

OTF Tools

Andreas Knüpfer

Introduction

The Open Trace Format Library (OTF) comes with support tools that perform frequent tasks.

otfmerge: Change the number of streams for an existing OTF trace.

otfaux: Append snapshot and statistics information to an existing OTF trace.

vtf2otf: Convert VTF3 trace files to OTF format.

otf2vtf: Convert OTF trace files to VTF format. (limited functionality).

otfdump: Convert an OTF trace or parts of it into a human readable, long version.

otfcompress: Compression program for single OTF files.

otfconfig: Show parameters of the OTF configuration.

otfprofile: Generate a profile of an OTF trace in LaTeX format.

otfshrink: Create a new OTF trace that only includes specified processes.

otfinfo: Program to get basic information of an OTF trace.

For all OTF tools the `-V` option will print the OTF version. See below for detailed description of each tool.

otfmerge

The **otfmerge**[-mpi] tool allows to merge an existing OTF trace to a different number of streams. The -n option specifies the number of output streams. At maximum there will be as many output streams as there are trace processes. Setting -n 0 will create the maximum number of streams automatically.

The output file name is set via the -o option. With -f it is possible to restrict the number of file handles used concurrently by otfmerge[-mpi]. This is necessary if the number of files exceeds the limit of file handles as set by the environment.

Via -rb and -wb the internal input resp. output buffer sizes per stream can be changed. However, the default buffer sizes should be suitable most of the time. The -stats and -snaps options allow to include statistics and snapshot records when merging. By default they are ignored.

Global definition records are copied to the output trace. Local definitions are also copied even though this invalidates the trace! Local definitions are not expected and should have been translated to global definitions beforehand by the resp. creator.

The following short help message is given when otfmerge[-mpi] is called with the -h option:

```
otfmerge[-mpi] - Change the number of streams for an
                  existing OTF trace.
```

```
Syntax: otfmerge[-mpi] [options] <input file name>
```

options:

| | |
|------------|---|
| -h, --help | show this help message |
| -V | show OTF version |
| -p | show progress |
| -n <n> | set number of streams for output set this to 0 for using one stream per process (default: 1) |
| -f <n> | max. number of filehandles available per rank |
| -o <name> | namestub of the output file (default: out) |
| -rb <size> | set buffersize of the reader |

| | |
|-------------|----------------------------------|
| | (for each rank) |
| -wb <size> | set buffersize of the writer |
| | (for each rank) |
| -z <zlevel> | write compressed output |
| | zlevel reaches from 0 to 9 where |
| | 0 is no compression and 9 is the |
| | highest level |
| --stats | cover statistics too |
| --snaps | cover snapshots too |
| --long | write long OTF format |

otfaux

The `otfaux` tool appends auxiliary information to an existing OTF trace. The event records are read but not modified.

There are two kinds of auxiliary data. First, there are snapshot information that provide the complete status of a trace process at a given time stamp. This contains call stack information, pending messages, current performance counter values, etc. Generating snapshots involves also in generating a thumbnail. This can be used to give the user an overview of the function activities in a trace. Second, there are statistics information accumulated from the beginning of the trace until the current time stamp. Statistics involve the number of calls, exclusive and inclusive time for per function resp. function group or accumulated message count and message volume for communication, etc. Statistics are always monotone increasing not unlike program profiles. Let S_a and S_b two statistics at time stamps $a < b$ then $S := S_b - S_a$ is the profile information for the time interval $[a, b]$.

Both, snapshots and statistics are generated at certain break point, which can be specified in several ways: First, `-n x` allows to have x break points distributed regularly over the trace's time interval. Second, `-p y` will generate a break point every y ticks starting from the beginning of the trace. If both options are given the one producing more break points wins. In addition break points can be specified with `-t z` which will add a single explicit break point regardless of `-n` and `-p` options.

If the `-g` switch is set then function statistics are replaced by function group statistics. This produces more terse output. The option `-v` switches on verbose mode which prints break point time stamps while processing.

In case there are auxiliary information already present the `-F` option forces `otfaux` to overwrite it. Otherwise `otfaux` exits with an error message. Via `-b` internal buffer size per stream can be adjusted although the default setting is suitable most of the time.

