# Guidelines on debugging and introduction to Totalview

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## Outline

- Different approaches to debugging
    - Printing
    - Compiling environment aiding tools
    - Signal trapping
- Debugging with totalview

ECMWF

## Don’t Panic

- “Programming is an art” … and so is debugging
  - “You don’t need a sledgehammer to crack a nut”
- Most problems are trivial and easy to fix.
- Look at stack trace/point of failure.
- Intuition, experience, luck all play a part.
- Check your code “again”.
- Explain/show your code to somebody else.
- Use make to build your libraries/models, to guarantee that the same options are used everywhere.

## Some suggestions

- Is the problem reproducible on a rerun?
    - Does it fail in exactly the same way and place
- Try OMP_NUM_THREADS=1
- No stack trace?
    - suspect ‘you’ have trashed memory
- Try to reproduce problem at a lower resolution

## The Universal Debug Tool
**(the print/write statement)**

- Will always be there for you!
- What to write out.
- Must be selective to keep file size(s) manageable.
- Can be activated with an DEBUG variable or Namelist entry.
- For “production” runs, try and switch off verbose output mode.

## Memory Constraints

- Task stack limit 4 Gbytes
- Thread stack limit
  - Master thread 4 Gbytes
  - Other threads 256 Mbytes
- Large arrays (>1 Mbyte) should be declared allocatable
  - allocatable arrays use the (per task) heap
  - no practical limit on heap size
- Fortran 90/95 (xlf90/xlf95) put local data on stack.
- Fortran 77 (xlf) puts statically allocated local data on heap.

# Eoj – check memory and CPU utilisation

```
eoj vers1.4 run at Wed Jun 11 17:35:46 GMT 2003 on hpca2501 for jobstep hpca2301.347796.0
Queued              : Wed Jun 11 17:11:09 GMT 2003 for     898 seconds
Dispatched          : Wed Jun 11 17:26:07 GMT 2003 for     579 seconds
Job Name            : edhm_model_fcgroup1
Step Name           : 0
Owner               : rdx
Unix Group          : rd
Account             : ecpreops
STDIN               : /dev/null
STDOUT              : /hpca/rdx_dir/log/mpm/edhm/fc/fcgroup1/model.1
STDERR              : /hpca/rdx_dir/log/mpm/edhm/fc/fcgroup1/model.1
Class               : np
Step Type           : General Parallel
Node Usage          : shared
Step Cpus           : 8
Total Tasks         :
Blocking            :
Node actual         : 1
Adapter Req.        : (csss,MPI,shared,US)
Resources           : ConsumableCpus(1) ConsumableMemory(900.000 mb)
#*#* Next 3 times NOT up-to-date (TOTAL CPU TIME given later IS accurate)
Step User   Time : 00:13:41.940000
Step System Time : 00:00:33.760000
Step Total  Time : 00:14:15.700000 (855.7 secs)
#*#* Last 3 times NOT up-to-date (TOTAL CPU TIME given later IS accurate)
Context switches : involuntary =       28637, voluntary    =          12378
                    per second =          49                             21
Page faults       : with I/O    =       13056, without I/O =        1203613
                    per second =          22                           2078
                  <---------- CPU ---------> <------------- MEM ------------>
Node      ? #T #t secs/CPU    (Eff%) (Now%) max/TSK mb (Eff%) (Now% - mb   ) Task list
-------- - -- -- ---------- ------ ------ ---------- ------ ------------- ---------
hpca1503 M  8  1    120.33 ( 20%) ( 52%)    764.85 ( 84%) ( 88% -   7680) 0:1:2:3:4:5:6:7:
-------- - -- -- ---------- ------ ------ ---------- ------ ------------- ---------
 Elapsed =              579 secs              900 mb = ConsumableMemory
 CPU Tot =              962.64 ( 0+00:16:02)  Average:      963 s/node,       120 s/task
System Billing Units used by this jobstep = 1.037
```

## Debugging – compiler options

- checking:
  - argument checking: -qextchk

    ```
    $ xlf –qextchk prog.f –o prog
    ```

    Note that checking is done at compilation/linking

  - array bounds checking: -C

    ```
    $ xlf –C prog.f –o prog
    $ ./prog
    ```

    Note that checking is done at runtime

  - undefined reference checking

    ```
    $ xlf –qinitauto=FF –qsigtrap  \
      -qflttrap=inv:over:nanq:zero:en prog.f –o prog
    ```

    Note that checking is done at runtime

## Floating point exception

- In IEEE, a floating point exception sets status flag
- By default execution continues
- Trapping the exception requires software checking of status flags
- Utilities for enabling and checking
  - CALLs to fpgets and fpsets within program
- Automatic trapping by compiler (option –qflttrap)
  - high overhead to do precisely for whole program
  - "IMPrecise" option checks only at subprogram entry and exit
  - can apply flttrap to routines selectively

## Floating point exception

- IEEE exception types
  - OVerflow, UNDerflow, ZEROdivide, INValid, INEXact
- Other -qflttrap options
  - IMPrecise: check at routine exit and entry only
  - ENable
    - must specify in main program
    - may as well specify it everywhere

## Floating point exception

- Examples

```
$ xlf –qflttrap=overflow:invalid:zerodivide:enable \
  –qsigtrap prog.f –o prog
$ ./prog
```

- One can also use other exception handlers
- Relatively expensive … up to 20%

## Debugging – core files

- Core files – how to get a traceback

  -
    ```
    $ dbx ./prog core <<eof
    where
    eof
    ```

## ECMWF local signal trap - ECLIB

```
INTEGER*4  CORE_DUMP_FLAG, IRETURN, SIGNALS(1), SIGNAL_TRAP
REAL A
CORE_DUMP_FLAG = 0
SIGNALS(1)     = 0
IRETURN = SIGNAL_TRAP(CORE_DUMP_FLAG, SIGNALS)
IF (IRETURN .LT. 0) THEN
  PRINT *, 'ERROR'
ELSE IF (IRETURN .EQ. 0) THEN
  PRINT *, 'FPE TRAPPING IS NOT SET'
ELSE
  PRINT *, 'FPE TRAPPING MODE =', IRETURN
ENDIF
call b(-2.)
end

subroutine b(a)
real a
write(*,*)sqrt(a)
return
END
```

- Link using $ECLIB, e.g.
  - `$ xlf -c prog.f`
  - `$ xlf prog.o -o prog $ECLIB`

## Signal_trap - arguments

- CORE_DUMP_FLAG:
  - = 0: no core dumped
  - Not = 0: core dumped
- SIGNALS – integer array with signals to trap
  - Signals(1)=0 => SIGFPE, SIGILL, SIGBUS, SIGSEGV, SIGXCPU.
  - See "kill –l " for list of signals.
- Sample traceback …

```
Signal received: SIGTRAP - Trace trap
        Signal generated for floating-point exception:
                FP division by zero
Instruction that generated the exception:
        fdivs fr01,fr01,fr02
        Source Operand values:
                fr01 =   1.00000000000000e+00
                fr02 =   0.00000000000000e+00
Traceback:
        Offset 0x00000040 in procedure sub_
        Offset 0x00000048 in procedure ifs_model
        --- End of call chain ---
```

## Totalview

- Recompile your application without optimization (and –g):
  - -qnooptimize for all routines
  - -qsmp=noopt for routines with OpenMP
  - Beware –qsmp=omp implies optimization
  - Best choice: -g [–qoptdebug] -qfullpath
- Command Line interface exists
  - $ totalviewcli
- Recommended use of totalview in batch mode, i.e. with the GUI version.

## Totalview – GUI interface

- Before submitting batch job to launch totalview, request an X11 proxy at login time via ECaccess (ssh –X or NX).
- Include in your batch job the display:

```
export DISPLAY=<your_ecaccess_display>
```

- If needed, include source code searchpath, e.g.

