

GDB Server for Soclib

The GdbServer tool is a software debugger for SoClib.

Overview

The GdbServer is able to manage all processors in a soclib platform. It listens for TCP connection from [Gnu GDB](#) clients. Once connected, clients can be used to freeze, run, step every processor in the platform, add breakpoints, catch exceptions and dump registers and memory content.

Implementation

The GdbServer contains no processor specific code and can be used to manage any Soclib processor model using the generic Iss interface. It is implemented as an Iss wrapper class. When the GdbServer is in use, it intercepts all events between the processor Iss model and the Soclib platform. This enables the GdbServer to access platform resources as viewed from the processor without modifying platform components or processor model source code. The GdbServer is able to freeze the wrapped processor model while the platform is still running.

In order to simplify the debug in a multi-processor context, all processors wrapped in a GdbServer will be frozen when a breakpoint is detected in one single processor.

Usage

Adding GdbServer support to your platform

Adding the GdbServer to your topcell is easy. First include the header:

```
#include "gdbserver.h"
```

Then replace processor instantiation:

```
// Without GdbServer
// soclib::caba::VciXcacheWrapper<soclib::common::Mips32ElIss> cpu0("cpu0", 0, maptab, IntTab(0))
// With GdbServer
soclib::caba::VciXcacheWrapper<soclib::common::GdbServer<soclib::common::Mips32ElIss> > cpu0(
```

Then define the cpu as frozen directly at the boot:

```
soclib::common::GdbServer<soclib::common::Mips32ElIss>::start_frozen();
```

Finally do not forget to update the platform description file:

```
Uses('iss_wrapper', iss_t = 'common:gdb_iss', gdb_iss_t = 'common:mips32el'),
```

Iss v1 and XCacheWrapper example

For using the GdbServer with the legacy Iss v1 simulators (like mipsel) models, the platform description file should contain:

```
Uses('vci_xcache_wrapper', iss_t = 'common:gdb_iss', gdb_iss_t = 'common:ississ2', iss2_t = 'com
```

The topcell description (top.cpp) should contain:

```
soclib::caba::VciXcacheWrapper<soclib::common::GdbServer<vci_param, soclib::common::IssIss2<socl
```

Connecting with a GDB client

When the simulation is running, the GDB Server listen for client connections on TCP port 2346.

```
$ ./system.x mutekh/kernel-soclib-mips.out
```

Its easy to connect to the simulation with a suitable gdb client:

- First launch the gdb client

```
$ mipsel-unknown-elf-gdb mutekh/kernel-soclib-mips.out
GNU gdb 6.7
Copyright (C) 2007 Free Software Foundation, Inc.
```

- Then enter this first command at the prompt

```
(gdb) target remote localhost:2346
Remote debugging using localhost:2346
0xe010cef4 in cpu_atomic_bit_waitset (a=0x602002cc, n=<error type>) at /home/diaxen/proje
99      {
```

Note that you can avoid to type this command every time: you just have to copy it in a .gdbinit file (in the same repertory from where you are launching gdb).

The processors are now frozen. Each processor is seen as a thread by the GDB client:

```
(gdb) info threads
 4 Thread 4 (Processor mips_iss3) 0xe010ceec in cpu_atomic_bit_waitset (a=0x602002cc, n=<error
   at /home/diaxen/projets/mutekh/cpu/mips/include/cpu/hexo/atomic.h:99
 3 Thread 3 (Processor mips_iss2) 0xe010ce64 in lock_spin (lock=0x602002cc) at /home/diaxen/pr
 2 Thread 2 (Processor mips_iss1) 0xe010d110 in gpct_lock_HEXO_SPIN_unlock (lock=0x602061e8) a
* 1 Thread 1 (Processor mips_iss0) 0xe010cef4 in cpu_atomic_bit_waitset (a=0x602002cc, n=<error
   at /home/diaxen/projets/mutekh/cpu/mips/include/cpu/hexo/atomic.h:99
```

Classical GDB debugging session takes place. Here is a register dump of the processor 0 (thread 1):

```
(gdb) info registers
      zero      at      v0      v1      a0      a1      a2      a3
R0     00000000 0000ff00 00000001 00000000 60200338 00000001 00000000 e010e74c
      t0      t1      t2      t3      t4      t5      t6      t7
R8     e010ef54 00000000 00000000 00000000 00000000 00000000 00000000 602021dc
      s0      s1      s2      s3      s4      s5      s6      s7
R16    00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
      t8      t9      k0      k1      gp      sp      s8      ra
R24    00000000 00000000 00000000 602007fc 60207ff0 60205ce8 60205ce8 e0101134
      sr      lo      hi      bad      cause      pc
      0000ff00 00000000 00000000 00000000 00000000 e010117c
      fsr      fir
      00000000 00000000
```

More informations on using the GDB client can be found on the [?The GNU Project Debugger](#) home page.