The `-h` switch provides the following short help message:

```
otfaux - Append snapshots and statistics to an
         existing OTF trace at given 'break'
         time stamps.
```

Syntax: `otfaux [options] <input file name>`

options:

| | |
|------------------------------|--|
| <code>-h, --help</code> | show this help message |
| <code>-V</code> | show OTF version |
| <code>-b <size></code> | buffer size for read and write operations |
| <code>-n <n></code> | number of breaks (distributed regularly) if <code>-p</code> and <code>-t</code> are not set, the default for <code>-n</code> is 200 breaks |
| <code>-p <p></code> | create break every ' <code>p</code> ' ticks (if both, <code>-n</code> and <code>-p</code> are specified the one producing more breaks wins) |
| <code>-t <t></code> | define (additional) break at given time stamp |
| <code>-F</code> | force overwrite old snapshots and statistics |
| <code>-R</code> | delete existing snapshots and statistics only |
| <code>-f <n></code> | max number of filehandles output |
| <code>--funcgroups</code> | create functiongroup summaries instead of function summaries |
| <code>--filegroups</code> | create file group summaries instead of file summaries |
| <code>-v</code> | verbose mode, print break time stamps |
| <code>-a</code> | show advancing progress during operation |

```

-o <namestub> makes a copy of the input trace
--thumbnail-procs <n>
    upper bound for the number of
    processes in the thumbnail
--thumbnail-samples <n>
    upper bound for the number of
    sampling points in the thumbnail
--inline-snapshots
    produces inline snapshots
    (requires the -o option)
--match-messages
    attach receive time information to
    send events (requires the -o option)

--snapshots    write snapshots and a thumbnail
                but NO statistics (default mode)
--thumbnail    write ONLY a thumbnail
--statistics    write ONLY statistics but NO
                snapshots or a thumbnail
--all          write snapshots, a thumbnail, and
                statistics

-s a[,b]*      regard given streams only when
                computing statistics.
                expects a single token or comma
                separated list.
                this implies the '--statistics'
                option!
-l            list existing stream tokens

```

vtf2otf

The `vtf2otf` tool translates a VTF3 trace to OTF. With `-o` the output file name is specified. If it has no `'.otf'` suffix already then it is appended automatically. This tool supports only those record types supported by OTF. Some deprecated or experimental VTF3 records are ignored.

The number of output streams to be generated is given with `-n n`. The `-f` option allows to restrict the number of file handles to be opened concurrently in case

there are too many streams. Again, `-b` adjusts the output buffer size per stream if the default is not suitable. If the `-h` switch is set the following help message is provided:

```
vtf2otf - Convert VTF3 trace files to OTF format.
```

```
Syntax: vtf2otf [options] <input file name>
```

```
options:
```

```
-h, --help      show this help message
-V              show OTF version
-o <file>       output file
-f <n>          max count of filehandles
-n <n>          output stream count
-b <n>          size of the writer buffer
-z <n>          use zlib compression
-io            compute io events. This is
               necessary for getting correct
               durations in IO-operations.
               Result of this step is a file with
               extra information. This file is
               used for creating correct duration-
               information in a normal run.
               If you do not have these extra
               -information-file, the duration of
               every IO-operation will be zero.
```

otf2vtf

The `otf2vtf` tool performs the backward transformation from OTF to VTF3. Again, `-o` gives the VTF3 output file name including file suffix. Via `-b` OTF's input buffer size per stream can be adjusted if necessary.

With `-A` resp. `-B` the VTF3 sub-format can be set to ASCII (default) resp. binary. The `-h` switch produces a short help message like follows:

otf2vtf - Convert OTF trace files to VTF3 format.

Syntax: otf2vtf [options] <input file name>

options:

| | |
|------------|--|
| -h, --help | show this help message |
| -V | show OTF version |
| -o <file> | output file |
| -b <n> | size of the reader buffer |
| -A | write VTF3 ASCII sub-format (default) |
| -B | write VTF3 binary sub-format |

otfdump

The `otfdump` tool prints information about a tracefile in human readable format.

otfdump - Convert an OTF trace or parts of it into a human readable, long version.

Syntax: otfdump [options] <input file name>

options:

| | |
|----------------|---|
| -h, --help | show this help message |
| -V | show OTF version |
| -f <n> | set max number of filehandles available (default: 50) |
| -o <file> | output file if the output file is unspecified the stdout will be used |
| --num <a> | output only records no. [a,b] |
| --time <a> | output only records with time stamp in [a,b] |

```

--nodef          omit definition records
--noevent        omit event records
--nostat         omit statistic records
--nosnap         omit snapshot records
--nomarker       omit marker records

--nokeyvalue     omit key-value pairs
--fullkeyvalue   show key-value pairs including the
                  contents of byte-arrays

--procs <a>      show only processes <a>
                  <a> is a space-separated list of
                  process-tokens
--records <a>    show only records <a>
                  <a> is a space-separated list of
                  record-type-numbers
                  record-type-numbers can be found in
                  OTF_Definitions.h (OTF*_RECORD)

-s, --silent     do not display anything except the
                  time otfdump needed to read the
                  tracefile