```
searchpath=‘dir_1/,dir_2/,...,dir_n/’
```

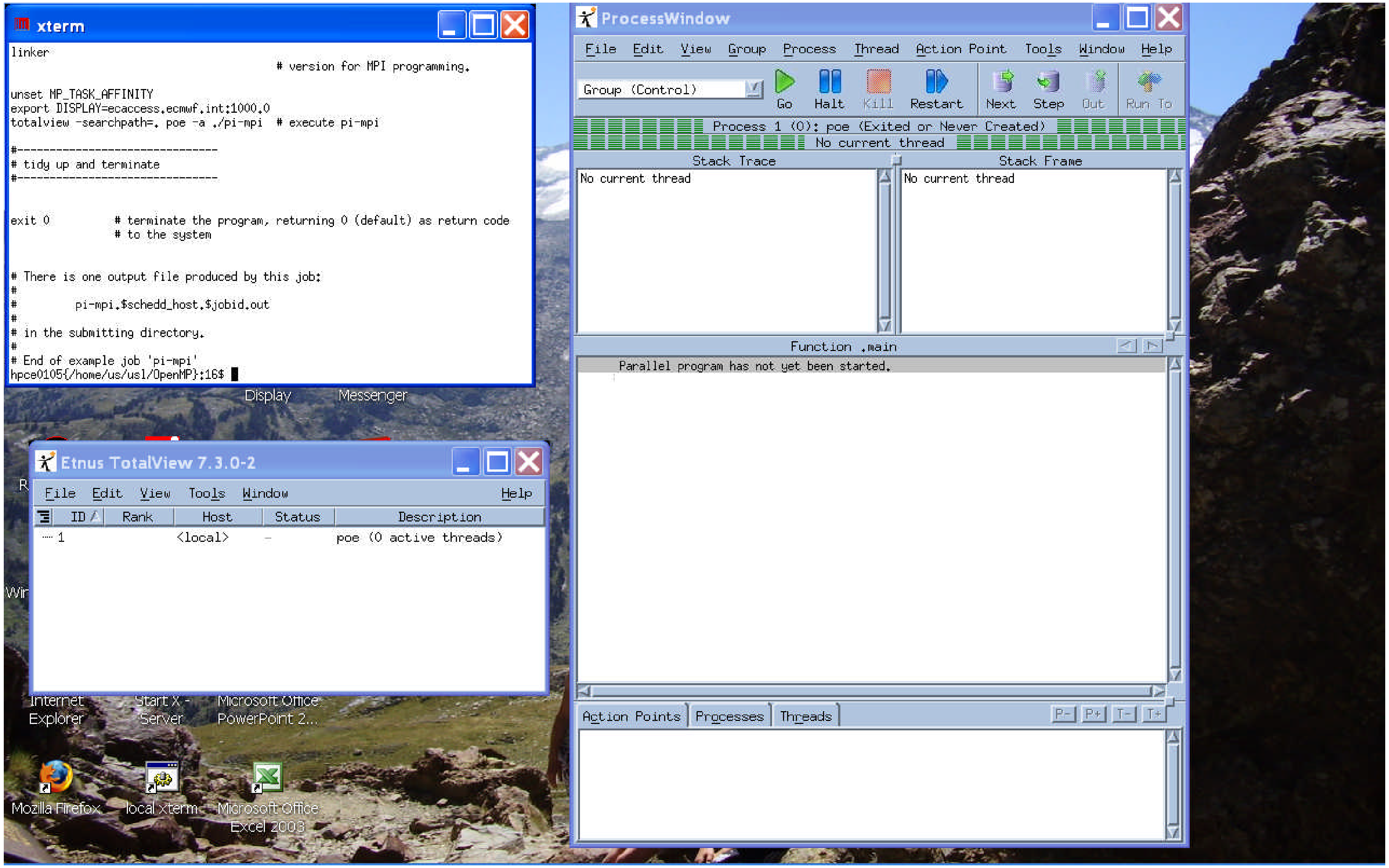
- For MPI-parallel (load-leveller jobs):

```
totalview -searchpath=$searchpath poe -a <executable> <args>
```

- For serial/OpenMP only (interactive)

```
totalview -searchpath=$searchpath <executable> -a <args>
```

# Totalview – GUI interface



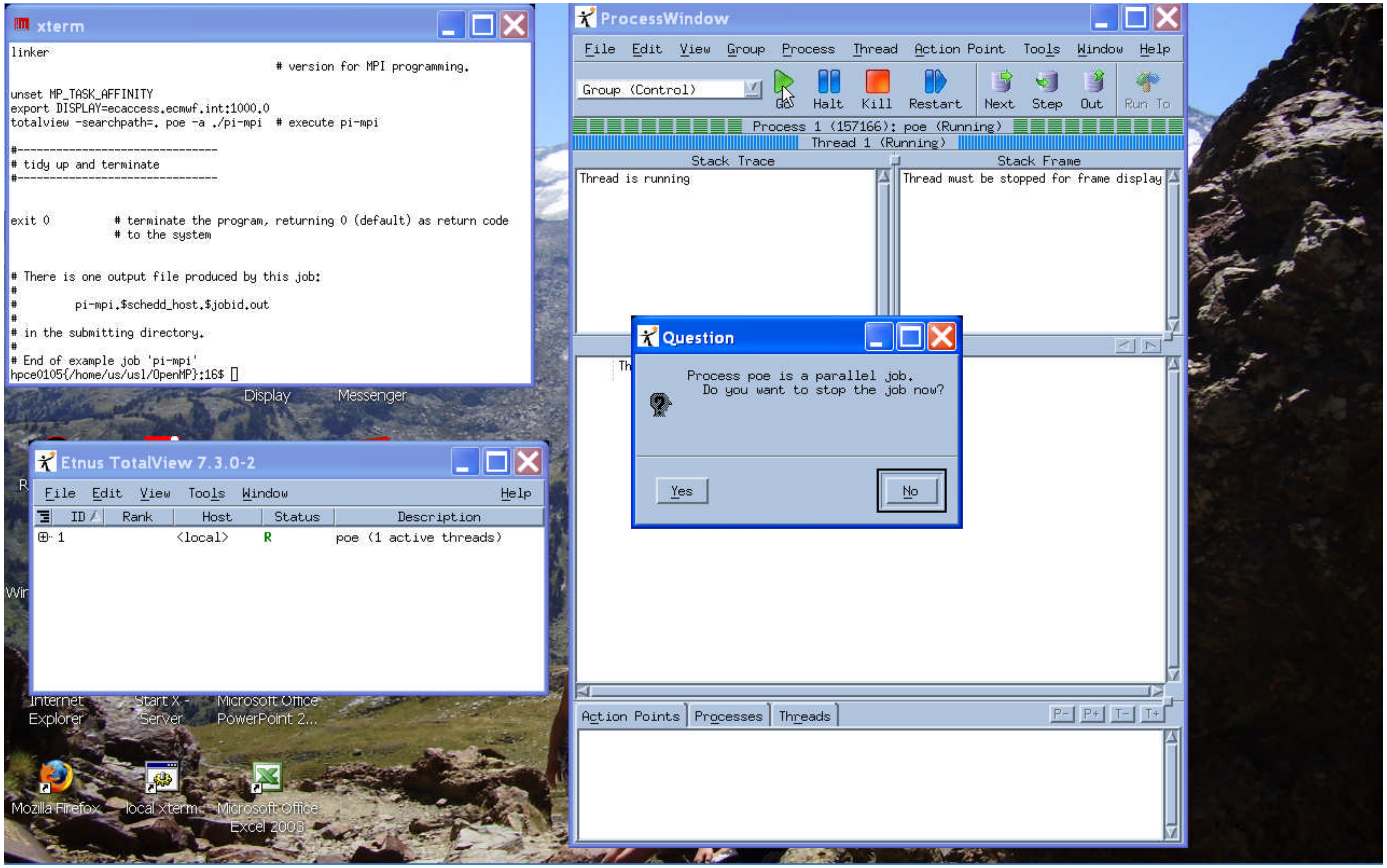
```
linker
                                        # version for MPI programming.

