CRIU Cross Compile References

1. **Cross compile required packages**
   a. What packages CRIU needs: https://criu.org/Installation
   b. (optional) How to cross compile 5 required packages (protobuf, protobuf-C, libnet, libcap, libnl): https://github.com/felicitia/criu/tree/riscv64-CC/scripts/cross-compile
      -- No need to re-build (unless you're interested ☺).The artifacts below are ready to use
   c. Download my artifacts directly (the RISC-V protobuf, protobuf-C, libnet, libcap, libnl):
      https://drive.google.com/file/d/1fYS1S2ctSZR4XB8vO5oR3hiyho3wXhOd/view?usp=share_link
2. **Ask Yixue for the latest CRIU riscv64 source code (Github may not be the latest)**
3. **Cross compile CRIU ("compel" module for now)**
   a. Follow README in this folder to configure stuff & run ***build_criu.sh***:
      https://github.com/felicitia/criu/tree/riscv64-CC/scripts/cross-compile
      -- Note we're only building "compel" for now. This is the output when running ***build_criu.sh***. The errors are expected as long as you can successfully build until the end of "compel" (highlighted in screenshot)

      ```
      HOSTCC    compel/src/main-host.o
      HOSTCC    compel/src/lib/handle-elf-host.o
      HOSTCC    compel/src/lib/log-host.o
      HOSTLINK  compel/compel-host-bin
      DEP       soccr/soccr.d
      CC        soccr/soccr.o
      AR        soccr/libsoccr.a
      make[1]: 'soccr/libsoccr.a' is up to date.
      criu/Makefile.packages:36: Can not find some of the required libraries
      criu/Makefile.packages:37: Make sure the following packages are installed
      criu/Makefile.packages:38: RPM based distros: protobuf protobuf-c protobuf-c-devel protob
      uf-compiler protobuf-devel protobuf-python libnl3-devel libcap-devel python3-future
      criu/Makefile.packages:39: DEB based distros: libprotobuf-dev libprotobuf-c-dev protobuf-
      c-compiler protobuf-compiler python3-protobuf python3-future libnl-3-dev libcap-dev
      criu/Makefile.packages:40: To run tests the following packages are needed
      criu/Makefile.packages:41: RPM based distros: libaio-devel python3-PyYAML
      criu/Makefile.packages:42: DEB based distros: python3-yaml libaio-dev libaio-dev
      criu/Makefile.packages:43: *** Compilation aborted.  Stop.
      make[1]: *** [criu/Makefile.packages:49: check-packages] Error 2
      make: *** [Makefile:263: criu] Error 2
      ```
   b. A more detailed (but messy ☺) notes with troubleshooting:
      https://github.com/felicitia/criu/blob/criu-dev/cross-compile/Cross-Compiling-CRIU.md
4. **Test CRIU's "compel"** (core module) using its own test cases
   a. Build test case, run this: https://github.com/felicitia/criu/blob/riscv64-CC/scripts/cross-compile/build_compel_test.sh

b. The RISC-V executable will be in *{CRIU_ROOT_DIR}*/compel/test/infect
c. mount executable to QEMU using sshfs (you know how ☺)
d. you can run ./spy on inside QEMU to test it and will see something like this

```
# ls
Makefile      parasite.c    parasite.o    spy           victim
Makefile-CC   parasite.h    parasite.po   spy.c         victim.c
# ./spy
Checking the victim alive
1, want 1
42, want 42
Infecting the victim
Stopping task
Preparing parasite ctl
        LC4: Preparing seqsk for 255
Configuring contexts
Infecting
code_syscall:
73 00 00 00 73 00 10 00
code_syscall:
73 00 00 00 73 00 10 00
code_syscall:
73 00 00 00 73 00 10 00
        LC3: Set up parasite blob using memfd
        LC3: Putting parasite blob into 0x3f829a4000->0x3fb6c91000
code_syscall:
```