



SOFTWARE

+ 19.56 updatex
+ 399.70 updateien
+ 0.00 gene
- 0.00 <<iteration loop>>
+ 447.52 genbc



FAST SOLUTIONS

- PAPI_L1_ICM
- PAPI_L2_DCM
- PAPI_L2_ICM
- PAPI_L1_TCM

TAU

Tutorial Exercise

NPB-OMP/BT

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- NAS Parallel Benchmark
- Instrumented with TAU using Opari and PDT
- Profiling
- Using paraprof profile browser

- Edit config/make.def and uncomment the tau_f90.sh line:

```
#-----  
#-----  
# The fortran compiler used for hybrid MPI programs  
#-----  
MPIF77 = mpif77  
  
# Alternative variants to perform instrumentation  
#MPIF77 = psc_instrument -t user,mpi,omp -s ${PROGRAM}.sir mpif77  
#MPIF77 = scalasca -instrument mpif77  
MPIF77 = tau_f90.sh  
#MPIF77 = vtf77 -vt:hyb -vt:f77 mpif77  
#MPIF77 = scorep --user mpif77  
■  
# PREP is a generic macro for instrumentation preparation  
#MPIF77 = $(PREP) mpif77
```

```
% module load tau
```

```
% make suite
```

```
% cd bin.tau
```

```
% cp ../jobscripts/run.msub .
```

```
% ccc_msub ./run.msub
```