unset MP_TASK_AFFINITY
export DISPLAY=ecaccess.ecmwf.int:1000.0
totalview -searchpath=. poe -a ./pi-mpi  # execute pi-mpi

#--------------------------------
# tidy up and terminate
#--------------------------------


exit 0          # terminate the program, returning 0 (default) as return code
                # to the system


# There is one output file produced by this job:
#
#         pi-mpi.$schedd_host.$jobid.out
#
# in the submitting directory.
#
# End of example job 'pi-mpi'
hpce0105{/home/us/usl/OpenMP}:16$
```

xterm
Etnus TotalView 7.3.0-2
File Edit View Tools Window Help
ProcessWindow
File Edit View Group Process Thread Action Point Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Out Run To
Stack Trace
Stack Frame
Action Points Processes Threads
P- P+ T- T+
Display
Messenger
Internet Explorer
Start X - Server
Microsoft Office PowerPoint 2...
Mozilla Firefox
local xterm
Microsoft Office Excel 2003

| ID | Rank | Host | Status | Description |
|---|---|---|---|---|
| 1 | | <local> | - | poe (0 active threads) |

```
Process 1 (0): poe (Exited or Never Created)
No current thread
No current thread
No current thread
Function .main
Parallel program has not yet been started.
```

# Totalview – GUI interface



```
linker
                                          # version for MPI programming.

unset MP_TASK_AFFINITY
export DISPLAY=ecaccess.ecmwf.int:1000.0
totalview -searchpath=. poe -a ./pi-mpi  # execute pi-mpi

#--------------------------------
# tidy up and terminate
#--------------------------------


exit 0          # terminate the program, returning 0 (default) as return code
                # to the system


# There is one output file produced by this job:
#
#         pi-mpi.$schedd_host.$jobid.out
#
# in the submitting directory.
#
# End of example job 'pi-mpi'
hpce0105{/home/us/usl/OpenMP}:16$
```

Etnus TotalView 7.3.0-2

| ID | Rank | Host | Status | Description |
|---|---|---|---|---|
| 1 | | <local> | R | poe (1 active threads) |

ProcessWindow

Group (Control)

Process 1 (157166): poe (Running)

Thread 1 (Running)

Stack Trace: Thread is running

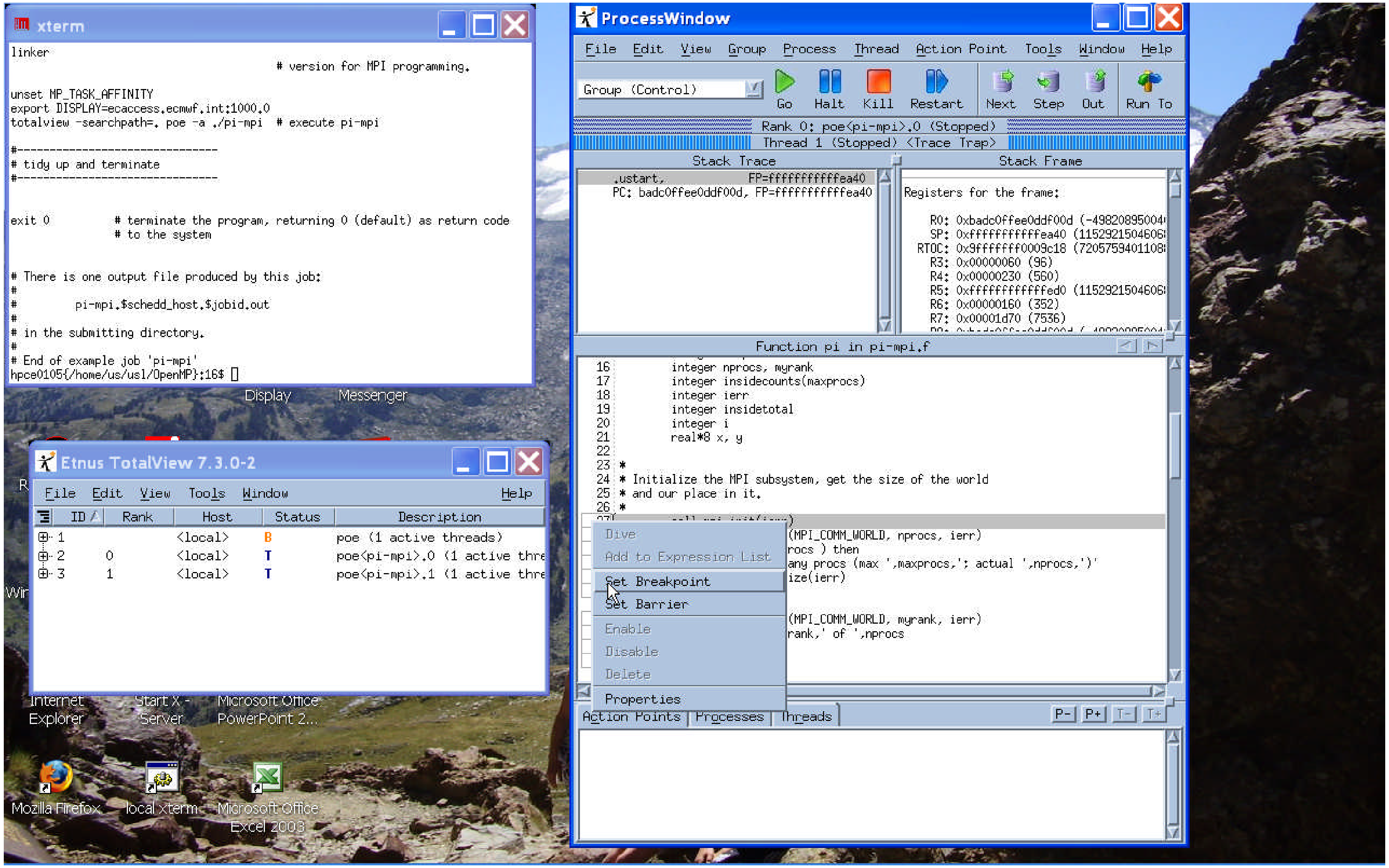
Stack Frame: Thread must be stopped for frame display

Question

Process poe is a parallel job.
Do you want to stop the job now?

xterm
File Edit View Tools Window Help
File Edit View Group Process Thread Action Point Tools Window Help
Go Halt Kill Restart Next Step Out Run To
Yes
No
Action Points Processes Threads
P- P+ T- T+
Display
Messenger
Internet Explorer
Start X - Server
Microsoft Office PowerPoint 2...
Mozilla Firefox
local xterm
Microsoft Office Excel 2003

# Totalview – GUI interface



