KGDB Quickstart 2.4

Contents:

Hardware Setup

Use a Null modem serial cable to connect across the Target and Development machines.

[*Development machine*]----------[*Target machine*]

1. Hardware pinout for the null modem serial cable

   OR

2. Hardware pinout for the null modem serial cable

Testing the working of the Null-modem serial cable.
On the Development machine :
stty ispeed 115200 ospeed 115200 -F /dev/ttyS0
cat testfile.txt > /dev/ttyS0

On the Target machine :
stty ispeed 115200 ospeed 115200 -F /dev/ttyS0
cat /dev/ttyS0

The following settings are used for the Remote debugging session, automatically.

<root #> stty -F /dev/ttyS0
speed 115200 baud; line = 0;
min = 1; time = 0;
-brkint -icrnl -imaxbel
-opost -onlcr
-isig -icanon -iexten -echo -echoe -echok -echoctl –echoke

Software Setup

1. Download Linux kernel source : linux-2.6.15.5.tar.bz2
2. Download the Kgdb patch : linux-2.6.15.5-kgdb-2.4.tar.bz2
3. Unzip the kernel sources
   cd ${BASE_DIR}
   tar -jxvf linux-2.6.15.5.tar.bz2
4. Unzip the kgdb patch
   tar -jxvf linux-2.6.15.5-kgdb-2.4.tar.bz2
5. Change the directory as follows:
   cd ${BASE_DIR}/linux-2.6.15.5

6. Apply KGDB patches
   patch -p1 < ${BASE_DIR}/linux-2.6.15.5-kgdb-2.4/core-lite.patch
   .....
   patch -p1 < ${BASE_DIR}/linux-2.6.15.5-kgdb-2.4/i386.patch
   Follow the order mentioned in "series" file while applying the patches

Compiling the kernel on the development machine

1. In the ${BASE_DIR}/linux-2.6.15.5/Makefile, set the EXTRAVERSION = -kgdb
2. make xconfig/oldconfig/menuconfig
   Select the options appropriate for the target machine Hardware.
   Select the options pertaining to kgdb under "Kernel hacking" as shown here
3. make bzImage
4. Transfer the built kernel to the Target machine from the Development machine.
   Copy the Kernel image from *${BASE_DIR}/linux-2.6.15.5/arch/i386/boot/bzImage* to the target machine as */boot/vmlinuz-2.6.15.5-kgdb*
   Copy the Map file from *${BASE_DIR}/linux-2.6.15.5/System.map* to the target machine as */boot/System.map-2.6.15.5-kgdb*
   Also create links as follows:
   ln -s /boot/vmlinuz-2.6.15.5-kgdb /boot/vmlinuz
   ln -s /boot/System.map-2.6.15.5-kgdb /boot/System.map
5. Edit the /boot/grub/grub.conf file in the target machine to have the kgdb enabled kernel entry.
   title Linux-2.6.15.5-kgdb
   root (hd0,0)
   kernel /boot/vmlinuz-2.6.15.5-kgdb ro root=/dev/hda1 kgdbwait kgdb8250=0,115200

Starting the debug session

1. After booting, the target machine will wait for the host development machine to connect, by displaying the message :-
   Waiting for connection from remote gdb...
2. *cd ${BASE_DIR}/linux-2.6.15.5*
3. For starting a debug session with baud rate of 115200 on /dev/ttyS0 , run the following as "root" user:-
   <root#> gdb ./vmlinux
   GNU gdb (GDB) 7.1-ubuntu
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This is free software: you are free to change and redistribute it.
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and "show warranty" for details.
This GDB was configured as "i486-linux-gnu".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
(gdb) set remotebaud 115200
(gdb) target remote /dev/ttyS0
Remote debugging using /dev/ttyS0
breakpoint () at kernel/kgdb.c:1212
1212 atomic_set(&kgdb_setting_breakpoint, 0);
(gdb)

4. For further commands refer http://kgdb.geeksofpune.in/tockdebug.htm

Using KGDB over Ethernet interface

1. Add the following kernel parameter to the grub entry:
   kgdboe=@10.0.0.6/,@10.0.0.3/ (that's kgdboe=@LOCAL-IP/,@REMOTE-IP/)
   # Sample grub.cfg which will by default boot the kgdb enabled kernel
   title Linux-2.6.15.5-kgdb(eth)
   root (hd0,0)
   kernel /boot/vmlinuz-2.6.15.5-kgdb ro root=/dev/hda1 kgdboe=@10.0.0.6/,@10.0.0.3/ console=ttyS0,115200
2. For starting a debug session, type the following:
   (gdb) ./vmlinux
   (gdb) target remote udp:HOSTNAME:6443
3. For further commands refer http://kgdb.geeksofpune.in/tockdebug.htm

Useful Links and Miscellaneous information

1. Useful Links : http://kgdb.sourceforge.net/
   http://kgdb.geeksofpune.in/
   http://kgdb.geeksofpune.in/downloads/
2. Active Developer : Amit Kale (amitkale@geeksofpune.in),
   Swapnil Pimpale (pimpale.swapnil@gmail.com)
3. Bug Report : kgdb-bugreport@lists.sourceforge.net