Using Sun’s HPC Software

Parry Husbands

6 March 1998

Why the Sun HPC Run-Time Environment?

On Xolas it is the only environment that supports the following useful tools:

- Prism
- HPF
- Sun MPI (A Multi-protocol Implementation)
- Sun PVM

PetSc is available as well in `/hpc/SUNWhpc/HPC2.0/SUNWpetsc`

To use these tools on Xolas

- Add `/hpc/SUNWhpc/bin` to your `PATH`
- Add `/hpc/SUNWhpc/man` to your `MANPATH`
- Add `/hpc/SUNWhpc/lib` to your `LD_LIBRARY_PATH`

Compiling:

- `{tmf77,tmcc} {sources, objects} {-lmpi,-ls3l}`
- No tmCC! You need to add the libraries explicitly
  `CC -I/hpc/SUNWhpc/include -o foo {sources, objects} -L/hpc/SUNWhpc/lib -lthread -lmpi`
- `hpf {sources, objects} {libraries}`

Important Concepts

- Nodes - machines
- Partitions - collections of machines
- Queues - queues of jobs (bound to a particular partition)
- (Disks - for the Parallel File System)

Using the System

- tminfo (`tminfo -h` or `man tminfo` for help)

```
xolas0 [3] [~]% tminfo -N
NAME          UP PARTITION    OS       OSREL NCPU   FMEM   FSWP LOAD1 LOAD5 LOAD15
xolas0         y xolas        SunOS    5.5.1    6 121.22 471.38  1.21  1.27  1.59
xolas1         y nixon        SunOS    5.5.1    8 238.73   1613  0.03  0.04  0.62
xolas2         y nixon        SunOS    5.5.1    8 329.26   1382  0.01  0.02  0.30
xolas3         y nixon        SunOS    5.5.1    8 460.30   1633  0.00  0.01  0.01
xolas4         n nixon        SunOS    5.5.1    8 366.69 376.62  0.03  0.02  0.02
xolas5         y xolas5       SunOS    5.5.1    8 180.50   1635  0.00  0.27  0.84
xolas6         n -            SunOS    5.5.1    8 456.48   1650  0.08  0.07  0.04
xolas7         y xolas7       SunOS    5.5.1   12 879.21   2736  5.72  5.00  4.90
xolas8         n -            SunOS    5.5.1    4 162.79   1424  0.09  0.02  0.02
xolas0 [4] [~]% tminfo -P
NAME          NODES: Tot(cpu)  Enb(cpu)  Onl(cpu)  ENA LOG INT MP  DEFAULT QUEUE
mpi1                   3( 24)    3( 24)    2( 16)  no  yes yes yes -
nixon                  4( 32)    4( 32)    3( 24)  yes yes yes yes -
xolas                  1(  6)    1(  6)    1(  6)  yes yes yes yes -
xolas5                 1(  8)    1(  8)    1(  8)  yes yes yes yes -
xolas7                 1( 12)    1( 12)    1( 12)  yes no  yes yes -
```

Using the System, cont'd

- tmps (`tmps -h` or `man tmps` for help)
  `tmps -Aef` lists all jobs by all people on all partitions

```
xolas0 [1] [~]% tmps -Aef
     TID  NPROC  UID        STATE  STIME        AOUT
Partition: xolas
   t1128     8   gsin       SEXNG  Nov16 10:30  void.x
   t1129     8   gsin       SEXNG  Nov16 10:56  void.x
   t2436     1   tairan     RUN    14:25:16     minim
   t2439     4   parry      RUN    14:26:39     /brazil/isbell/IR/code/solaris/ppmatlabserver
-beparent patsy:0.0 -log - -text
Partition: xolas7
   t1655     8   gsin       SEXNG  Nov25 11:32  void.x
```

- tmkill (`tmkill -h` or `man tmkill` for help)
  `tmkill -C {tid}` is very useful

Submitting Jobs

- tmrun (`tmrun -h` or `man tmrun` for help)

  Typical Usage:

  `tmrun -np 4 -p nixon a.out`

  Useful Options:

  -Ns Don't spawn multiple processes per SMP

  -q Specify the queue.

