

Laboratory Assignment: Building a custom kernel

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1 Introduction

In this laboratory assignment you will start by first installing linux in a virtual machine, after which you are going to configure and build a customized kernel for your system. Usually one never need to bother with creating a customized kernel, however, when one is given a task of administrating several servers running a unix-like operating system there might be times where a custom kernel is needed, for example if your server is running some special devices that isn't supported in the standard kernel.

2 Aim

After completion of this assignment you will have:

- Knowledge on how to customize the kernel of your system.

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3 Reading instructions

Before starting this assignment you should have read [1, chapters 13.1-13.3,13.7-13.9] or [2, chapters 11.1-11.4, 11.6-11.9 and 24]

4 Tasks

4.1 Installing a hypervisor

There are numerous hypervisors out on the market. For this course I recommend to use a Type 2 hypervisor for simplicity. See for example VirtualBox [3].

Read up on the different hypervisors available and install the one you preferred. *Note, if you are doing this lab on the university computers, you must use VirtualBox, since it comes preinstalled on all the computers in L207.*

4.2 Installing Linux

Once you have picked your hypervisor, its time to pick your operating system.

In this course, all the labs will be written for Ubuntu-server, however you are free to install any Linux-distribution you like. Download and install the operating system in your hypervisor.

Once the operating system is installed, ping `www.miun.se` to ensure that your network connection is working.

4.3 Before starting

Now that your system is up and running, we will start looking into customizing your kernel. However before you start this, open a terminal window and run

```
uname -a
```

Take a screenshot and make sure this is included in your report.

4.4 Compile the kernel

Follow the guide that can be found at [4] to create your custom kernel. Remember to use `make localmodconfig` when configuring the kernel to make sure that all the necessary modules are built, it will also significantly reduce the time needed to build the kernel by reducing the amount of modules that has to be built. Make sure that your kernel includes nfs support otherwise you will not be able to set up the nfs-server in laboratory assignment 4. *Take a screenshot of when you are building the kernel*

Once you have built the kernel, reboot your system and select your newly built kernel from the Grub-loader. Once you have logged in, again run the command:

```
uname -a
```

And take a screenshot and make sure this is included in your report.

5 Examination

In your report, you should besides including the three screenshots mentioned above, also motivate your choice of hypervisor and distribution and include a description of the process of building your own custom kernel.

References

- [1] Evi Nemeth, Garth Snyder, Trent R. Hein, and Ben Whaley. *UNIX and Linux system administration handbook*. Prentice Hall, Upper Saddle River, NJ, 4th ed. edition, 2011. ISBN 978-0-13-148005-6 (pbk. : alk. paper).
- [2] Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, and Dan Mackin. *Unix and Linux system administration handbook*. Addison-Wesley/Pearson, Boston, fifth edition. edition, 2017. ISBN 9780134277554.
- [3] Oracle virtualbox. URL <https://www.virtualbox.org/>.
- [4] Kernel/compile. URL <https://wiki.ubuntu.com/Kernel/BuildYourOwnKernel>. Accessed: 2018-09-06.