```

otfcompress

The `otfcompress` tool performs compression and decompression on traces.

```
otf(de)compress - Compression program for single
                  OTF files.
```

Syntax: `otf(de)compress [options] <file(s)>`

```

options:
-h, --help      show this help message
-V             show OTF version
-c             compress (default action if

```


| | |
|----------|--|
| | called as 'otfcompress') |
| -d | decompress (default action if called as 'otfdecompress') |
| -k | keep original file (compressed resp. uncompressed) |
| -o <dir> | output directory (implicitly sets -k) |
| -[0-9] | use given compression level (default 4) |
| | 0 - plain |
| | 1 - minimum compression, fastest |
| | 9 - maximum compression, slowest |

otfconfig

The `otfconfig` tool shows various installation parameters of OTF, which are important for developers.

`otfconfig` - Show parameters of the OTF configuration.

Syntax: `otfconfig` [options]

options:

| | |
|---------------|--------------------------------|
| -h, --help | show this help message |
| -V, --version | show OTF version |
| --have-zlib | is zlib enabled |
| --have-zoidfs | is ZOIDFS for IOFSL enabled |
| --includes | path to the otf headers |
| --libs | libline needed for linking otf |
| --sizes | print size of integer types |

otfprofile

The `otfprofile` [-mpi] tool creates a concise profile of an OTF trace in Latex format.

otfprofile[-mpi] - generate a profile of a trace in LaTeX format.

Syntax: otfprofile[-mpi] [options] <input file name>

options:

| | |
|-----------------------|---|
| -h, --help | show this help message |
| -V | show OTF version |
| -v | increase output verbosity (can be used more than once) |
| -p | show progress |
| -f <n> | max. number of filehandles available per rank (default: 50) |
| -b <size> | set buffersize of the reader (default: 1048576) |
| -o <prefix> | specify the prefix of output file(s) (default: result) |
| -g <n> | max. number of process groups in LaTeX output (range: 1-16, default: 16) |
| -c, --cluster[<alg>] | do additional clustering of processes/threads using comparison algorithm <alg> (KMEANS or CLINKAGE) (default comparison algorithm: KMEANS) |
| -m <mapfile> | write cluster mapping to <mapfile> (implies -c, default: result.map) |
| -s <prefix> | call otfshrink to apply the cluster mapping to input trace and produce a new trace named <prefix> with symbolic links to the original (implies -c) |
| -H | use hard groups for CLINKAGE clustering (implies --cluster CLINKAGE) |
| -q <0-1> | quality threshold for CLINKAGE clustering (implies --cluster CLINKAGE, default: 0.1) |

```

--stat          read only summarized information,
                no events
--[no]csv       enable/disable producing CSV output
                (default: disabled)
--[no]marker    enable/disable producing marker output for irregular
                (default: disabled)
--[no]tex       enable/disable producing LaTeX output
                (default: enabled)
--[no]pdf       enable/disable producing PDF output
                (implies --tex if enabled,
                default: enabled)

```

PDF creation requires the PGFPLOTS package version >1.4
<http://sourceforge.net/projects/pgfplots/>

otfshrink

The `otfshrink` tool creates a new `otf` file that is reduced to specified processes.

`otfshrink` - Create a new OTF trace that only includes specified processes.

Syntax: `otfshrink [options] -i <file>`

```

options:
-h, --help      show this help message
-V             show OTF version
-i <file>       input file name
-o <name>       namestub of the output file
                (default: out)
-l "<list>"      a list of processes in quotes
                to enable, i.e. keep in the copy,
                e.g. '-l "1,2 4-8 3",10 12-20'
-v            invert setting from '-l',
                i.e. deactivate/exclude listed
                processes
-m "<list>"      map all listed processes to one

```

| | |
|-----------|---|
| | representative and remove all remaining ones |
| | first process in list is the representative, must not be mixed with '-l' and '-v' |
| -f <file> | read multiple '-m' lists from the given file |
| | one list/group per line, empty lines allowed |
| -s <mode> | simulation mode: display all selected processes, no files are created, |
| | (display modes: (l)ist, (r)ange, or (t)able, default: range) |
| -p <file> | displays all processes with name and id input file without ".otf" |

Multiple instances of '-l', '-m', and '-f' may be used.

otfinfo

The otfinfo tool is useful to get basic information about a tracefile.

otfinfo - Program to get basic information of an OTF trace.

Syntax: otfinfo [options] <input file name>

options:

| | |
|-------------|--|
| -h, --help | show this help message |
| -V | show OTF version |
| -f <n> | set max number of filehandles available |
| -l <ilevel> | set the information level for the output |
| | (0 - 4, default: 1) |
| -a | set the information level to 4 |

-p show progress bar for reading
 event files