Appendix

Pprof output for 16 processors

```
Reading Profile files in profile.*

NODE 0;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           2        1,115           1           7    1115667 int main(int, char **) C
 92.1       1,027        1,027           1           0    1027312 MPI_Init()
  6.4       0.249           71           1          23      71167 double powerMethod(double *, double *, int, int) C
  6.4          68           70          10          40       7088 void matVec(double *, double *, double *, int) C
  1.1          12           12           1           2      12621 void generatematrix(double *, int) C
  0.2           2            2           1           0       2505 MPI_Finalize()
  0.1           1            1          10           0        145 MPI_Gather()
  0.1        0.61         0.61          10           0         61 MPI_Bcast()
  0.0       0.041        0.041          11           0          4 double norm2(double *, int) C
  0.0       0.009        0.009          13           0          1 MPI_Comm_size()
  0.0       0.004        0.004          13           0          0 MPI_Comm_rank()
  0.0       0.004        0.004           1           0          4 void generatevec(double *, int) C
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 0, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
        10       5000       5000       5000          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 1;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,115           1           7    1115490 int main(int, char **) C
 92.1       1,027        1,027           1           0    1027362 MPI_Init()
  6.3        0.25           70           1          23      70733 double powerMethod(double *, double *, int, int) C
  6.3          68           70          10          40       7045 void matVec(double *, double *, double *, int) C
  1.2          13           13           1           2      13063 void generatematrix(double *, int) C
  0.2           2            2           1           0       2332 MPI_Finalize()
  0.1           1            1          10           0        128 MPI_Bcast()
  0.0       0.408        0.408          10           0         41 MPI_Gather()
  0.0       0.036        0.036          11           0          3 double norm2(double *, int) C
  0.0       0.008        0.008          13           0          1 MPI_Comm_size()
  0.0       0.004        0.004           1           0          4 void generatevec(double *, int) C
  0.0           0            0          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 1, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 2;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,115           1           7    1115586 int main(int, char **) C
 92.1       1,027        1,027           1           0    1027346 MPI_Init()
  6.3        0.25           70           1          23      70504 double powerMethod(double *, double *, int, int) C
  6.3          69           70          10          40       7022 void matVec(double *, double *, double *, int) C
  1.2          13           13           1           2      13232 void generatematrix(double *, int) C
  0.2           2            2           1           0       2688 MPI_Finalize()
  0.1       0.868        0.868          10           0         87 MPI_Bcast()
  0.0       0.309        0.309          10           0         31 MPI_Gather()
  0.0       0.037        0.037          11           0          3 double norm2(double *, int) C
  0.0       0.007        0.007          13           0          1 MPI_Comm_size()
  0.0       0.004        0.004           1           0          4 void generatevec(double *, int) C
  0.0       0.001        0.001          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 2, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
```

```
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 3;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1       1,115           1           7    1115479 int main(int, char **) C
 92.1       1,027       1,027           1           0    1027346 MPI_Init()
  6.3       0.245          70           1          23      70319 double powerMethod(double *, double *, int, int) C
  6.3          69          70          10          40       7003 void matVec(double *, double *, double *, int) C
  1.2          13          13           1           2      13481 void generatematrix(double *, int) C
  0.2           2           2           1           0       2545 MPI_Finalize()
  0.1       0.648       0.648          10           0         65 MPI_Bcast()
  0.0       0.337       0.337          10           0         34 MPI_Gather()
  0.0       0.041       0.041          11           0          4 double norm2(double *, int) C
  0.0       0.008       0.008          13           0          1 MPI_Comm_size()
  0.0       0.005       0.005           1           0          5 void generatevec(double *, int) C
  0.0       0.003       0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 3, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

FUNCTION SUMMARY (total):
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           7       4,462           4          28    1115556 int main(int, char **) C
 92.1       4,109       4,109           4           0    1027342 MPI_Init()
  6.3       0.994         282           4          92      70681 double powerMethod(double *, double *, int, int) C
  6.3         275         281          40         160       7039 void matVec(double *, double *, double *, int) C
  1.2          52          52           4           8      13099 void generatematrix(double *, int) C
  0.2          10          10           4           0       2518 MPI_Finalize()
  0.1           3           3          40           0         85 MPI_Bcast()
  0.1           2           2          40           0         63 MPI_Gather()
  0.0       0.155       0.155          44           0          4 double norm2(double *, int) C
