Курс "ППП" 2011 осень

Трассировка MPI программ

Знакомство:
Библиотека трассировки - mpicl
Визуализатор трассы - TV

План

- Интерфейс библиотеки mpicl
- Пример подготовки пограммы
- Просмотр трассы в TV1.0
- Выдача задания лабороторной работы №2

Интерфейс библиотеки mpicl

MPI_Init - ....

tracefiles - specify temporary and/or permanent trace files (required. If node process 0 opens a tracefile, then data from other processes that have not done so will be funneled through process 0.)

tracestatistics - specify which user events to collect statistics for (optional)

tracelevel - specify level of tracing (optional, but no data collected if levels not set)

tracenode - begin tracing
(sync option required if collecting data for ParaGraph;
sync option not required if only collecting statistics)

traceevent - to record user events
(optional, and called as often as needed)

tracedata - to record special user event data
(optional, and called as often as needed)

MPI_Finalize - turn off tracing, wait until all processes are finished, renormalize clocks if necessary, then flush trace data to disk one process at a time

и еще .....

Интерфейс библиотеки mpicl

void tracefiles(char *tempfile, char *permfile, int verbose)

: used for specifying temporary and permanent disk storage for trace data

- tempfile is the prefix (including directory) of the name of the disk to be used for temporary storage of trace data. A suffix (the node number) is appended to make all temporary files unique. If a null string is specified for this parameter, a temporary file is not used.

- permfile is the name of the disk file where this node's trace data should be sent for "permanent" storage. If a null string is specified for this parameter, the data is send to processor 0. If processor 0 does not specify a permanent tracefile name, the data sent to it or generated locally is not saved.

- verbose == 1, fields in trace records are labelled
  != 1, fields are not labelled (ParaGraph-readable form)

Интерфейс библиотеки mpicl

void tracenode(int tracesize, int flush, int sync)

: node initialization routine

- tracesize is the number of bytes to be allocated for data storage

- flush == 1, if space runs out, send the data to secondary storage
and reinitialize
== 2, if space runs out, overwrite the data
otherwise, if space runs out, stop collecting data

- sync == 0, do nothing
== 1, synchronize the processor clocks.

Интерфейс библиотеки mpicl

void tracelevel(int mpi, int user, int trace)

: set the types of tracing data collected

- mpi: tracing level for MPI commands

- user: tracing level for user-specified events

- trace: tracing level for MPICL commands

if < 0, then instrumentation is disabled.
if >= 0, then statistics are collected.
if > 0, then event records are generated.

Интерфейс библиотеки mpicl

void traceinfo (int *remaining, int *picl, int *user, int *trace)

: get instrumentation information

- remaining: approximate number of event records that can be saved in the remaining free storage in the instrumentation work space

- mpi: tracing level for MPI commands

- user: tracing level for user-specified events

- trace: tracing level for MPICL commands

Интерфейс библиотеки mpicl

void traceexit()

: stop tracing

void traceflush()

: send data to the temporary or permanent trace file and reinitialize the data storage area. (Implicitly called in MPI_Finalzie if instrumentation has ever been enabled.)

Интерфейс библиотеки mpicl

void traceevent(char *recordstring, int event, int nparams, int *params)

: used to record information about a user-defined event
- recordstring: record the beginning ("entry"), ending ("exit"), or simple occurrence ("mark") of a user event, label the event ("label"), or write a message to the trace file immediately ("message").

- event: user-specified event identifier. It should be a nonnegative integer. If statistics for this event are to be collected, the event id should also be less than the "events" field specified in the call to tracestatistics.

- nparams: number of integers or characters (see the params description below) in the params data.

- params: The data associated with the “entry”, “exit”, and “mark” records should be integer. The data associated with the “label” and “message” records should be character.

Интерфейс библиотеки mpicl

void tracedata(int event, int dataid, char *datatype, int items, char *data)

: used to save (additional) data associated with a user-defined event.

- event: user-specified event identifier. It should be a nonnegative integer.

- dataid: user-specified data identifier. This is used by by the user to identify the data, and the only restriction is that it be an integer.

- datatype: charater string indicating type of data. Supported data types are "character", "integer", "long", "float", "real", and "double".

- items: number of data elements (of the specified type)

- data: user event data, or specified type.

Пример подготовки пограммы

```
#include  <pcontrol.h>


/* enable tracing */
MPI_Pcontrol(TRACEFILES, "", "tracefile", 0);
MPI_Pcontrol(TRACELEVEL, 1, 1, 1);
MPI_Pcontrol(TRACENODE, 1000000, 0, 1);



MPI_Pcontrol(TRACEEVENT, "mark", 0, 0, "");
MPI_Pcontrol(TRACEEVENT, "entry", 1, 0, "");
MPI_Pcontrol(TRACEEVENT, "exit", 1, 0, "");
```

Пример подготовки пограммы

- Компилировать с библиотекой mpicl
  - Использовать **mpicc-TV aa.c -o aa**
- Запустить обычным образом
- Отсортировать трассу
  - Использовать **tracesort tracefile**

Просмотр трассы в TV1.0

Просмотр трассы на рабочем месте

- Загрузить TV 1.0
- Перенести файл трассы на локальную машину
- Применить п.1. к п.2.