



**OPERATING SYSTEM**

**INDIVIDUAL ASSIGNMENT**

**CHROME OPERATING SYSTEM**

NAME

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SUBMITTED TO Lec-wendimu

## **Introduction (Background & Motivation)**

### **Background:**

Chrome OS is a fast, simple, and secure operating system developed by Google. It is based on the Linux kernel and designed to work primarily with web-based applications and cloud storage. Unlike traditional operating systems, Chrome OS is optimized for minimal hardware and relies heavily on the Google ecosystem.

### **Motivation:**

Running Chrome OS in a virtual environment (like VirtualBox) allows users to test the OS without affecting the host system. It is useful for developers, students, or anyone curious about Chrome OS, and it is a great opportunity to learn about virtualization, lightweight OS environments, and Linux-based platforms.

## **b. Objectives**

- To install and run Chrome OS inside Oracle VirtualBox.
- To gain experience with virtual machine configuration.
- To explore Chrome OS's features, filesystem support, and performance.
- To learn troubleshooting and scripting techniques during the installation process.

## **c. Requirements**

### **i. Hardware Requirements**

**Processor:** Intel or AMD x86\_64 processor with virtualization support (VT-x/AMD-V enabled)

**RAM:** Minimum 4 GB (8 GB recommended)

**Storage:** At least 20 GB of free disk space

**Graphics:** Basic display adapter; higher resolution support depends on Guest Additions and build used

## ii. Software Requirements

**Oracle VM VirtualBox:** Cross-platform virtualization tool

**Chrome OS Image:** Use Chromium OS-based builds (e.g., FydeOS, Brunch Framework with recovery image)

**VirtualBox Extension Pack (optional):** For enhanced features like USB 3.0, display support

**7-Zip or WinRAR:** For extracting the Chrome OS image file

## d. Installation Steps (with Explanation)

### **Chrome OS on VirtualBox: Full Installation Guide (Using CloudReady)**

#### ☐ **Introduction**

Chrome OS is a lightweight, fast, and cloud-based operating system developed by Google. Though not officially supported on VirtualBox, CloudReady by Neverware offers a Chromium OS-based alternative that can be installed and run in a virtual machine.

This guide walks you through the full setup to install Chrome OS (via CloudReady) on Oracle VirtualBox, including all prerequisites, configuration steps, and troubleshooting tips.

## □ Prerequisites

### Hardware:

- **Processor:** Intel/AMD 64-bit with virtualization (VT-x/AMD-V) enabled in BIOS
- **RAM:** Minimum 4 GB (8 GB recommended)
- **Storage:** At least 20 GB free space

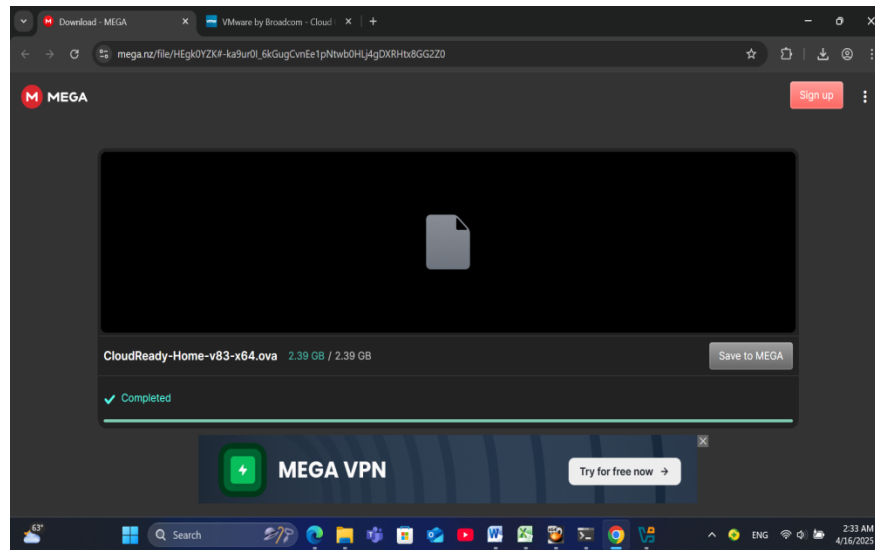
### Software:

- Oracle **VirtualBox** installed
- **CloudReady** image (download from Neverware): .zip format
- **7-Zip** or **WinRAR** for file extraction
- Basic terminal or command prompt usage knowledge