After it executes:

```
% pprof | more
```

And for the GUI:

```
% paraprof
```

ParaProf Manager Window



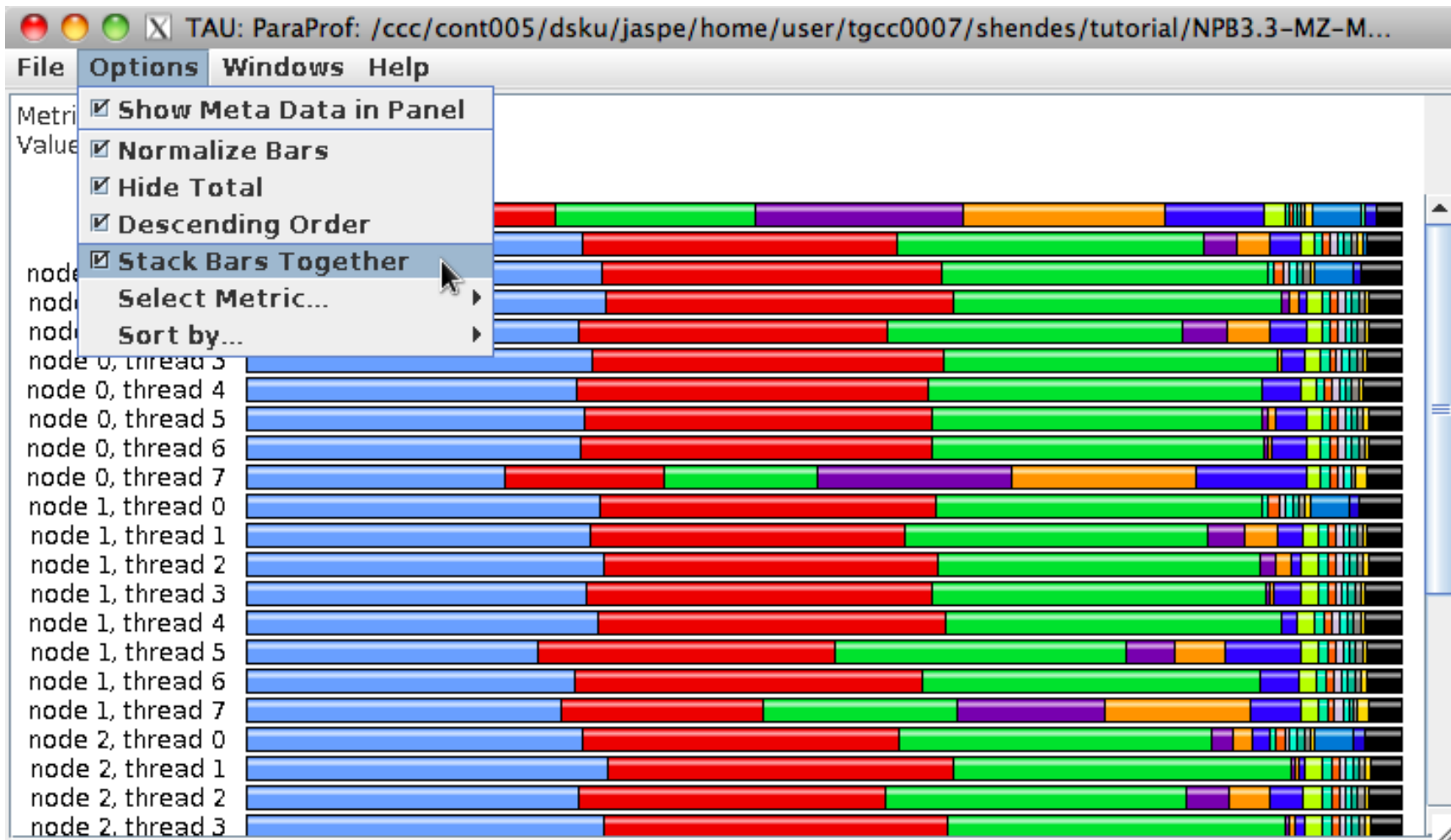
