Project 1

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Abstract

The first project of Operating Systems 2. This assignment is meant to introduce us to working with the the linux kernel and writing concurrent programs in C.

I. Booting the Kernel on the VM

A. Log of Commands

1) : Acquiring a local copy of the Kernel by running

```
$ git clone git://git.yoctoproject.org/linux-yocto-3.14
```

2) : Copying over all the necessary files into the root of my linux tree:

```
$ cp /scratch/spring2015/files/config-3.14.26-yocto-qemu ./.config
$ cp /scratch/spring2015/files/bzImage-qemux86.bin ./
$ cp /scratch/spring2015/files/core-image-lsb-sdk-qemux86.ext3 ./
```

3) : Building the kernel:

```
$ make -j4 all
```

4) : Writing a run script:

```
#!/bin/bash

source /scratch/opt/environment-setup-i586-poky-linux

qemu-system-i386 -gdb tcp::5618 -S -nographic -kernel bzImage-qemux86.bin \
-drive file=core-image-lsb-sdk-qemux86.ext3,if=virtio \
-enable-kvm -net none -usb -localtime --no-reboot \
--append "root=/dev/vda rw console=ttyS0 debug"
```

5) : Running the script for the first time:

```
$ chmod u+x run
$ ./run
```

6) : Creating the gdb initializer script:

```
target remote :5618
symbol-file linux-yocto-3.14/vmlinux
```

7) : Connecting gdb from another shell:

```
$ gdb
```

8) : After typing continue in the gdb instance, I was able to successfully login with the credentials of root.

B. Qemu CLI Flags

-gdb tcp::5618 This flag will tell Qemu to open a gdb server on the following device. We specify to a reserved tcp port.

-S This flag instructs Qemu to not start the CPU at start up and to wait for a continue from the device monitor.

-nographic Normally Qemu displays output to VGA. With this flag it will bypass that entirely and spin up a headless command line application.

-kernel bzImage-qemux86.bin Specifies the particular kernel to use.

-drive file=core-image-lsb-sdk-qemux86.ext3,if=virtio This flag specifies the drive to use, with some following options. The file option defines a disk image and the if option defines the type of interface the device is connected to.

-enable-kvm This flag enables full KVM (Kernel-based Virtual Machine) support.

-net none Instructs the VM that no network devices should be configured.

-usb Enables the USB drivers.

-localtime Sets the time to the localtime of the calling machine.

–no-reboot Exits rather than rebooting.

–append "root=/dev/vda rw console=ttyS0 debug" Sends command line arguments to the kernel.