Mittuniversitetet

MID SWEDEN UNIVERSITY

DT149G Administration of UNIX-like systems

# Laboratory Assignment— Building a custom kernel

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# Contents

# 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 Nemeth et al., 2017, chapters 11.1-11.4, 11.6-11.9 and 24. You will also need to consult the guide for compiling a new kernel in Ubuntu "Kernel/Compile", 2024.

# 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 "Oracle VirtualBox", n.d.

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 "Kernel/Compile", 2024 to create your custom kernel. Make sure that your kernel includes nfs and netfiler support otherwise you will not be able to set up the nfs-server in laboratory assignment 3, and run docker in laboratory assignment 4 and 6.

*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

*Kernel/compile.* (2024). Retrieved October 25, 2024, from https://wiki.ubuntu. com/Kernel/BuildYourOwnKernel

Nemeth, E., Snyder, G., Hein, T. R., Whaley, B., & Mackin, D. (2017). *Unix and linux system administration handbook* (Fifth edition.). Addison-Wesley/Pearson.

Oracle virtualbox. (n.d.). https://www.virtualbox.org/