61__g38cf134. ari :/ opt/cray/ ari / modulefiles / gni−headers /5.0.12.0−7.0.1.1 _6.36__g3b1768f.ari :/ opt/cray/ ari / modulefiles /xpmem/2.2.20−7.0.1.1_4.20__g0475745.ari :/ opt/cray/ ari / modulefiles / job /2.2.4−7.0.1.1 _3.47 __g36b56f4.ari :/ opt/cray/ ari / modulefiles / dvs/2.12_2 .2.165−7.0.1.1 _14.4__ge967908e:/opt/cray/ ari / modulefiles / alps /6.6.58−7.0.1.1 _6.19__g437d88db.ari :/ opt/cray/ ari / modulefiles /rca /2.2.20−7.0.1.1 _4.61 __g8e3fb5b. ari :/ opt/cray/pe/ modulefiles /atp /2.1.3:/ opt/cray/pe/ modulefiles /PrgEnv−intel /6.0.5:/ opt/ cray/pe/craype− targets / default / modulefiles /craype− haswell :/ opt/cray/pe/ modulefiles /cray−mpich /7.7.10:/ opt/cray/pe/craype− targets / default / modulefiles /craype−hugepages2M:/opt/cray/pe/ modulefiles /cray−fftw /3.3.8.4

PE_NETCDF_DEFAULT_FIXED_PRGENV=CRAY CRAYCLANG INTEL

PE_PETSC_DEFAULT_GENCOMPILERS_GNU_haswell =8.2 7.1

DMAPP_ABORT_ON_ERROR=1

MODULESHOME=/opt/cray/pe/modules/3.2.11.4

PKG_CONFIG_PATH=/opt/cray/rca/2.2.20−7.0.1.1_4.61 __g8e3fb5b.ari/lib64/pkgconfig:/opt/cray/ alps /6.6.58−7.0.1.1 _6.19__g437d88db.ari/ lib64 / pkgconfig :/ opt / cray/xpmem/2.2.20−7.0.1.1_4.20__g0475745.ari/ lib64 / pkgconfig :/ opt / cray / gni−headers /5.0.12.0−7.0.1.1 _6.36__g3b1768f.ari / lib64 / pkgconfig :/ opt / cray/dmapp/7.1.1−7.0.1.1 _4.61 __g38cf134. ari / lib64 / pkgconfig :/ opt / cray / pe/pmi /5.0.14/ lib64 / pkgconfig :/ opt / cray/ugni /6.0.14.0−7.0.1.1 _7.49__ge78e5b0.ari / lib64 / pkgconfig :/ opt / cray/udreg /2.3.2−7.0.1.1 _3.47 __g8175d3d.ari / lib64 / pkgconfig :/ opt / cray / pe/craype /2.6.2/ pkg−config :/ opt / cray / pe/iobuf /2.0.9/ lib / pkgconfig :/ opt / cray / pe/ fftw /2.1.5.9/ lib / pkgconfig :/ usr /common/software/darshan /3.2.1/ lib / pkgconfig :/ opt / cray / pe/atp /3.8.1/ lib / pkgconfig :/ opt / cray / pe/ atp /2.1.3/ lib / pkgconfig

LIBSCI_BASE_DIR=/opt/cray/pe/libsci/19.06.1

G_BROKEN_FILENAMES=1

HISTSIZE=1000

PE_PETSC_DEFAULT_GENCOMPS_CRAY_sandybridge =90

XCRYSDEN_SCRATCH=/global/homes/w/USER/xcrys_tmp

CRAYPE_DIR=/opt/cray/pe/craype/2.6.2

PE_GA_DEFAULT_VOLATILE_PRGENV=GNU

PE_PETSC_DEFAULT_GENCOMPS_CRAY_x86_64=90

PE_MPICH_GENCOMPS_CRAYCLANG=90

PE_TRILINOS_DEFAULT_GENCOMPILERS_GNU _x86_64=8.2 7.1

PE_HDF5_PARALLEL_DEFAULT_REQUIRED _PRODUCTS=PE_MPICH

PE_MPICH_DIR_CRAYCLANG_DEFAULT64=64

PE_PETSC_DEFAULT_GENCOMPILERS_GNU_x86_64 =8.2 7.1

PE_PKGCONFIG_DEFAULT_PRODUCTS=PE_TRILINOS: PE_TPSL_64:PE_TPSL:PE_PETSC: PE_PARALLEL_NETCDF: PE_NETCDF_HDF5PARALLEL:PE_NETCDF: PE_MPICH:PE_LIBSCI:PE_HDF5_PARALLEL: PE_HDF5:PE_GA:PE_FFTW2:PE_FFTW

CPU=x86_64

CRAYPE_VERSION=2.6.2

PE_FFTW_TARGET_share=share

CRAY_PMI_POST_LINK_OPTS=−L/opt/cray/pe/pmi/5.0.14/ lib64

CRAY_GNI_HEADERS_INCLUDE_OPTS=−I/opt/cray/gni− headers/5.0.12.0−7.0.1.1_6.36__g3b1768f.ari/include

CVS_RSH=ssh

LESSOPEN=lessopen.sh %s

PE_TPSL_64_DEFAULT_GENCOMPS_INTEL_x86_64 =190

PE_FFTW_DEFAULT_TARGET_x86_cascadelake= x86_cascadelake

PE_TPSL_DEFAULT_GENCOMPILERS_CRAYCLANG _haswell=9.0

MPICH_GNI_ROUTING_MODE=ADAPTIVE_3

CRAY_XPMEM_INCLUDE_OPTS=−I/opt/cray/xpmem /2.2.20−7.0.1.1_4.20__g0475745.ari/include