## □ Step-by-Step Installation Guide

### ✈ Step 1: Download and Extract CloudReady

1. Go to: <https://www.neverware.com/freedownload>
2. Download the **CloudReady OVA** or **ZIP** for VMware/VirtualBox (choose 64-bit version).
3. If it's a ZIP file, extract using 7-Zip or WinRAR.
  - You will get a .img file (e.g., cloudready-free-xx.img) or .ova.



this files already .ova means CloudReady-home-v83-x64.ova

## □ *Step 2: Convert .img to .vdi (If not using .ova)*

*This step already jump because my cloudyready.ova*

If you got a .img file:

1. Open **Command Prompt** and navigate to the image folder:

```
cd C:\path\to\cloudready\
```

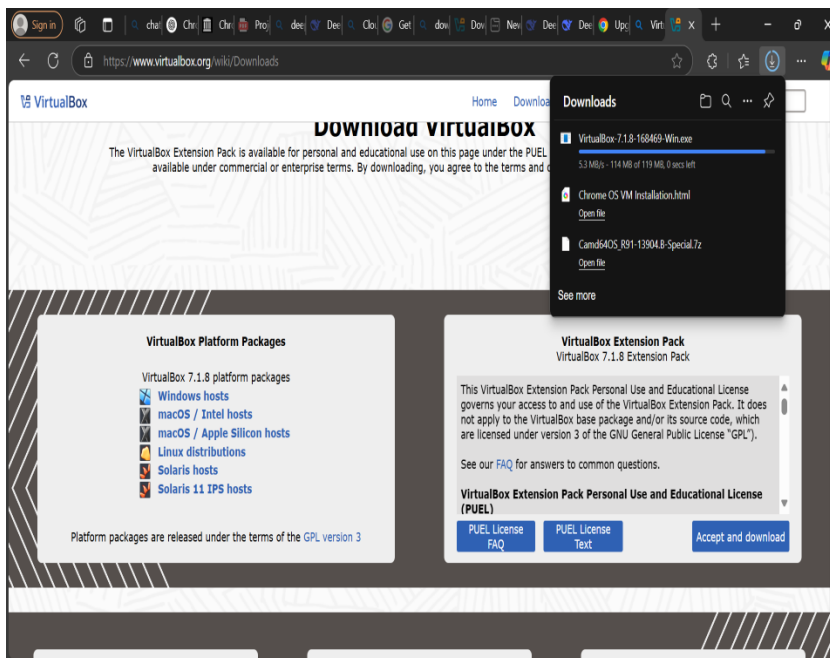
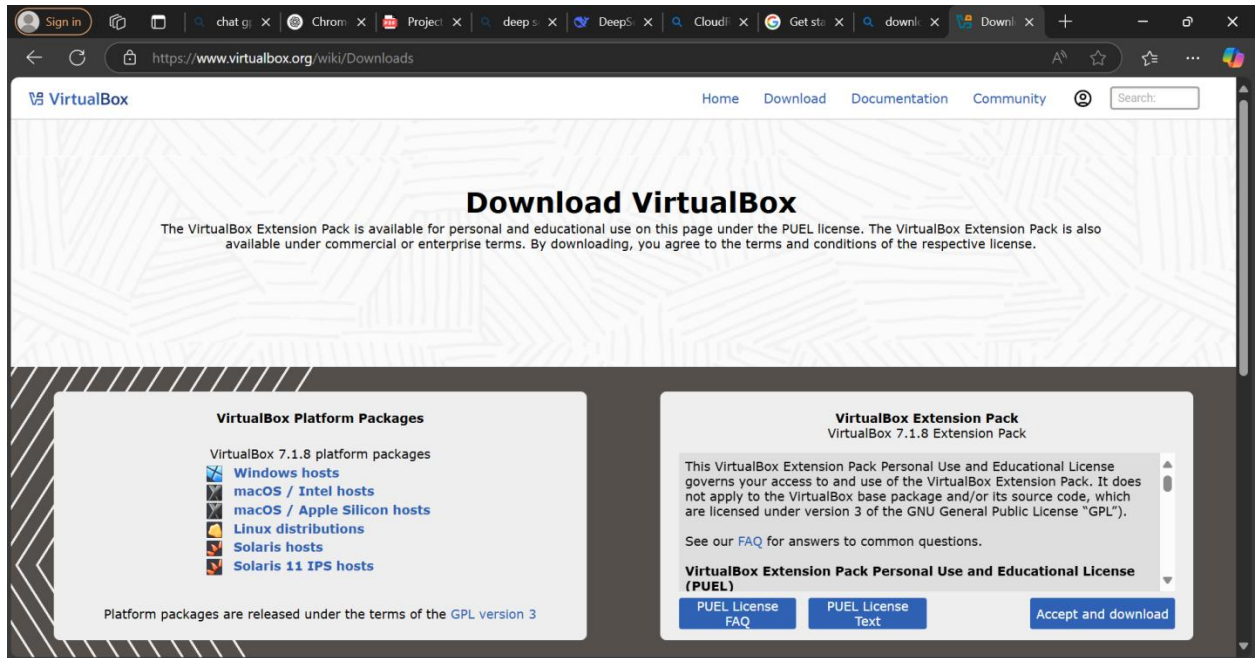
2. Convert it using:

```
VBoxManage convertfromraw cloudready.img cloudready.vdi --  
format VDI
```