```
linker
                                        # version for MPI programming.

unset MP_TASK_AFFINITY
export DISPLAY=ecaccess.ecmwf.int:1000.0
totalview -searchpath=. poe -a ./pi-mpi  # execute pi-mpi

#--------------------------------
# tidy up and terminate
#--------------------------------


exit 0          # terminate the program, returning 0 (default) as return code
                # to the system


# There is one output file produced by this job:
#
#         pi-mpi.$schedd_host.$jobid.out
#
# in the submitting directory.
#
# End of example job 'pi-mpi'
hpce0105{/home/us/usl/OpenMP}:16$
```

| ID | Rank | Host | Status | Description |
|---|---|---|---|---|
| 1 | | <local> | B | poe (1 active threads) |
| 2 | 0 | <local> | T | poe<pi-mpi>.0 (1 active thre |
| 3 | 1 | <local> | T | poe<pi-mpi>.1 (1 active thre |

```
Rank 0: poe<pi-mpi>.0 (Stopped)
Thread 1 (Stopped) <Trace Trap>
```

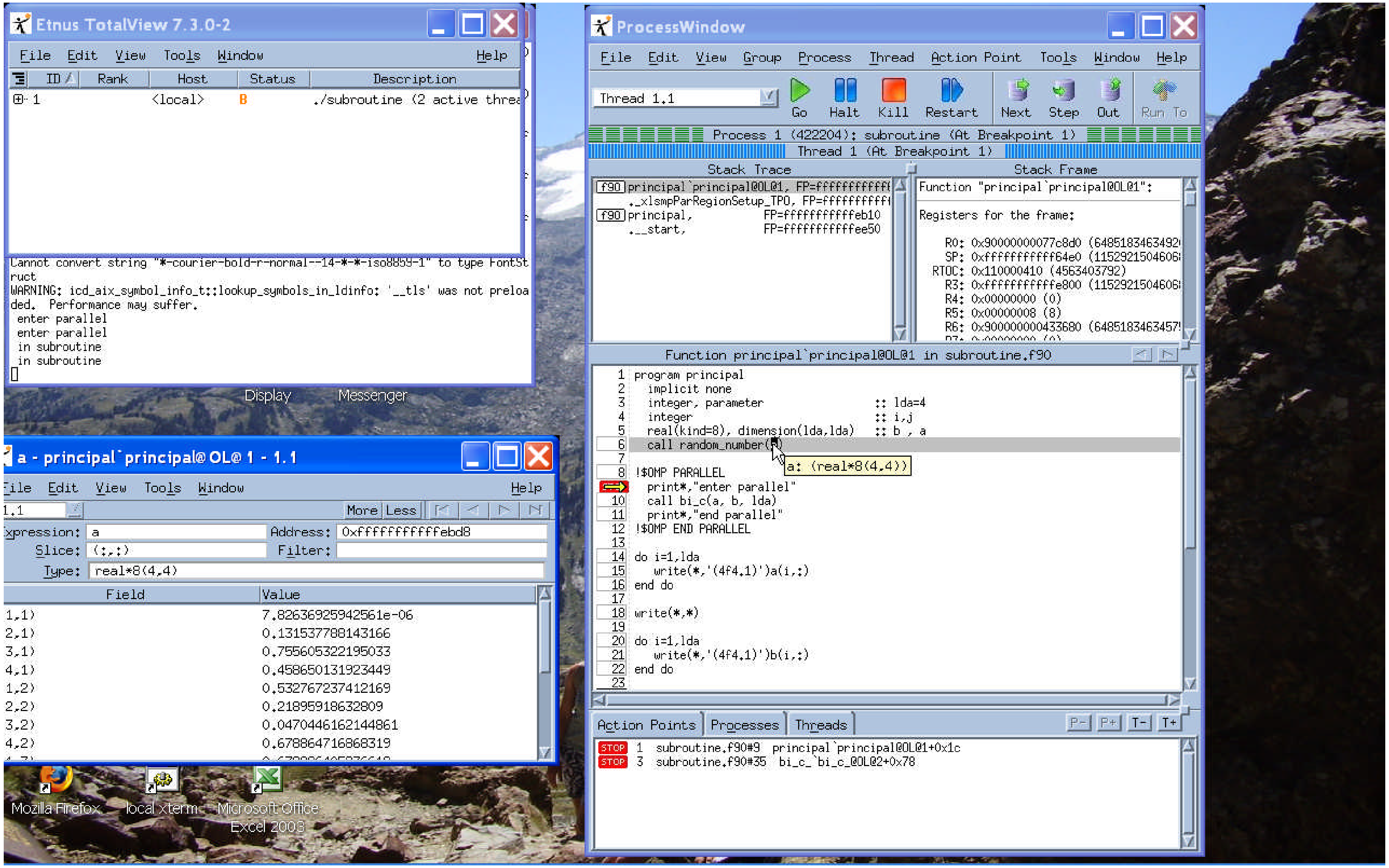
```
  .ustart,              FP=ffffffffffffea40
  PC: badc0ffee0ddf00d, FP=ffffffffffffea40
```

```
Registers for the frame:

    R0: 0xbadc0ffee0ddf00d (-49820895004
    SP: 0xffffffffffffea40 (11529215046068
  RTOC: 0x9ffffffff0009c18 (72057594011088
    R3: 0x00000060 (96)
    R4: 0x00000230 (560)
    R5: 0xffffffffffffed0 (11529215046068
    R6: 0x00000160 (352)
    R7: 0x00001d70 (7536)
```

Function pi in pi-mpi.f

```
        integer nprocs, myrank
        integer insidecounts(maxprocs)
        integer ierr
        integer insidetotal
        integer i
        real*8 x, y

*
* Initialize the MPI subsystem, get the size of the world
* and our place in it.
*
                             (MPI_COMM_WORLD, nprocs, ierr)
                             rocs ) then
                             any procs (max ',maxprocs,'; actual ',nprocs,')'
                             ize(ierr)


                             (MPI_COMM_WORLD, myrank, ierr)
                             rank,' of ',nprocs
```

# Totalview – GUI interface


Etnus TotalView 7.3.0-2
File Edit View Tools Window Help
ProcessWindow
File Edit View Group Process Thread Action Point Tools Window Help
Go Halt Kill Restart Next Step Out Run To
a - principal`principal@OL@1 - 1.1
File Edit View Tools Window Help
More Less
Action Points Processes Threads
P- P+ T- T+
Display
Messenger
Mozilla Firefox
local xterm
Microsoft Office Excel 2003

| ID | Rank | Host | Status | Description |
|---|---|---|---|---|
| 1 | | <local> | B | ./subroutine (2 active threa |

```
Cannot convert string "*-courier-bold-r-normal--14-*-*-iso8859-1" to type FontSt
ruct
WARNING: icd_aix_symbol_info_t::lookup_symbols_in_ldinfo: '__tls' was not preloa
ded.  Performance may suffer.
 enter parallel
 enter parallel
 in subroutine
 in subroutine
```