  -Z n Put groups of n processes on each SMP. (e.g. `-np 15 -Z 5`)

  -R "resource string" Specify in great detail what machines you want to run the job. For example, `-R "name=xolas2"` (see man page)

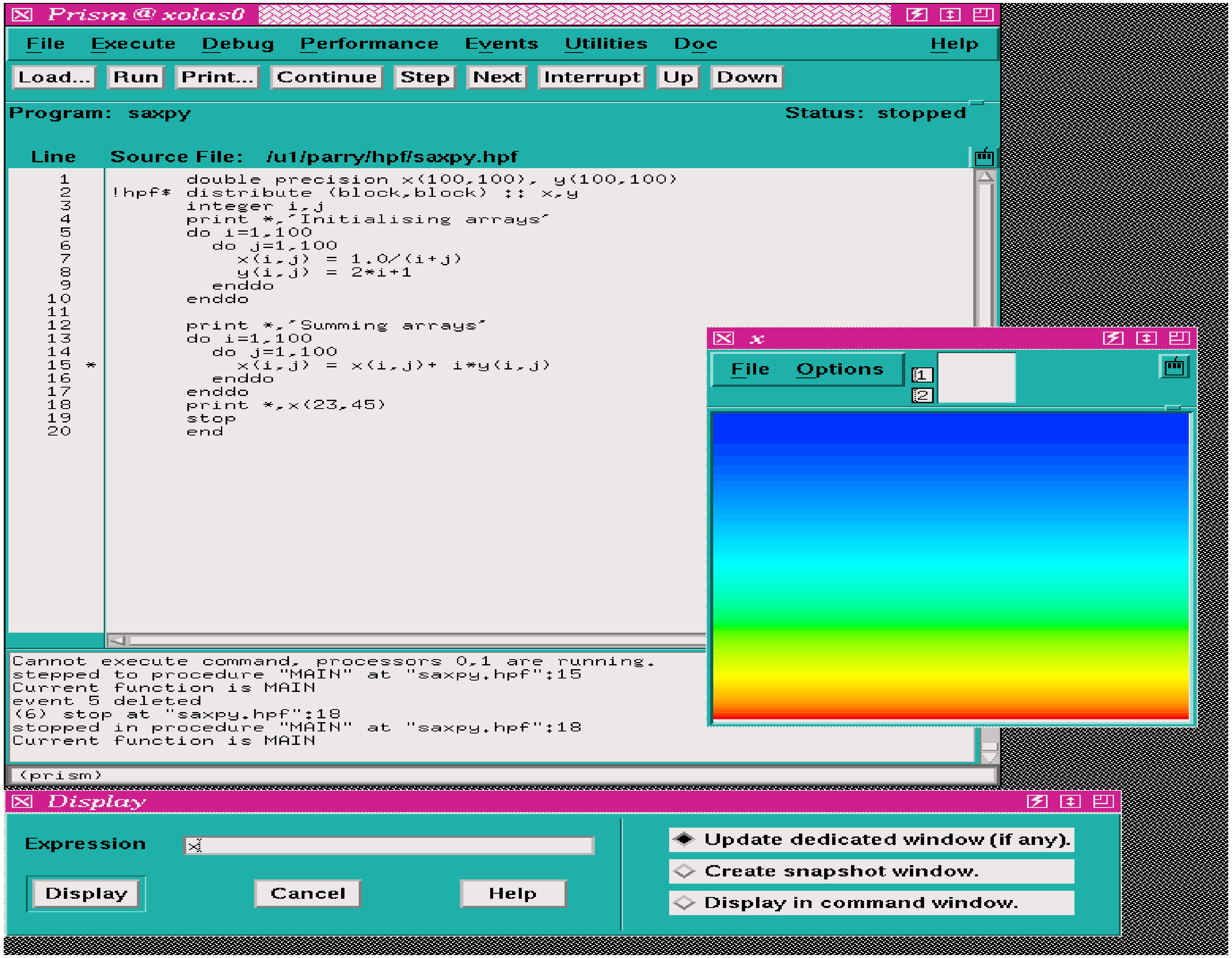
- tmsub (fire and forget)

Using Prism

- Check out the man page or the online help.
- Supports gcc, Sun C, Sun Fortran, HPF
- Compile your program with -g! Also use -xs if using Sun C or Sun Fortran. Use -tmprofile for HPF programs if you want performance data.
- Run it! Be sure to give the right partition and number of processors.

```
prism -np 4 -tmrun "-p nixon" saxpy
```

Prism in Action



Other Goodies

In `/cs/parry`**:**

- ScaLAPACK (`SCALAPACK, scalapack+blacslibs, scalapackexamples`)
- MPICH Arctic (`mpich`, almost there)

For copies of these slides,
`http://theory.lcs.mit.edu/~parry/xugtalk.ps`

Online documentation can be found at `http://docs.sun.com` and `http://www.sun.com/servers/hpc/software`