

Operating System Laboratory



INTRODUCTION

Operating systems are the fundamental part of every computing device to run any type of software. The increasing use of computing devices in all areas of life (leisure, work), lead to a variety of operating systems. Yet all operating systems share common principles. These principles are important for computer science students in their understanding of programming languages and software built on top of operating systems.

The Operating System Laboratory, OSLab is an online course that will teach students about principles of operating systems using a constructivist approach and problem-oriented learning. OSLab focuses on the hands-on training experience of the students and will complement existing lectures. The course is modular structured, where each module covers a topic and is in itself closed. Thereby a tutor can select modules according to his need and easily add new modules to the course.

During this project, it is the task of the University of Fribourg to create two E-Learning Modules covering the topics of "Device Driver and Input/Output" and "Security". These modules will consist of a theoretical part as well as some practical exercises.

THE MODULES

Device Driver and Input/Output

This module introduces device drivers and input/output handling in operating systems. As in our days, there are more and more peripheral devices, this is a very important part of operating systems. First of all, the general concept of device drivers is explained, followed by a closer look at the realization under Windows and Unix. Furthermore, the students learn about I/O handling in general and its realization under Windows and Unix. In the end, they have to implement a user space USB driver for Windows and Linux/Unix Systems.

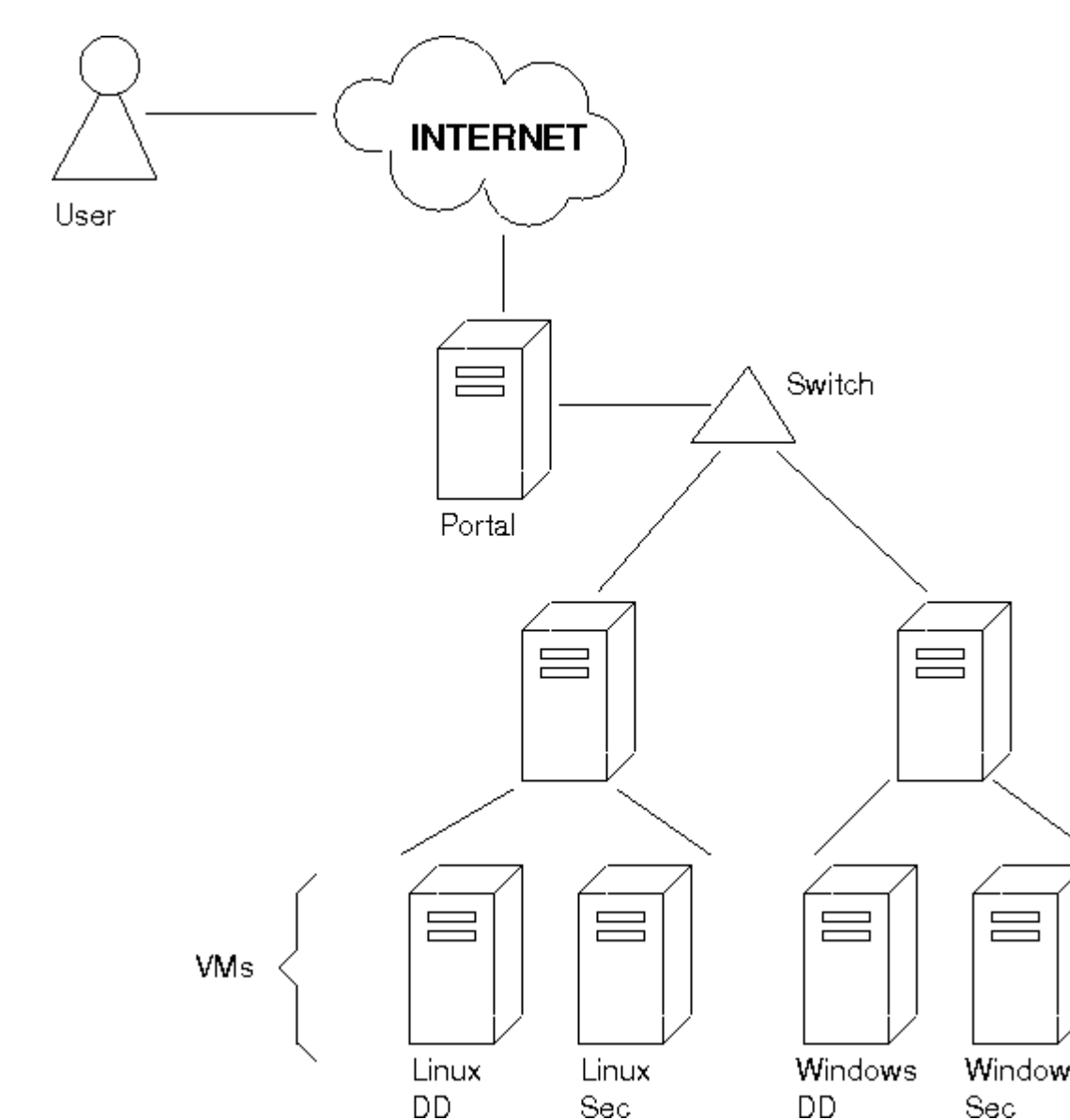


Security

This module introduces security concerns of operating systems. At the beginning of the module, we describe some threats for modern systems to motivate the need for security mechanisms. Afterwards, we explain the possible attacks and prevention methods. These possibilities are divided into traditional methods and modern methods. Later in the hands-on part, the students have to find security risks in running systems and to secure the given system. Furthermore, they have to do some measurements using tamper resistant devices to show, that security has a strong influence on the system's performance.



THE LABORATORY



A student, who wants to access the laboratory, will connect to the portal server, which is directly connected to the Internet. The portal server authenticates the user and redirects her to the appropriate hands-on system, which runs in a virtual machine.

ACKNOWLEDGMENTS

The OSLab project is sponsored by the Swiss Virtual Campus. The project is a cooperation of the University of Neuchâtel, Bern, Rostock and Fribourg.