TAU: ParaProf Manager

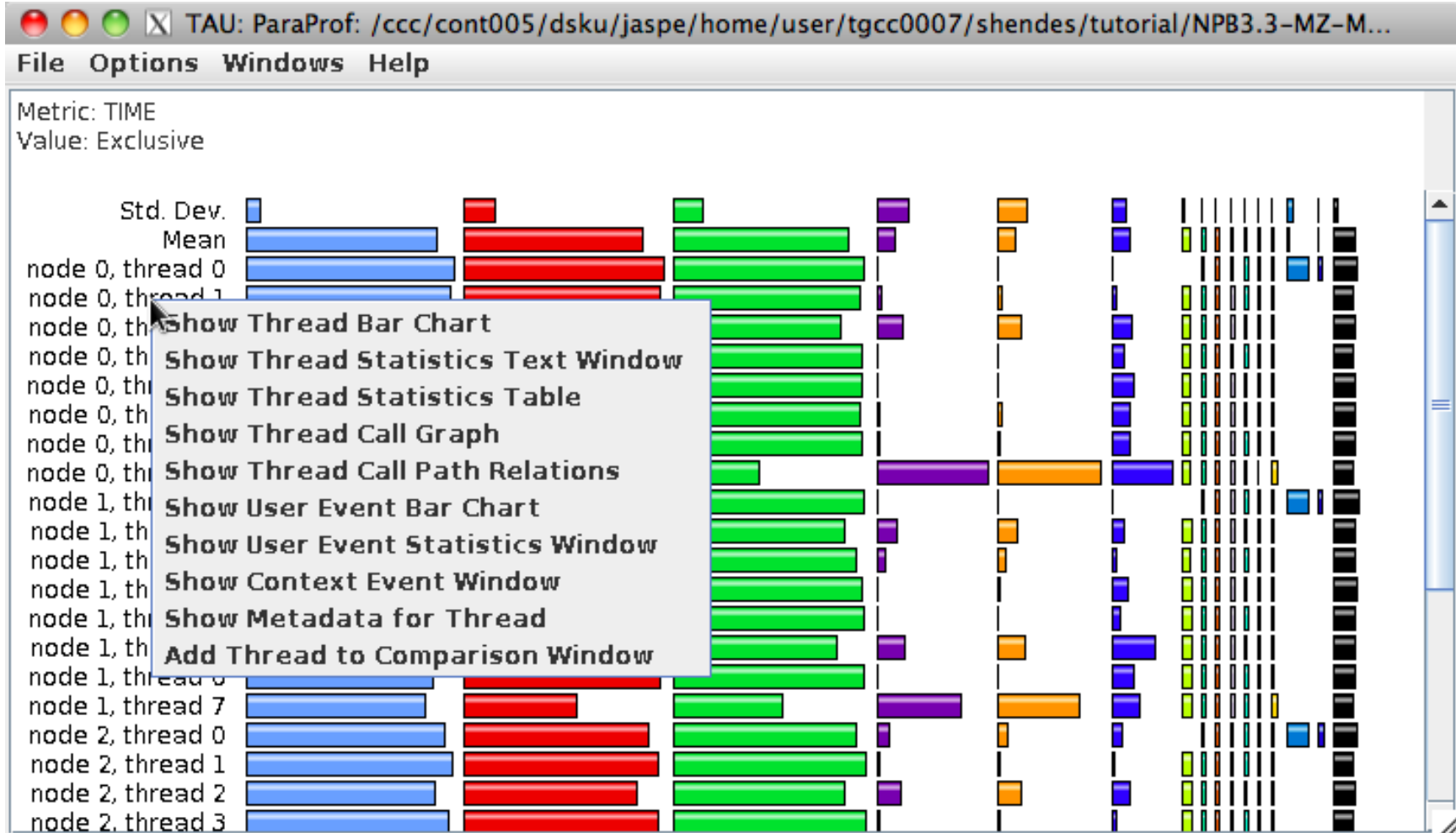
File Options Help

Applications