PE_LIBSCI_DEFAULT_GENCOMPILERS_GNU_x86_64 =8.1 7.1

PE_LIBSCI_GENCOMPS_GNU_x86_64=81 71

PE_TPSL_64_DEFAULT_GENCOMPILERS_INTEL _x86_skylake=19.0

BASH_FUNC_module%%=() { eval '/opt/cray/pe/modules /3.2.11.4/bin/modulecmd bash $∗'
}

LSB Version: n/a
Distributor ID: SUSE
Description :   SUSE Linux Enterprise Server 15
Release :   15
Codename: n/a
Linux cori02 4.12.14−150.66−default #1 SMP Tue Feb 2 20:30:04 UTC 2021 (6899509) x86_64 x86_64 x86_64 GNU/Linux
Architecture :   x86_64
CPU op−mode(s):   32−bit , 64−bit
Byte Order: Little Endian
CPU(s):   64
On−line CPU(s) list : 0−63
Thread(s) per core : 2
Core(s) per socket : 16
Socket(s):   2
NUMA node(s):   2
Vendor ID: GenuineIntel
CPU family: 6

Model: 63
Model name: Intel (R) Xeon(R) CPU E5−2698 v3
    @ 2.30GHz
Stepping: 2
CPU MHz: 2299.835
CPU max MHz: 3600.0000
CPU min MHz: 1200.0000
BogoMIPS: 4599.67
 Virtualization :   VT−x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 40960K
NUMA node0 CPU(s):
  0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,
  32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
NUMA node1 CPU(s):
  1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,
  33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63
Flags: fpu vme de pse tsc msr pae mce cx8
    apic sep mtrr pge mca cmov pat pse36 clflush dts
    acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx
    pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs
    bts rep_good nopl xtopology nonstop_tsc cpuid
    aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx
    smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca
    sse4_1 sse4_2 x2apic movbe popcnt
    tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
    abm cpuid_fault epb invpcid_single pti ssbd ibrs
    ibpb stibp tpr_shadow vnmi flexpriority ept vpid
    fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms
    invpcid cqm xsaveopt cqm_llc cqm_occup_llc dtherm
    ida arat pln pts md_clear flush_l1d
MemTotal: 527490796 kB
MemFree: 287346372 kB
MemAvailable: 384552016 kB
Buffers: 3004652 kB
Cached: 121889308 kB
SwapCached: 50468 kB
Active: 90903636 kB
 Inactive :   109943116 kB
Active(anon):   68147372 kB
 Inactive (anon):   8738632 kB
Active(file):   22756264 kB
 Inactive (file): 101204484 kB
Unevictable: 8388720 kB
Mlocked: 8388720 kB
SwapTotal: 33554428 kB
SwapFree: 33330172 kB
Dirty: 2000 kB
Writeback: 0 kB
AnonPages: 84293404 kB
Mapped: 3109892 kB
Shmem: 2690152 kB
Slab: 20436792 kB
SReclaimable: 3568304 kB
SUnreclaim: 16868488 kB
KernelStack: 79360 kB

PageTables: 458064 kB
NFS_Unstable: 0 kB
Bounce: 0 kB
WritebackTmp: 0 kB
CommitLimit: 297299824 kB
Committed_AS: 333994348 kB
VmallocTotal: 34359738367 kB
VmallocUsed: 0 kB
VmallocChunk: 0 kB
HardwareCorrupted: 0 kB
AnonHugePages: 8589312 kB
ShmemHugePages: 0 kB
ShmemPmdMapped: 0 kB
HugePages_Total: 0
HugePages_Free: 0
HugePages_Rsvd: 0
HugePages_Surp: 0
Hugepagesize: 2048 kB
DirectMap4k: 73417472 kB
DirectMap2M: 456017920 kB
DirectMap1G: 9437184 kB
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
loop0   7:0   0   2.6G 0 loop
loop1   7:1   0   20G 0 loop / var / lib /docker
loop2   7:2   0   33.6G 0 loop / var /opt /cray/ imps−
    image−binding/PE_x86_64/squash_mounts/
    squashfs_lM64Bw_mount_point
loop3   7:3   0   1 loop
loop4   7:4   0   1.3G 1 loop
loop5   7:5   0   320M 1 loop
loop6   7:6   0   3.2G 1 loop
loop7   7:7   0 342.9M 1 loop
loop8   7:8   0   1 loop
loop9   7:9   0   1 loop
sda   8:0   0   200G 0 disk
|−sda1   8:1   0   9M 0 part
|−sda2   8:2   0   2G 0 part /boot
|−sda3   8:3   0   32G 0 part
|−sda4   8:4   0   32G 0 part /tmp
|−sda5   8:5   0   32G 0 part [SWAP]
'−sda6   8:6   0   24G 0 part / var /crash
sdb   8:16   0 917.3G 0 disk
'−sdb1   8:17   0 917.3G 0 part / var /opt /cray/
    persistent
sr0   11:0   1 1024M 0 rom
[0:2:0:0]   disk   DELL   PERC H730 Mini 4.25   /
    dev/sda   214GB
[0:2:1:0]   disk   DELL   PERC H730 Mini 4.25   /
    dev/sdb   984GB
[10:0:0:0]   cd/dvd PLDS   DVD+−RW DS−8ABSH
    AD51 /dev/sr0   −