Lab 12: Installing and Configuring VirtualBox

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**Theoretical Background**  
  
Virtualisation is a foundational concept in modern networking and cloud computing. It enables the abstraction of hardware resources, allowing multiple operating systems to run concurrently on a single physical machine. VirtualBox is an open-source virtualisation platform that emulates a complete x86 hardware environment, making it ideal for network labs and system testing.  
  
In this lab, we focus on setting up a virtual machine using VirtualBox and connecting it to the host machine via host-only networking. This type of networking allows isolated communication between the host and the guest system, useful for testing and development without affecting the broader institutional or internet-connected network. The student will install an Ubuntu Server inside VirtualBox to act as a standalone Linux host, forming the base for future labs involving network simulation, SDN, and graph analytics.  
  
Key advantages of virtualisation include:  
- Cost efficiency through resource consolidation  
- Safe testing environments (VMs are sandboxed)  
- Snapshot and rollback capabilities  
- Platform independence and reproducibility

## **Introduction**

This lab introduces students to Oracle VirtualBox, an open-source virtualisation platform. The objective is to create and configure a virtual machine (VM) running Ubuntu Server, and verify connectivity from the host to the VM using SSH and ping.

Draw the layered architecture described in the introduction.

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## Software and Hardware Requirements

**Software Requirements:**  
- Oracle VirtualBox  
- Ubuntu Server 22.04 LTS ISO  
- OpenSSH Server (inside VM)

**Hardware Requirements:**- CPU: 4 cores  
- RAM: Minimum 2 GB allocated to VM (host should have at least 8 GB)  
- 20 GB of disk space (dynamically allocated)

## Lab Steps

1. Download and install Oracle VirtualBox from https://www.virtualbox.org  
2. Download Ubuntu Server 22.04 LTS ISO.  
3. Create a new VM in VirtualBox:  
 - Name: Ubuntu\_Server\_Lab  
 - Type: Linux, Version: Ubuntu (64-bit)  
 - RAM: 2048 MB  
 - Hard disk: 20 GB, dynamically allocated  
 - Network Adapter: Host-only Adapter  
4. Attach the ISO and install Ubuntu with default settings.  
5. Install OpenSSH Server during Ubuntu installation.  
6. From the host, ping the VM’s IP and SSH into it.

## Validation Tests

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| Test | Paste output here |
| VM boots successfully, and the user can log in. | A screenshot of a computer |
| The host machine can ping the VM’s IP address. | A screen shot of a computer |
| SSH access to VM from host works: `ssh user@<VM-IP>` | A screenshot of a computer |