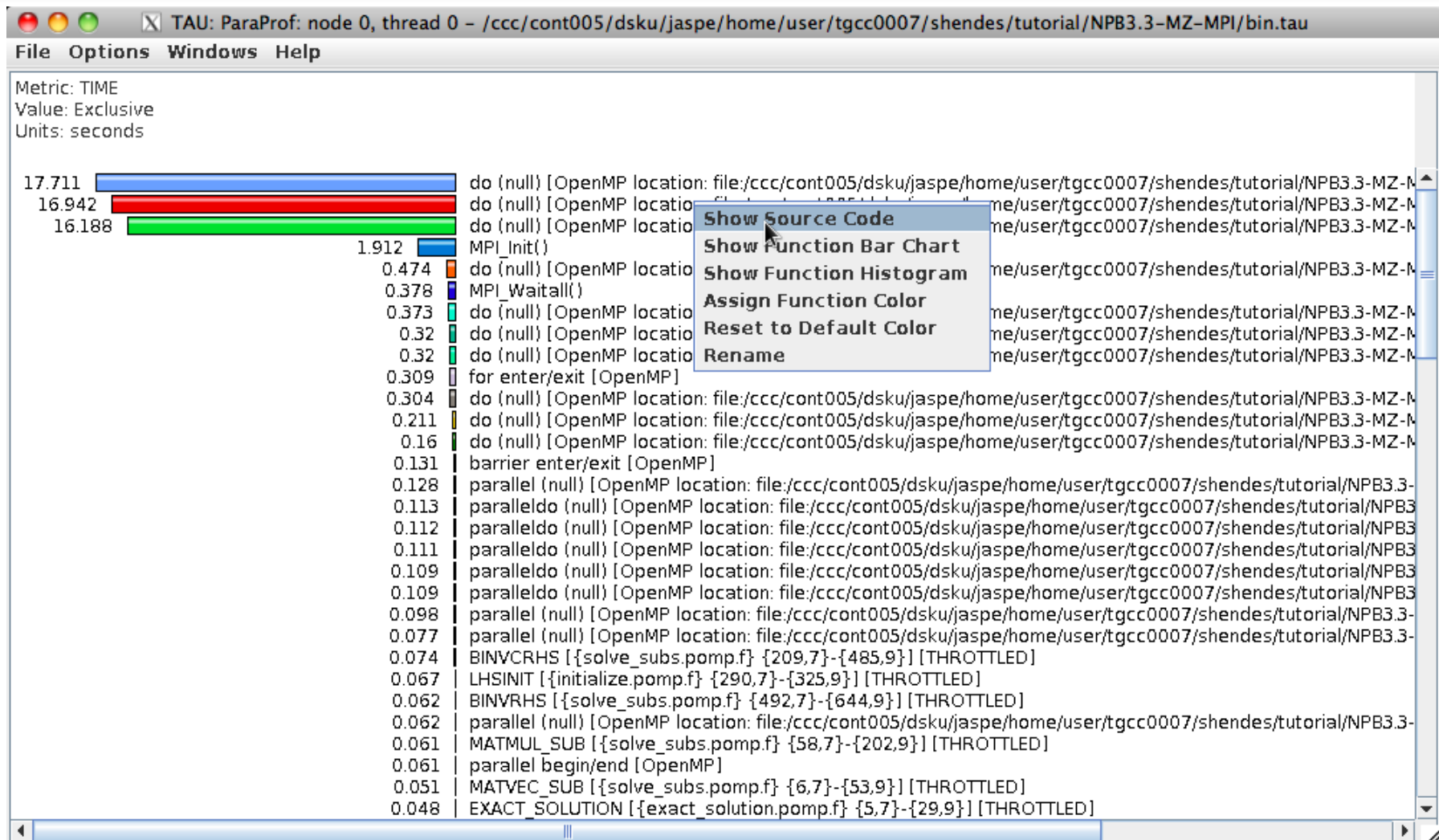
- Standard Applications
 - Default App
 - Default Exp
 - bin.tau/NPB3.3-MZ-MPI/tutorial/shende
 - TIME

