MP1 GDB Integration

Chinmay Ajit Sawkar

Steps for setting up GDB integration:
1. Removed old bochs installation using sudo apt-get remove bochs.
2. Configured Bochs with gdb stub enabled using sudo ./configure --enable-gdb-stub.
   Got error messages like
         a. Compile error: X11/extensions/Xrandr.h: No such file or directory
         b. X11/Xlib.h not found
   Resolved errors by installing required packages.
3. After configuration used 'sudo make' and 'sudo make install to shift it to /usr/local/bin
4. Added "gdbstub: enabled=1, port=1234, text_base=0, data_base=0, bss_base=0" to bochsrc file so that bochs emulator acts as remote host with port '1234'
5. Added -g flag to the compile steps in the makefile to generated debugging information needed by GDB
6. Compiled the kernel image and copied it to floppy disk.
7. Ran the bochs, it shows 'waiting for Gdb connection'
8. Ran gdb on another terminal
9. Setting architecture to set architecture i386:x86-64:intel was giving error, so tried without setting architecture it was working.
10. Setup target remote host and added 2 checkpoints for debugging
11. Ran the kernel, the kernel stopped at 2 checkpoints for debugging.

Please find below the screenshot of the gdb debugger and the kernel with name printed.

Bochs x86 emulator, http://bochs.sourceforge.net/

```
Initialized console.
Replace the following <NAME> field with your name.
After your are done admiring your output, you can shutdown this 'machine'.

WELCOME TO MY KERNEL!
<CHINMAY AJIT SAWKAR>
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csce410@csce410-VirtualBox: ~/Documents/MP1

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Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word".
(gdb) quit
csce410@csce410-VirtualBox:~/Documents/MP1$ gdb -q kernel.bin
Reading symbols from kernel.bin...
(gdb) target remote localhost:1234
Remote debugging using localhost:1234
0x0000fff0 in ?? ()
(gdb) b main
Breakpoint 1 at 0x100057: file kernel.C, line 29.
(gdb) b kernel.C:35
Breakpoint 2 at 0x100097: file kernel.C, line 36.
(gdb) run
The "remote" target does not support "run".  Try "help target" or "continue".
(gdb) continue
Continuing.

Breakpoint 1, main () at kernel.C:29
29      {
(gdb) c
Continuing.

Breakpoint 2, main () at kernel.C:36
36          Console::puts("Replace the following <NAME> field with your name.\n");
(gdb) c
Continuing.
(gdb)
```

https://people.engr.tamu.edu/bettati/Courses/OSProjects/integrating-bochs-environmen

...ug the kernel

...mmand,

...remote loc

...lso connect b

...remote 127.

...er you have ch

...instruction st

...kpoint in any

(gdb) b main()

(gdb) b kernel.C:35

- Use the continue (c) command to co

    (gdb) continue

    This shows up the main menu in you

    kernel. It now halts at the breakpoin

- Debug your kernel code as desired u

- You can end the debugging session b

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IPS: 17.706M                    A:     NUM  CAPS SCRL
0000000000000i[      ] BXSHARE not set. using compile time default '/usr/local/share/bo
chs'
0000000000000i[      ] reading configuration from bochsrc.bxrc
0000000000000i[      ] Enabled gdbstub
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Bochs Configuration: Main Menu
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This is the Bochs Configuration Interface, where you can describe the
machine that you want to simulate.  Bochs has already searched for a
configuration file (typically called bochsrc.txt) and loaded it if it
could be found.  When you are satisfied with the configuration, go
ahead and start the simulation.

You can also start bochs with the -q option to skip these menus.

1. Restore factory default configuration
2. Read options from...
3. Edit options
4. Save options to...
5. Restore the Bochs state from...
6. Begin simulation
7. Quit now
```