

Getting started with the FAST profiler

Getting the software

The latest version of the profiler software should be available at [the FAST project site](#).

Tools you will need

To build the profiler library, you will need the following tools:

1. A C++ compiler. We have tested only with the GNU C++ compiler, `g++`. We have used versions 4.1 through 4.3. We expect newer versions to work, but it is likely that older versions will not work.
2. GNU `binutils`, specifically `libbfd`. We require a version that is usable to build a dynamic library. This is typically found in `/usr/lib64`, under the name `libbfd-*-*.so`, where `*` varies from system to system.
3. CMake (from <http://www.cmake.org/>). We require version 2.6 or newer.

While the FAST profiler uses `libunwind`, this version of FAST includes the necessary code; it does not rely on any previously-installed `libunwind`.

To produce call graphs, you will need the following tools:

1. Ruby, version 1.8.7 or 1.9.2.
2. Graphviz

The R statistical analysis system is very useful for analyzing the resulting data.

Building the software

The examples given below assume that you want to build the FAST software in a subdirectory of your current working directory, and that you want the subdirectory to be named `bin`. You can, of course, substitute another name.

1. Uncompress and extract the files. Using GNU tar, this can be done with the command:

```
$> tar xzf fast-x.y.z.tgz
```

This will make a directory called `fast` under your current working directory.

2. Create the directory in which you will build the software. We support only an "out-of-source" build:

```
$> mkdir bin
```

3. Move to the build directory and run cmake:

```
$> cd bin
$> cmake ../fast
```

This will search for necessary libraries and create a makefile and directories for building.

4. Run make, but *do not try a parallel build* (do not use `make -j...`):

```
$> make
```

Although CMake is capable of building makefiles that support parallel builds, the makefiles generated for FAST do not at this time allow this.

This will first build `libunwind`, and then build `libSimpleProfiler.so`. It will also build several example programs that you may find useful for understanding the behavior of the profiler and its supporting tools.

5. Optionally, after making the profiler, you may remove many of the files and directories which are needed to build the profiler, but not to run it after the build:

```
$> rm CMakeCache.txt CTestTestfile.cmake Makefile cmake_install.cmake
$> rm done.libunwind found.libunwind
$> rm -r libunwind/ CMakeFiles/
```

Establishing the working environment

To make the profiling tools available in a interactive shell (either `bash` or `tcsh`), you can run the following from your build directory:

```
source <path-to-bin>/etc/setup
```

Compiling your own software

It is *not* necessary to compile your software specially for use with the FAST profiler. However, for best results, we have found it useful to include debugging symbols (`-g` with the GNU compiler) and to not allow the optimizer to omit frame pointers (`-fno-omit-frame-pointer` with the GNU compiler).

Running the profiler

Once the correct environment has been established, you should be able to profile any non-threaded application by issuing the following command:

```
profrun <executable_name> [executable_args]...
```

For example:

```
profrun examples/ex01/<arch>/ex01
```

A successful run of `profrun` should produce output similar to:

```
profrun: subshell 22729 complete with status=0
profrun: profrun of examples/ex01/Linux.x86_64/ex01 complete;
profrun: - profdata_22729_22729_407766617* files should exist.
```

As indicated by the last line, the profile data should be in the files `profdata_22729_22729_407766617*`. For example:

```
-rwxr--r-- 1 paterno cdadmin 17048 Feb 26 16:12 profdata_22729_22729_407766617
-rw-r--r-- 1 paterno cdadmin   152 Feb 26 16:12 profdata_22729_22729_407766617_debugging
-rw-r--r-- 1 paterno cdadmin    71 Feb 26 16:12 profdata_22729_22729_407766617_libraries
-rw-r--r-- 1 paterno cdadmin  4072 Feb 26 16:12 profdata_22729_22729_407766617_maps
-rw-r--r-- 1 paterno cdadmin  1288 Feb 26 16:12 profdata_22729_22729_407766617_names
-rw-r--r-- 1 paterno cdadmin   113 Feb 26 16:12 profdata_22729_22729_407766617_paths
-rw-r--r-- 1 paterno cdadmin   417 Feb 26 16:12 profdata_22729_22729_407766617_timing
-rw-r--r-- 1 paterno cdadmin    96 Feb 26 16:12 profdata_22729_22729_407766617_totals
```

See the document *FAST User's Manual* for a description of each of the output files.