```
Thread 1.1
Process 1 (422204): subroutine (At Breakpoint 1)
Thread 1 (At Breakpoint 1)
```

Stack Trace

```
f90 principal`principal@OL@1, FP=ffffffffffff
     ._xlsmpParRegionSetup_TPO, FP=ffffffffff
f90 principal,                FP=ffffffffffffeb10
     .__start,                FP=ffffffffffffee50
```

Stack Frame

```
Function "principal`principal@OL@1":

Registers for the frame:

    R0: 0x90000000077c8d0 (6485183463492
    SP: 0xffffffffffff64e0 (1152921504606
  RTOC: 0x110000410 (4563403792)
    R3: 0xfffffffffffe800 (1152921504606
    R4: 0x00000000 (0)
    R5: 0x00000008 (8)
    R6: 0x900000000433680 (6485183463457
```

Function principal`principal@OL@1 in subroutine.f90

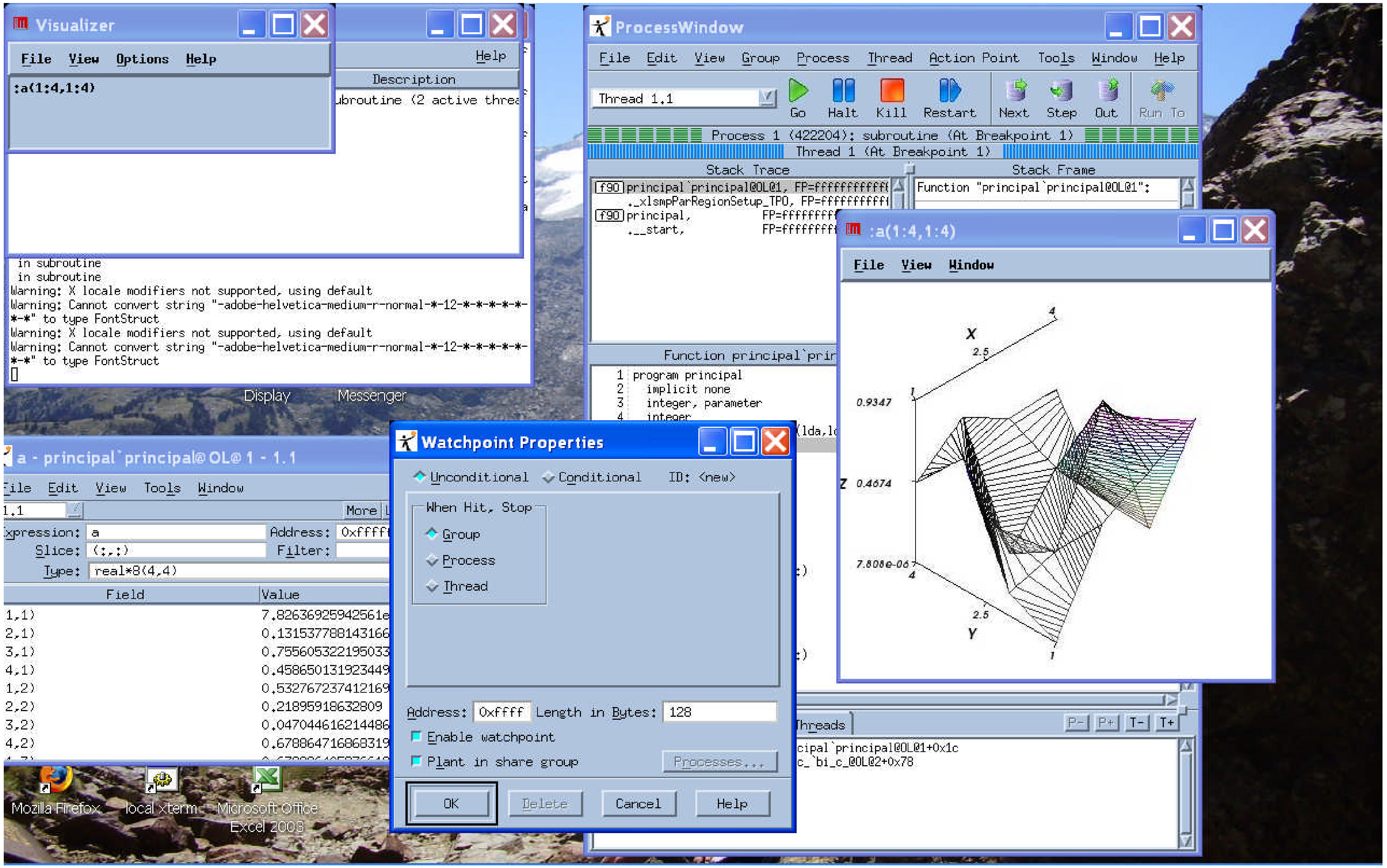
```
 1  program principal
 2    implicit none
 3    integer, parameter                :: lda=4
 4    integer                           :: i,j
 5    real(kind=8), dimension(lda,lda)  :: b , a
 6    call random_number(a)
 7                                        a: (real*8(4,4))
 8  !$OMP PARALLEL
 9    print*,"enter parallel"
10    call bi_c(a, b, lda)
11    print*,"end parallel"
12  !$OMP END PARALLEL
13
14  do i=1,lda
15     write(*,'(4f4.1)')a(i,:)
16  end do
17
18  write(*,*)
19
20  do i=1,lda
21     write(*,'(4f4.1)')b(i,:)
22  end do
23
```

```
STOP  1  subroutine.f90#9   principal`principal@OL@1+0x1c
STOP  3  subroutine.f90#35  bi_c_`bi_c_@OL@2+0x78
```

```
1.1
Expression: a                     Address: 0xffffffffffffebd8
     Slice: (:,:)                  Filter:
      Type: real*8(4,4)
```

| Field | Value |
|---|---|
| 1,1) | 7.82636925942561e-06 |
| 2,1) | 0.131537788143166 |
| 3,1) | 0.755605322195033 |
| 4,1) | 0.458650131923449 |
| 1,2) | 0.532767237412169 |
| 2,2) | 0.21895918632809 |
| 3,2) | 0.0470446162144861 |
| 4,2) | 0.678864716868319 |

# Totalview – GUI interface



```
:a(1:4,1:4)
```

```
ubroutine (2 active threa
```

```
 in subroutine
 in subroutine
Warning: X locale modifiers not supported, using default
Warning: Cannot convert string "-adobe-helvetica-medium-r-normal-*-12-*-*-*-*-
*-*" to type FontStruct
Warning: X locale modifiers not supported, using default
Warning: Cannot convert string "-adobe-helvetica-medium-r-normal-*-12-*-*-*-*-
*-*" to type FontStruct
```

```
Thread 1.1
Process 1 (422204): subroutine (At Breakpoint 1)
Thread 1 (At Breakpoint 1)
```

```
f90 principal`principal@OL@1, FP=ffffffffffff
     ._xlsmpParRegionSetup_TPO, FP=ffffffffffff
f90 principal,              FP=ffffffff
     .__start,              FP=ffffffff
```

```
Function "principal`principal@OL@1":
```

```
Function principal`prir
 program principal
   implicit none
   integer, parameter
   integer
                                        (lda,lc
```