  0.0       0.032       0.032          52           0          1 MPI_Comm_size()
  0.0       0.017       0.017           4           0          4 void generatevec(double *, int) C
  0.0       0.008       0.008          52           0          0 MPI_Comm_rank()

FUNCTION SUMMARY (mean):
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1       1,115           1           7    1115556 int main(int, char **) C
 92.1       1,027       1,027           1           0    1027342 MPI_Init()
  6.3       0.248          70           1          23      70681 double powerMethod(double *, double *, int, int) C
  6.3          68          70          10          40       7039 void matVec(double *, double *, double *, int) C
  1.2          13          13           1           2      13099 void generatematrix(double *, int) C
  0.2           2           2           1           0       2518 MPI_Finalize()
  0.1       0.853       0.853          10           0         85 MPI_Bcast()
  0.1       0.626       0.626          10           0         63 MPI_Gather()
  0.0      0.0387      0.0387          11           0          4 double norm2(double *, int) C
  0.0       0.008       0.008          13           0          1 MPI_Comm_size()
  0.0     0.00425     0.00425           1           0          4 void generatevec(double *, int) C
  0.0       0.002       0.002          13           0          0 MPI_Comm_rank()
```

Pprof output for 16 processors

```
Reading Profile files in profile.*

NODE 0;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,109           1           7    1109381 int main(int, char **) C
 96.7       1,073        1,073           1           0    1073154 MPI_Init()
  2.1       0.257           23           1          23      23181 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2288 void matVec(double *, double *, double *, int) C
  0.7           8            8           1           0       8135 MPI_Finalize()
  0.3           3            3           1           2       3441 void generatematrix(double *, int) C
  0.2           2            2          10           0        261 MPI_Gather()
  0.2           2            2          10           0        243 MPI_Bcast()
  0.0       0.039        0.039          11           0          4 double norm2(double *, int) C
  0.0       0.012        0.012           1           0         12 void generatevec(double *, int) C
  0.0       0.005        0.005          13           0          0 MPI_Comm_size()
  0.0       0.003        0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 0, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
        10       1248       1248       1248          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 1;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,104           1           7    1104604 int main(int, char **) C
 97.1       1,072        1,072           1           0    1072019 MPI_Init()
  2.1       0.256           23           1          23      23029 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2273 void matVec(double *, double *, double *, int) C
  0.5           5            5          10           0        514 MPI_Bcast()
  0.4           4            4           1           0       4548 MPI_Finalize()
  0.3           3            3           1           2       3424 void generatematrix(double *, int) C
  0.0       0.161        0.161          10           0         16 MPI_Gather()
  0.0       0.039        0.039          11           0          4 double norm2(double *, int) C
  0.0       0.015        0.015           1           0         15 void generatevec(double *, int) C
  0.0       0.008        0.008          13           0          1 MPI_Comm_size()
  0.0       0.003        0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 1, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 2;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,103           1           7    1103953 int main(int, char **) C
 97.0       1,071        1,071           1           0    1071366 MPI_Init()
  2.1       0.257           23           1          23      23030 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2273 void matVec(double *, double *, double *, int) C
  0.5           5            5          10           0        511 MPI_Bcast()
  0.4           4            4           1           0       4669 MPI_Finalize()
  0.3           3            3           1           2       3428 void generatematrix(double *, int) C
  0.0       0.146        0.146          10           0         15 MPI_Gather()
  0.0        0.04         0.04          11           0          4 double norm2(double *, int) C
  0.0       0.016        0.016           1           0         16 void generatevec(double *, int) C
  0.0       0.012        0.012          13           0          1 MPI_Comm_rank()
  0.0       0.006        0.006          13           0          0 MPI_Comm_size()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 2, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
```

```
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 3;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,103           1           7    1103833 int main(int, char **) C
 97.1       1,071        1,071           1           0    1071370 MPI_Init()
  2.1       0.259           23           1          23      23032 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2273 void matVec(double *, double *, double *, int) C
  0.5           5            5          10           0        504 MPI_Bcast()
  0.4           4            4           1           0       4730 MPI_Finalize()
  0.3           3            3           1           2       3414 void generatematrix(double *, int) C
  0.0       0.118        0.118          10           0         12 MPI_Gather()
  0.0       0.038        0.038          11           0          3 double norm2(double *, int) C
  0.0       0.014        0.014           1           0         14 void generatevec(double *, int) C
