ADVANCED OPERATING SYSTEMS PROJECT 1

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1. Project Goal

To get familiar with FreeBSD and kernel compilation and optimization. To learn how to write and use kernel loadable modules and to prepare for the final project! You may have to learn how to install a BSD operating system and consequently bash, gcc and how to compile source codes using gcc. You will learn the development of kernel modules and loading them at run time.

2. Project Definition

After installing FreeBSD using the developer mode (note that you must not customize this setting and you may also include the port collection as well) you must perform the following:

(1) Perform stress testing using the fresh installed system (you can use forkbomb to perform this test or any other tool you wish).
(2) Remove any unrequired system modules, device drivers or services to optimize the kernel and freeing some memory.
(3) Recompile the kernel using this optimized setting and booting into this newly compiled kernel.
(4) Perform the previous stress test again.
(5) Plotting the test Results (e.g. using GNUPlot)
(6) Developing the kernel module and loading it at run time (described below).
(7) Developing user mode application and passing command to the kernel module.
(8) Obtaining results and finally unloading the loaded module.

3. Module Definition

In this module, you must provide the functionality of performing a required super user action in the kernel mode through your loadable module by an ordinary user. You will develop a module that accepts a username and password and any other required data, and adds the required user with provided password to the groups of "wheel". Note that you must load the module through a root user and test it through an ordinary user (not a super user).
To cut the matter short, you develop a loadable module, install it in the kernel and you write a program to give command of adding user to that kernel module and then after adding that user, you simply unload that module.

4. Deliverables

You must provide both charts and data associated with the stress tests. You must explain the kernel optimization process and know the items you have removed from kernel. You may avoid long explanations and memorize them for the face-to-face delivery! Meanwhile per line explanation of kernel compilation process is mandatory.

5. Project due date

Project due date is 12th of November 23:59. By the way, it definitely HAS face-to-face delivery.

You may ask any question in the discussion board of the course web site. Label your mail and also the compressed answer file(s) as

\[ AOS_{HW1}[YourStudentNumber]\]

Post the answers to

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