```
:)
:)
```

```
cipal`principal@OL@1+0x1c
c_`bi_c_@OL@2+0x78
```

```
1.1
Expression: a                  Address: 0xffff
     Slice: (:,:)               Filter:
      Type: real*8(4,4)
```

| Field | Value |
|---|---|
| 1,1) | 7.82636925942561e |
| 2,1) | 0.131537788143166 |
| 3,1) | 0.755605322195033 |
| 4,1) | 0.458650131923449 |
| 1,2) | 0.532767237412169 |
| 2,2) | 0.21895918632809 |
| 3,2) | 0.047044616214486 |
| 4,2) | 0.678864716868319 |

Watchpoint Properties:

[✓ Unconditional] Conditional   ID: <new>

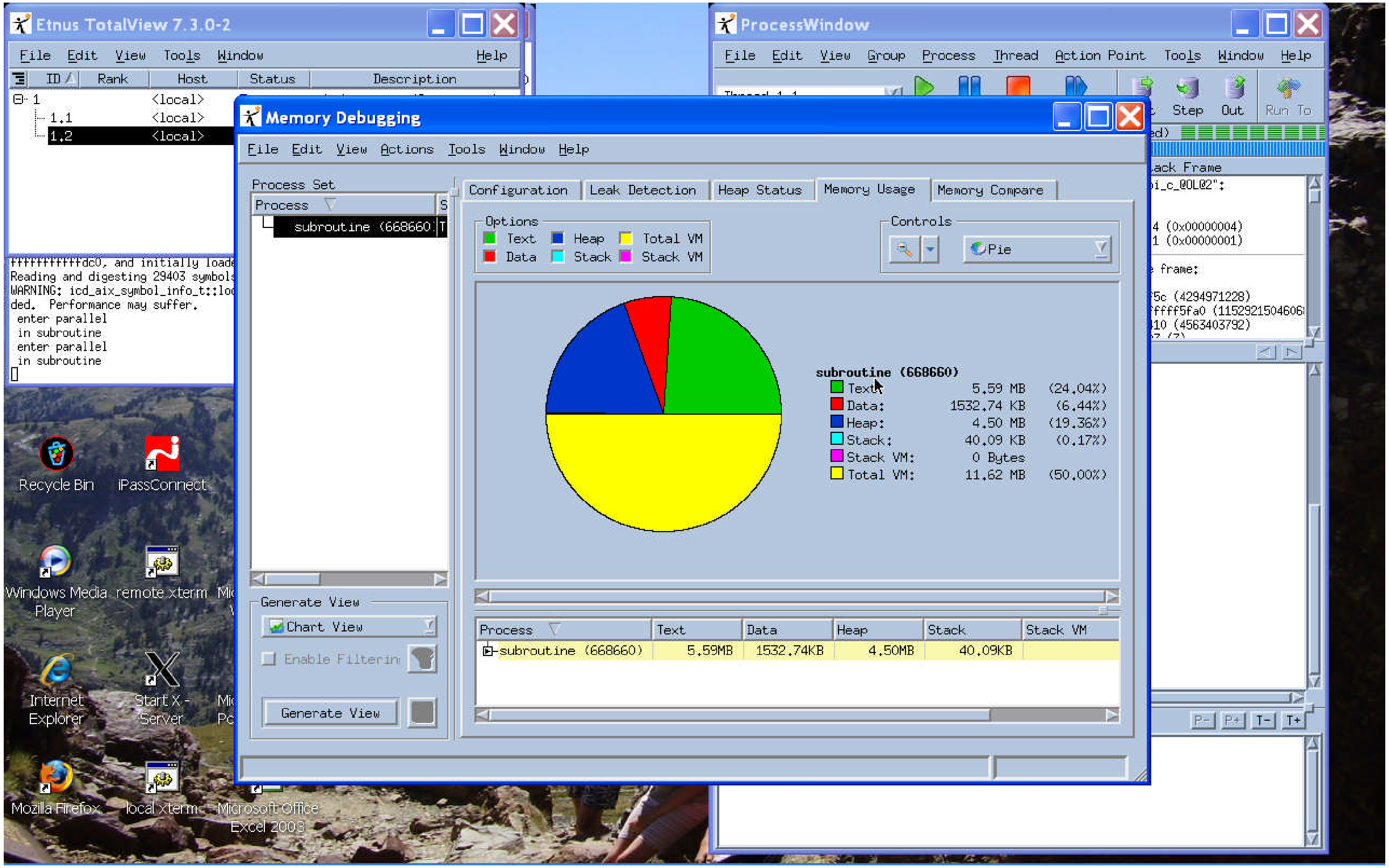
When Hit, Stop: [✓ Group] Process Thread

Address: 0xffff   Length in Bytes: 128

[✓ Enable watchpoint]

[✓ Plant in share group]

# Totalview – GUI interface


Etnus TotalView 7.3.0-2
File Edit View Tools Window Help
ID Rank Host Status Description
ProcessWindow
File Edit View Group Process Thread Action Point Tools Window Help
Step Out Run To
Memory Debugging
File Edit View Actions Tools Window Help
Process Set
Configuration Leak Detection Heap Status Memory Usage Memory Compare
Options
Controls
Pie
Generate View
Chart View
Enable Filterin
Generate View
Recycle Bin
iPassConnect
Windows Media Player
remote xterm
Internet Explorer
Start X - Server
Mozilla Firefox
local xterm
Microsoft Office Excel 2003

```
1         <local>
  1.1     <local>
  1.2     <local>
```

```
ffffffffffdc0, and initially loade
Reading and digesting 29403 symbols
WARNING: icd_aix_symbol_info_t::loc
ded.  Performance may suffer.
 enter parallel
 in subroutine
 enter parallel
 in subroutine
```

Options: 🟩 Text 🟦 Heap 🟨 Total VM 🟥 Data Stack Stack VM

**subroutine (668660)**

| | | |
|---|---|---|
| 🟩 Text: | 5.59 MB | (24.04%) |
| 🟥 Data: | 1532.74 KB | (6.44%) |
| 🟦 Heap: | 4.50 MB | (19.36%) |
| Stack: | 40.09 KB | (0.17%) |
| Stack VM: | 0 Bytes | |
| 🟨 Total VM: | 11.62 MB | (50.00%) |

| Process | Text | Data | Heap | Stack | Stack VM |
|---|---|---|---|---|---|
| subroutine (668660) | 5.59MB | 1532.74KB | 4.50MB | 40.09KB | |

ECMWF

## Case Study – "bug" in EC-EARTH

- EC-EARTH – international project for earth system modelling.
- Experimental runs on our HPC systems.
- Coupled model runs, using MPMD parallel modelling approach:
  - poe -pgmmodel mpmd -cmdfile ${cmdfile} …

  with cmdfile like:

```
oasis3.MPI1.x
ifsMASTER -v ecmwf -e ewhx
opa_exe.ORCA2_OASIS3.1.1
appl-tm5.x
```

## Case Study – initial error

- Oasis compiled with –O3, TM5 with –g, IFS with –g and signal trap:

