CMPE283 : Virtualization
Assignment 4: Instrumenting KVM (cont'd)

Due: Dec 19, 2017 before midnight

This assignment builds upon assignment 3. The purpose of this assignment is to illustrate the difference in performance when using nested paging versus shadow paging, and to illustrate the different exit frequencies and types. This lab assignment is worth up to 20 points and may be done in groups of up to **two people max.** Each team member can receive up to 20 points. It is expected that groups of more than one student will find an equitable way to distribute the work outlined in this assignment. You can form groups from both Monday and Tuesday sections, as both sections will receive the same assignment.

Prerequisites

- A working assignment 3.

The Assignment

Your assignment is as follows:

1. Run your assignment 3 code and boot a test VM using that code.
2. Once the VM has booted, from 'dmesg' on your host machine, record the exit count information required by assignment 3.
3. Shutdown your test VM.
4. Remove the 'kvm-intel' module from your running kernel:
   - rmmod kvm-intel
5. Reload the kvm-intel module with the parameter **ept=0** (this will disable nested paging and force KVM to use shadow paging instead)
   - This is usually found in /lib/modules/XXX/kernel/arch/x86/kvm , where XXX is the version of the kernel you build **for assignment 3 – don't make a mistake and use the one that came with the stock Linux installation.**
   - insmod /lib/modules/XXX/kernel/arch/x86/kvm/kvm-intel.ko ept=0
6. Boot the same test VM again, and capture the same output from your 'dmesg' output.
7. Answer the questions below.

On or before the due date, turn in answers to the questions below via E-Mail.

Grading

This assignment will be graded and points awarded based on the following:

- 20 points for the answers to the questions below

Submissions shall be made via email to the email addresses listed in the class syllabus/green sheet. DO NOT WAIT UNTIL LATE ON THE DUE DATE, as email server lags or delays may result in a late submission. Since you have three weeks to complete this assignment, I will not accept "email server outage or delay" as an excuse for late submissions. If you are concerned about this, submit your assignment early. This is one area that I am extremely picky with – even 1 second late will result in a zero score.

I will be comparing all submissions to ensure no collaboration has taken place. Make sure you do not copy another group's work. If you copy another group's work, members of both groups will receive an F in the class and be reported to the department chair for disciplinary action. If you are working in a group, make sure your partners do not copy another group's work without your knowledge, as

all group members will be penalized if cheating is found.

Special Notes

- When submitting, submit **only**:
  - A plain text email (no HTML)
  - A single PDF file attachment containing the answers to the questions (the PDF can have whatever name you want)
  - A list of student IDs and names for members of the group, in the following format, one per line:
    - ID <id> <name>
      - (example) ID 0123456789 Larkin, Michael
- The subject line of the email must be "CMPE283 Assignment 4 Submission" (no quotes)
- Do not submit .zip, .tar, .rar, etc. Send me an email with one attachment, a PDF file, as described above.
- Make sure to follow all other instructions in this assignment precisely.
- **Failure to follow the instructions above may result in a zero score for the assignment.**

Questions

1. For each member in your team, provide 1 paragraph detailing what parts of the lab that member implemented / researched. (You may skip this question if you are doing the lab by yourself).
2. Note whether or not you used a larger count of exits between outputs (1000 or 2000 exits vs the suggested 500). - Copy this from assignment 3's questions if unsure.
3. Include a sample of your print output from dmesg from "with ept" and "without ept".
4. What did you learn from the count of exits? Was the count what you expected? If not, why not?
5. What changed between the two runs (ept vs no-ept)?