ParaProf Main Window





ParaProf Node Window

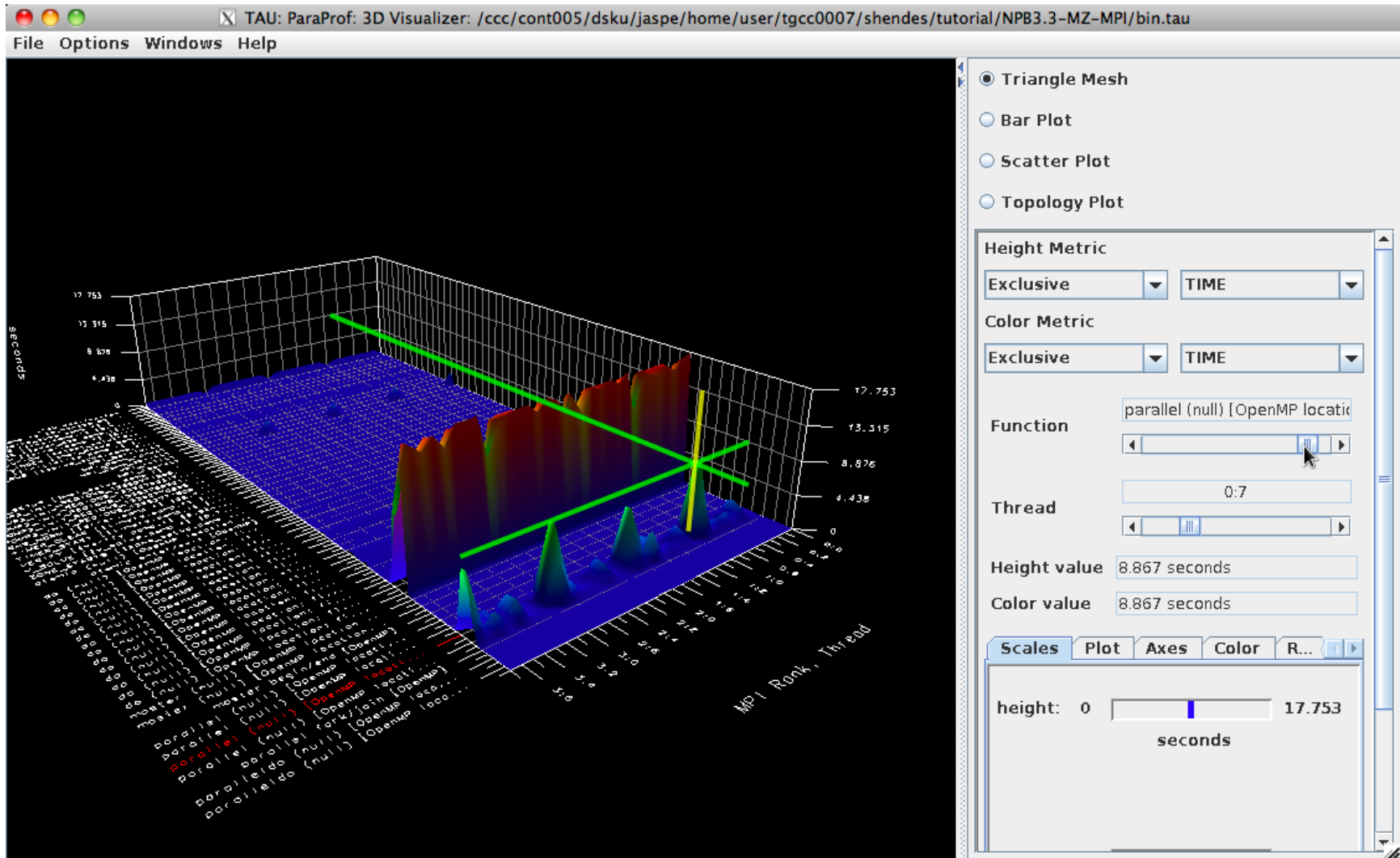



```
TAU: ParaProf: Source Browser: /ccc/cont005/dsku/jaspe/home/user/tgcc0007/shendes/tutorial/NPB3.3-MZ-MPI/BT-MZ/y_solve.f
File Help
52 !$OMP DO
53   do k = 1, nz-2
54     do i = 1, nx-2
55       do j = 0, jsize
56
57         tmp1 = rho_i(i,j,k)
58         tmp2 = tmp1 * tmp1
59         tmp3 = tmp1 * tmp2
60
61         fjac(1,1,j) = 0.d0
62         fjac(1,2,j) = 0.d0
63         fjac(1,3,j) = 1.d0
64         fjac(1,4,j) = 0.d0
65         fjac(1,5,j) = 0.d0
66
67         fjac(2,1,j) = - ( u(2,i,j,k)*u(3,i,j,k) )
68         > * tmp2
69         fjac(2,2,j) = u(3,i,j,k) * tmp1
70         fjac(2,3,j) = u(2,i,j,k) * tmp1
71         fjac(2,4,j) = 0.d0
72         fjac(2,5,j) = 0.d0
```