```
1:signal_drhook(SIGABRT=6): New handler installed at 0x100ac5b8; old
preserved at 0xa062ea70
ERROR: 0031-250  task 3: Segmentation fault
1:  Traceback:
1:    Offset 0x0000086c in procedure pm_async_thread
1:    Offset 0x000000dc in procedure _pthread_body
1:    --- End of call chain ---
```

- Error (segmentation fault) in TM5 and IFS reports where it failed …

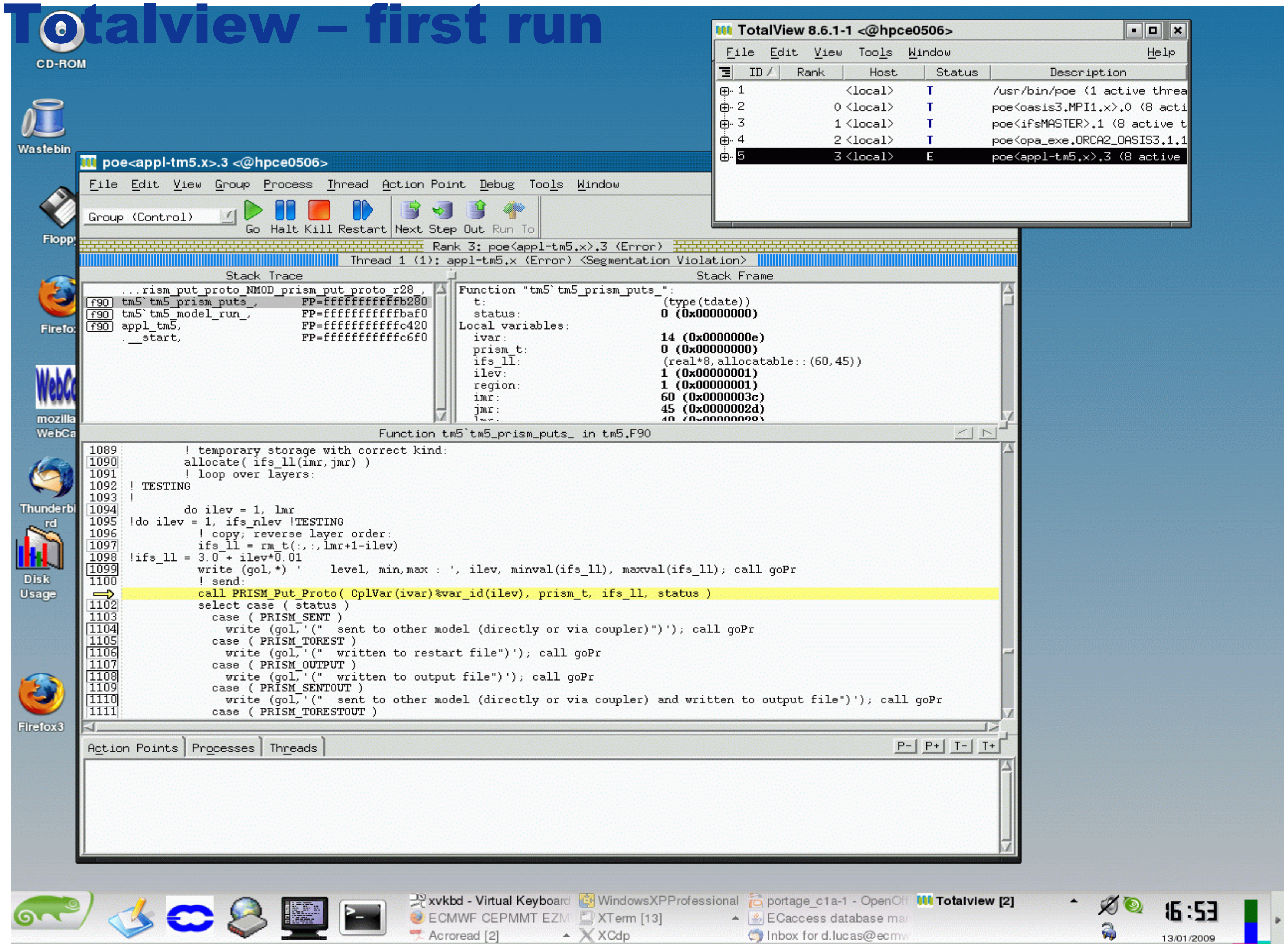
# Case Study – totalview (1)

- The job has been adapted to use totalview:

```
export DISPLAY=galahad:0.0
export MP_PGMMODEL='mpmd‘
export MP_CMDFILE="${cmdfile}“
export MP_HOSTFILE="${hostfile}“
export MP_LABELIO='yes'
/usr/local/apps/toolworks/totalview.8.6.1-1/bin/totalview /usr/bin/poe
```

- Error in TM5 in a routine PRISM_Put_Proto (see following page).

# Totalview – first run



TotalView 8.6.1-1 <@hpce0506>
File Edit View Tools Window Help

```
ID  Rank  Host     Status  Description
1         <local>  T       /usr/bin/poe (1 active threa
2     0   <local>  T       poe<oasis3.MPI1.x>.0 (8 acti
3     1   <local>  T       poe<ifsMASTER>.1 (8 active t
4     2   <local>  T       poe<opa_exe.ORCA2_OASIS3.1.1
5     3   <local>  E       poe<appl-tm5.x>.3 (8 active
```

poe<appl-tm5.x>.3 <@hpce0506>
File Edit View Group Process Thread Action Point Debug Tools Window
Group (Control)
Go Halt Kill Restart Next Step Out Run To

```
Rank 3: poe<appl-tm5.x>.3 (Error)
Thread 1 (1): appl-tm5.x (Error) <Segmentation Violation>
```

```
Stack Trace
      ...rism_put_proto_NMOD_prism_put_proto_r28_,
f90   tm5`tm5_prism_puts_,       FP=ffffffffffffb280
f90   tm5`tm5_model_run_,        FP=ffffffffffffbaf0
f90   appl_tm5,                  FP=ffffffffffffc420
      .__start,                  FP=ffffffffffffc6f0
```

```
Stack Frame
Function "tm5`tm5_prism_puts_":
  t:                              (type(tdate))
  status:                         0 (0x00000000)
Local variables:
  ivar:                           14 (0x0000000e)
  prism_t:                        0 (0x00000000)
  ifs_ll:                         (real*8,allocatable::(60,45))
  ilev:                           1 (0x00000001)
  region:                         1 (0x00000001)
  imr:                            60 (0x0000003c)
  jmr:                            45 (0x0000002d)
```