  0.0       0.006        0.006          13           0          0 MPI_Comm_size()
  0.0       0.002        0.002          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 3, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 4;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,103           1           7    1103954 int main(int, char **) C
 97.0       1,071        1,071           1           0    1071374 MPI_Init()
  2.1       0.247           23           1          23      23014 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2273 void matVec(double *, double *, double *, int) C
  0.5           5            5          10           0        516 MPI_Bcast()
  0.4           4            4           1           0       4605 MPI_Finalize()
  0.3           3            3           1           2       3467 void generatematrix(double *, int) C
  0.0        0.11         0.11          10           0         11 MPI_Gather()
  0.0       0.038        0.038          11           0          3 double norm2(double *, int) C
  0.0       0.012        0.012           1           0         12 void generatevec(double *, int) C
  0.0       0.006        0.006          13           0          0 MPI_Comm_size()
  0.0       0.002        0.002          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 4, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 5;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,103           1           7    1103057 int main(int, char **) C
 97.0       1,070        1,070           1           0    1070183 MPI_Init()
  2.1       0.253           22           1          23      22907 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2262 void matVec(double *, double *, double *, int) C
  0.5           5            5           1           0       5036 MPI_Finalize()
  0.4           4            4          10           0        492 MPI_Bcast()
  0.3           3            3           1           2       3473 void generatematrix(double *, int) C
  0.0        0.11         0.11          10           0         11 MPI_Gather()
  0.0       0.038        0.038          11           0          3 double norm2(double *, int) C
  0.0       0.014        0.014           1           0         14 void generatevec(double *, int) C
  0.0       0.007        0.007          13           0          1 MPI_Comm_size()
  0.0       0.005        0.005          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 5, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
```

```
---------------------------------------------------------------------------------------

NODE 6;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1       1,101           1           7    1101804 int main(int, char **) C
 97.1       1,069       1,069           1           0    1069359 MPI_Init()
  2.1       0.247          22           1          23      22967 double powerMethod(double *, double *, int, int) C
  2.1          17          22          10          40       2268 void matVec(double *, double *, double *, int) C
  0.5           4           4          10           0        500 MPI_Bcast()
  0.4           4           4           1           0       4449 MPI_Finalize()
  0.3           3           3           1           2       3501 void generatematrix(double *, int) C
  0.0       0.117       0.117          10           0         12 MPI_Gather()
  0.0        0.04        0.04          11           0          4 double norm2(double *, int) C
  0.0        0.02        0.02           1           0         20 void generatevec(double *, int) C
  0.0       0.006       0.006          13           0          0 MPI_Comm_size()
  0.0       0.005       0.005          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 6, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 7;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1       1,108           1           7    1108454 int main(int, char **) C
 96.5       1,069       1,069           1           0    1069599 MPI_Init()
  2.1        0.25          23           1          23      23130 double powerMethod(double *, double *, int, int) C
  2.1          17          22          10          40       2284 void matVec(double *, double *, double *, int) C
  1.0          10          10           1           0      10871 MPI_Finalize()
  0.5           5           5          10           0        532 MPI_Bcast()
  0.3           3           3           1           2       3505 void generatematrix(double *, int) C
  0.0       0.086       0.086          10           0          9 MPI_Gather()
  0.0       0.035       0.035          11           0          3 double norm2(double *, int) C
  0.0       0.014       0.014           1           0         14 void generatevec(double *, int) C
  0.0       0.005       0.005          13           0          0 MPI_Comm_size()
  0.0       0.003       0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 7, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 8;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1       1,090           1           7    1090861 int main(int, char **) C
 97.0       1,057       1,057           1           0    1057941 MPI_Init()
  2.1       0.267          22           1          23      22966 double powerMethod(double *, double *, int, int) C
  2.1          17          22          10          40       2266 void matVec(double *, double *, double *, int) C
  0.5           4           4           1           0       4989 MPI_Finalize()
  0.4           4           4          10           0        459 MPI_Bcast()
  0.3           3           3           1           2       3524 void generatematrix(double *, int) C
  0.0       0.206       0.206          10           0         21 MPI_Gather()
  0.0       0.037       0.037          11           0          3 double norm2(double *, int) C
  0.0       0.014       0.014           1           0         14 void generatevec(double *, int) C