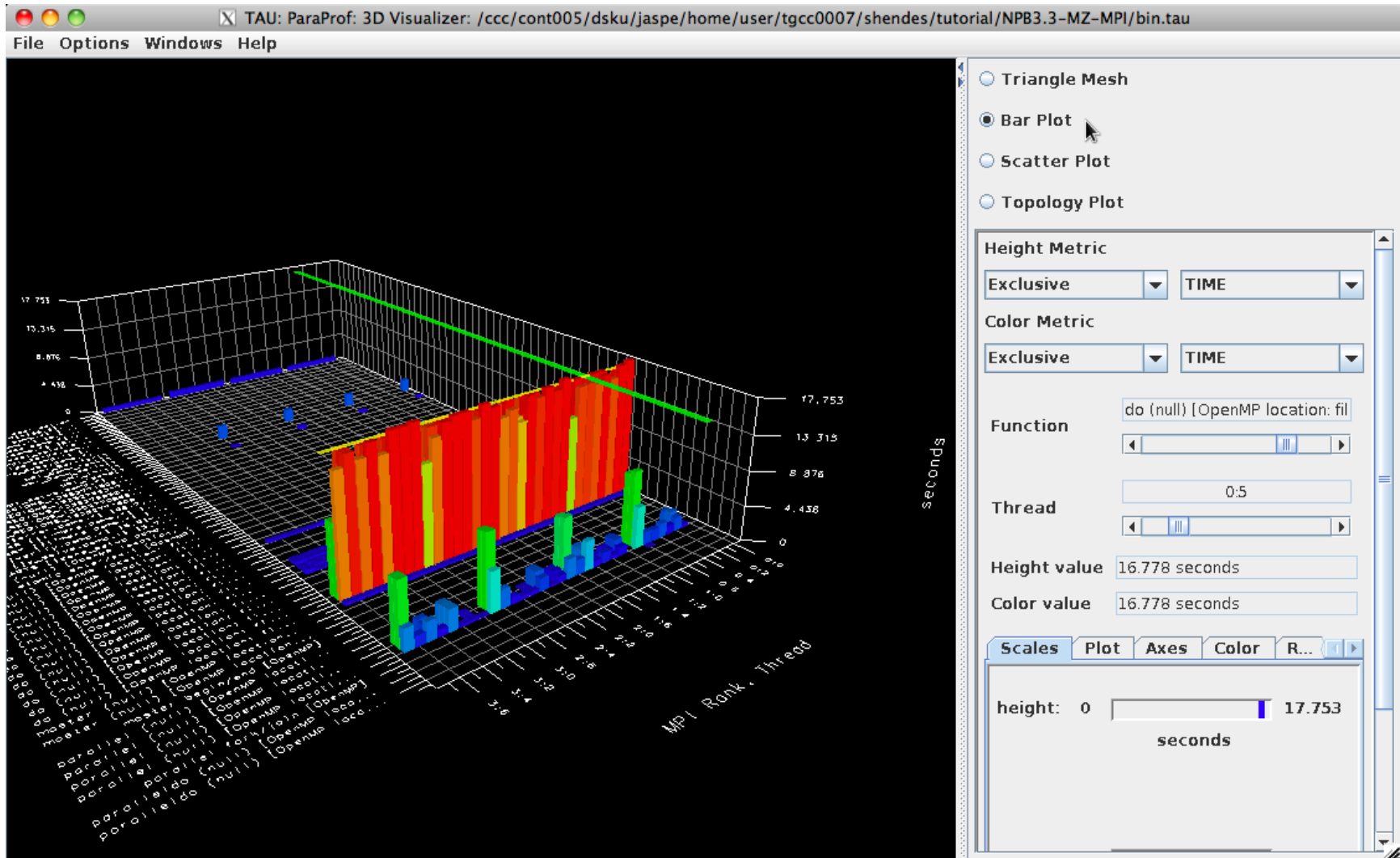
ParaProf 3D Visualization



ParaProf 3D Window



ParaProf 3D Bar Plot



- Get rid of OPENMP flag in config/make.def to build for MPI only

```
MPIF77 = tau_f90.sh
#MPIF77 = vtf77 -vt:hyb -vt:f77 mpif77
#MPIF77 = scorep --user mpif77

# PREP is a generic macro for instrumentation preparation
#MPIF77 = $(PREP) mpif77

# This links MPI fortran programs; usually the same as ${F77}
FLINK = $(MPIF77)

#-----
# Global *compile time* flags for Fortran programs
#-----
#FFLAGS = -O3 $(OPENMP)
FFLAGS = -O3
█
..
```

- Load modules:
- module load vampirtrace/5.12.2 tau vampir
- Use VampirTrace runtime options as before

```
[shendes@curie50 NPB3.3-MZ-MPI]$ make clean
rm -f core
rm -f */*opari* */*.mod.*
rm -f *~ */core */*~ */*.o */npbparams.h */*.obj */*.exe
rm -f sys/setparams sys/makesuite sys/setparams.h
[shendes@curie50 NPB3.3-MZ-MPI]$ ls $TAU/Makefile.*
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-mpi-pdt
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-mpi-pdt-openmp-opari
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-papi-mpi-pdt
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-papi-mpi-pdt-epilog-scalasca-trace
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-papi-mpi-pdt-openmp-opari
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-papi-mpi-pdt-vampirtrace-trace
/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-phase-icpc-mpi-pdt
[shendes@curie50 NPB3.3-MZ-MPI]$ export TAU_MAKEFILE=/usr/local/tau-2.21.2/x86_64/lib/Makefile.tau-icpc-papi-mpi-pdt-vampirtrace-trace
[shendes@curie50 NPB3.3-MZ-MPI]$ make suite
```

Feedback / Questions?

Contact us:
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