```
Function tm5`tm5_prism_puts_ in tm5.F90
           ! temporary storage with correct kind:
           allocate( ifs_ll(imr,jmr) )
           ! loop over layers:
! TESTING
!
           do ilev = 1, lmr
!do ilev = 1, ifs_nlev !TESTING
             ! copy; reverse layer order:
             ifs_ll = rm_t(:,:,lmr+1-ilev)
!ifs_ll = 3.0 + ilev*0.01
             write (gol,*) '    level, min,max : ', ilev, minval(ifs_ll), maxval(ifs_ll); call goPr
             ! send:
=>           call PRISM_Put_Proto( CplVar(ivar)%var_id(ilev), prism_t, ifs_ll, status )
             select case ( status )
               case ( PRISM_SENT )
                 write (gol,'("  sent to other model (directly or via coupler)")'); call goPr
               case ( PRISM_TOREST )
                 write (gol,'("  written to restart file")'); call goPr
               case ( PRISM_OUTPUT )
                 write (gol,'("  written to output file")'); call goPr
               case ( PRISM_SENTOUT )
                 write (gol,'("  sent to other model (directly or via coupler) and written to output file")'); call goPr
               case ( PRISM_TORESTOUT )
```

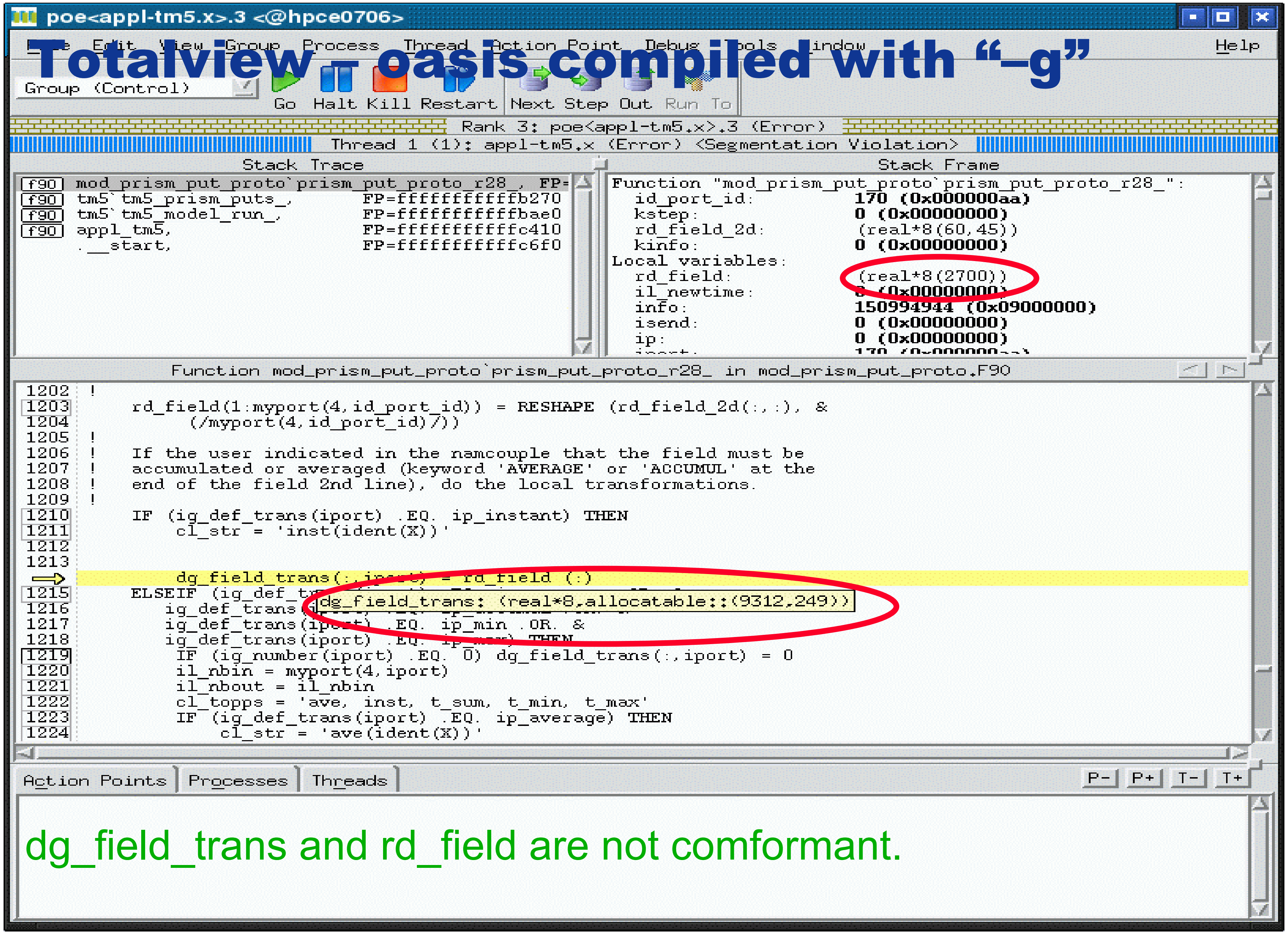
## Case Study – signal trap

- Activate signal trap in TM5:

```
3:  Signal received: SIGSEGV - Segmentation violation
3:
3:  Traceback:
3:    Location 0x000000010072c7fc
3:    Offset 0x00001d08 in procedure __tm5_NMOD_tm5_prism_puts_, near line
    1101 in file tm5.F90
3:    Offset 0x00001b50 in procedure __tm5_NMOD_tm5_model_run_, near line
    842 in file tm5.F90
3:    Offset 0x000004d0 in procedure appl_tm5, near line 189 in file appl-tm5.F90
3:    --- End of call chain ---
```

- Not much more information yet, because oasis not compiled with “-g”.
- Recompiling oasis with “-g” and running totalview produces …

# Totalview – oasis compiled with “–g”


poe<appl-tm5.x>.3 <@hpce0706>
File Edit View Group Process Thread Action Point Debug Tools Window Help
Group (Control)
Go Halt Kill Restart Next Step Out Run To

```
Rank 3: poe<appl-tm5.x>.3 (Error)
Thread 1 (1): appl-tm5.x (Error) <Segmentation Violation>
```

Stack Trace

```
f90  mod_prism_put_proto`prism_put_proto_r28_, FP=
f90  tm5`tm5_prism_puts_,            FP=ffffffffffffb270
f90  tm5`tm5_model_run_,             FP=ffffffffffffbae0
f90  appl_tm5,                       FP=ffffffffffffc410
     .__start,                       FP=ffffffffffffc6f0
```

Stack Frame

```
Function "mod_prism_put_proto`prism_put_proto_r28_":
  id_port_id:        170 (0x000000aa)
  kstep:             0 (0x00000000)
  rd_field_2d:       (real*8(60,45))
  kinfo:             0 (0x00000000)
Local variables:
  rd_field:          (real*8(2700))
  il_newtime:        0 (0x00000000)
  info:              150994944 (0x09000000)
  isend:             0 (0x00000000)
  ip:                0 (0x00000000)
```

Function mod_prism_put_proto`prism_put_proto_r28_ in mod_prism_put_proto.F90

```
!
    rd_field(1:myport(4,id_port_id)) = RESHAPE (rd_field_2d(:,:), &
        (/myport(4,id_port_id)/))
!
!   If the user indicated in the namcouple that the field must be
!   accumulated or averaged (keyword 'AVERAGE' or 'ACCUMUL' at the
!   end of the field 2nd line), do the local transformations.
!
    IF (ig_def_trans(iport) .EQ. ip_instant) THEN
        cl_str = 'inst(ident(X))'


        dg_field_trans(:,iport) = rd_field (:)
    ELSEIF (ig_def_tr[illegible]
       ig_def_trans([illegible]
       ig_def_trans(iport) .EQ. ip_min .OR. &
       ig_def_trans(iport) .EQ. ip_max) THEN
        IF (ig_number(iport) .EQ. 0) dg_field_trans(:,iport) = 0
        il_nbin = myport(4,iport)
        il_nbout = il_nbin
        cl_topps = 'ave, inst, t_sum, t_min, t_max'
        IF (ig_def_trans(iport) .EQ. ip_average) THEN
            cl_str = 'ave(ident(X))'
```

```
dg_field_trans: (real*8,allocatable::(9312,249))
```

dg_field_trans and rd_field are not comformant.

ECMWF

## References

- Xlf Compiler Reference:

http://www.ecmwf.int/publications/manuals/hpcf_power6/xlf12.1_cr.pdf

- Xlf Optimisation and Programming Guide:

http://www.ecmwf.int/publications/manuals/hpcf_power6/proguide.pdf

- Totalview:

http://www.roguewave.com/support/product-documentation/totalview-family.aspx#totalview