  0.0       0.005       0.005          13           0          0 MPI_Comm_size()
  0.0       0.003       0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 8, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------
```

```
NODE 9;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,090           1           7    1090874 int main(int, char **) C
 97.0       1,057        1,057           1           0    1057936 MPI_Init()
  2.1       0.249           22           1          23      22947 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2266 void matVec(double *, double *, double *, int) C
  0.5           4            4           1           0       4969 MPI_Finalize()
  0.5           4            4          10           0        491 MPI_Bcast()
  0.3           3            3           1           2       3513 void generatematrix(double *, int) C
  0.0       0.322        0.322          10           0         32 MPI_Gather()
  0.0       0.037        0.037          11           0          3 double norm2(double *, int) C
  0.0       0.013        0.013           1           0         13 void generatevec(double *, int) C
  0.0       0.004        0.004          13           0          0 MPI_Comm_rank()
  0.0       0.003        0.003          13           0          0 MPI_Comm_size()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 9, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 10;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,090           1           7    1090315 int main(int, char **) C
 97.0       1,057        1,057           1           0    1057399 MPI_Init()
  2.1       0.247           22           1          23      22901 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2261 void matVec(double *, double *, double *, int) C
  0.5           5            5           1           0       5052 MPI_Finalize()
  0.5           4            4          10           0        491 MPI_Bcast()
  0.3           3            3           1           2       3573 void generatematrix(double *, int) C
  0.0       0.255        0.255          10           0         26 MPI_Gather()
  0.0       0.039        0.039          11           0          4 double norm2(double *, int) C
  0.0       0.009        0.009           1           0          9 void generatevec(double *, int) C
  0.0       0.005        0.005          13           0          0 MPI_Comm_size()
  0.0       0.004        0.004          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 10, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 11;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,096           1           7    1096643 int main(int, char **) C
 96.4       1,057        1,057           1           0    1057706 MPI_Init()
  2.1       0.255           22           1          23      22931 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2264 void matVec(double *, double *, double *, int) C
  1.0          11           11           1           0      11130 MPI_Finalize()
  0.4           4            4          10           0        482 MPI_Bcast()
  0.3           3            3           1           2       3528 void generatematrix(double *, int) C
  0.0       0.244        0.244          10           0         24 MPI_Gather()
  0.0       0.037        0.037          11           0          3 double norm2(double *, int) C
  0.0       0.012        0.012           1           0         12 void generatevec(double *, int) C
  0.0       0.004        0.004          13           0          0 MPI_Comm_size()
  0.0       0.001        0.001          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 11, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 12;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
```

```
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,090           1           7    1090713 int main(int, char **) C
 97.0       1,057        1,057           1           0    1057745 MPI_Init()
  2.1       0.251           22           1          23      22882 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2259 void matVec(double *, double *, double *, int) C
  0.5           4            4           1           0       4909 MPI_Finalize()
  0.4           4            4          10           0        481 MPI_Bcast()
  0.3           3            3           1           2       3567 void generatematrix(double *, int) C
  0.0       0.236        0.236          10           0         24 MPI_Gather()
  0.0       0.036        0.036          11           0          3 double norm2(double *, int) C
  0.0       0.014        0.014           1           0         14 void generatevec(double *, int) C
  0.0       0.006        0.006          13           0          0 MPI_Comm_size()
  0.0       0.003        0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 12, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 13;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,089           1           7    1089178 int main(int, char **) C
 97.0       1,056        1,056           1           0    1056270 MPI_Init()
  2.1       0.247           22           1          23      22860 double powerMethod(double *, double *, int, int) C
  2.1          17           22          10          40       2257 void matVec(double *, double *, double *, int) C
  0.5           5            5           1           0       5299 MPI_Finalize()
  0.4           4            4          10           0        481 MPI_Bcast()
  0.3           3            3           1           2       3613 void generatematrix(double *, int) C
  0.0       0.181        0.181          10           0         18 MPI_Gather()
  0.0        0.04         0.04          11           0          4 double norm2(double *, int) C
  0.0       0.012        0.012           1           0         12 void generatevec(double *, int) C
  0.0       0.007        0.007          13           0          1 MPI_Comm_rank()
  0.0       0.003        0.003          13           0          0 MPI_Comm_size()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 13, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 14;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0           1        1,089           1           7    1089593 int main(int, char **) C
 97.1       1,058        1,058           1           0    1058327 MPI_Init()
  1.9       0.253           21           1          23      21060 double powerMethod(double *, double *, int, int) C
  1.9          17           20          10          40       2077 void matVec(double *, double *, double *, int) C
  0.5           4            4           1           0       4975 MPI_Finalize()
  0.3           3            3           1           2       3768 void generatematrix(double *, int) C
  0.3           3            3          10           0        327 MPI_Bcast()
  0.0       0.212        0.212          10           0         21 MPI_Gather()
  0.0       0.036        0.036          11           0          3 double norm2(double *, int) C
  0.0       0.017        0.017           1           0         17 void generatevec(double *, int) C
  0.0       0.004        0.004          13           0          0 MPI_Comm_size()
  0.0       0.003        0.003          13           0          0 MPI_Comm_rank()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 14, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

NODE 15;CONTEXT 0;THREAD 0:
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
```

```
---------------------------------------------------------------------------------------
100.0            1        1,097           1           7    1097394 int main(int, char **) C
 96.4        1,057        1,057           1           0    1057727 MPI_Init()
  2.1        0.249           22           1          23      22822 double powerMethod(double *, double *, int, int) C
  2.1           17           22          10          40       2253 void matVec(double *, double *, double *, int) C
  1.1           11           11           1           0      11736 MPI_Finalize()
  0.4            4            4          10           0        493 MPI_Bcast()
  0.3            3            3           1           2       3662 void generatematrix(double *, int) C
  0.0        0.181        0.181          10           0         18 MPI_Gather()
  0.0        0.037        0.037          11           0          3 double norm2(double *, int) C
  0.0        0.019        0.019           1           0         19 void generatevec(double *, int) C
  0.0        0.006        0.006          13           0          0 MPI_Comm_rank()
  0.0        0.005        0.005          13           0          0 MPI_Comm_size()
---------------------------------------------------------------------------------------

USER EVENTS Profile :NODE 15, CONTEXT 0, THREAD 0
---------------------------------------------------------------------------------------
NumSamples   MaxValue   MinValue  MeanValue  Std. Dev.  Event Name
---------------------------------------------------------------------------------------
        10      2E+04      2E+04      2E+04          0  Message size for broadcast
         0          0          0          0          0  Message size for gather
---------------------------------------------------------------------------------------

FUNCTION SUMMARY (total):
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0          22       17,574          16         112    1098413 int main(int, char **) C
 96.9      17,029       17,029          16           0    1064342 MPI_Init()
  2.1           4          365          16         368      22854 double powerMethod(double *, double *, int, int) C
  2.1         280          360         160         640       2256 void matVec(double *, double *, double *, int) C
  0.6         100          100          16           0       6256 MPI_Finalize()
  0.4          75           75         160           0        470 MPI_Bcast()
  0.3          56           56          16          32       3525 void generatematrix(double *, int) C
  0.0           5            5         160           0         33 MPI_Gather()
  0.0       0.606        0.606         176           0          3 double norm2(double *, int) C
  0.0       0.227        0.227          16           0         14 void generatevec(double *, int) C
  0.0       0.084        0.084         208           0          0 MPI_Comm_size()
  0.0       0.066        0.066         208           0          0 MPI_Comm_rank()

FUNCTION SUMMARY (mean):
---------------------------------------------------------------------------------------
%Time    Exclusive    Inclusive       #Call      #Subrs  Inclusive Name
              msec   total msec                          usec/call
---------------------------------------------------------------------------------------
100.0            1        1,098           1           7    1098413 int main(int, char **) C
 96.9        1,064        1,064           1           0    1064342 MPI_Init()
  2.1        0.253           22           1          23      22854 double powerMethod(double *, double *, int, int) C
  2.1           17           22          10          40       2256 void matVec(double *, double *, double *, int) C
  0.6            6            6           1           0       6256 MPI_Finalize()
  0.4            4            4          10           0        470 MPI_Bcast()
  0.3            3            3           1           2       3525 void generatematrix(double *, int) C
  0.0        0.331        0.331          10           0         33 MPI_Gather()
  0.0       0.0379       0.0379          11           0          3 double norm2(double *, int) C
  0.0       0.0142       0.0142           1           0         14 void generatevec(double *, int) C
  0.0      0.00525      0.00525          13           0          0 MPI_Comm_size()
  0.0      0.00413      0.00413          13           0          0 MPI_Comm_rank()
```