3. This creates a VirtualBox-compatible disk: cloudready.vdi

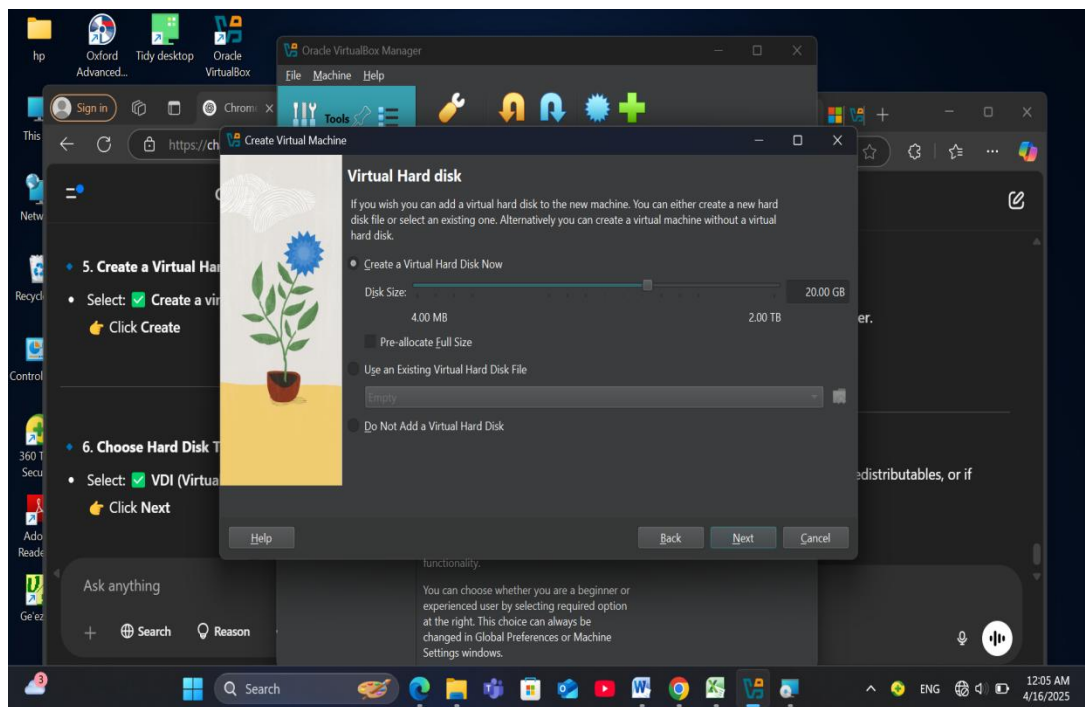
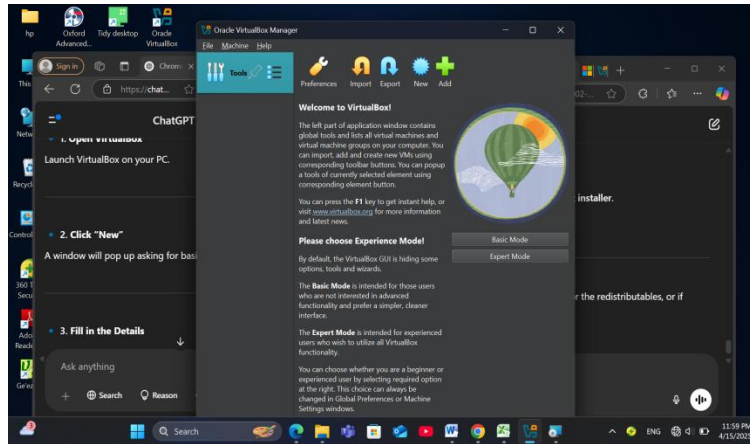
## □ **Step 3: Create the Virtual Machine (VM)**

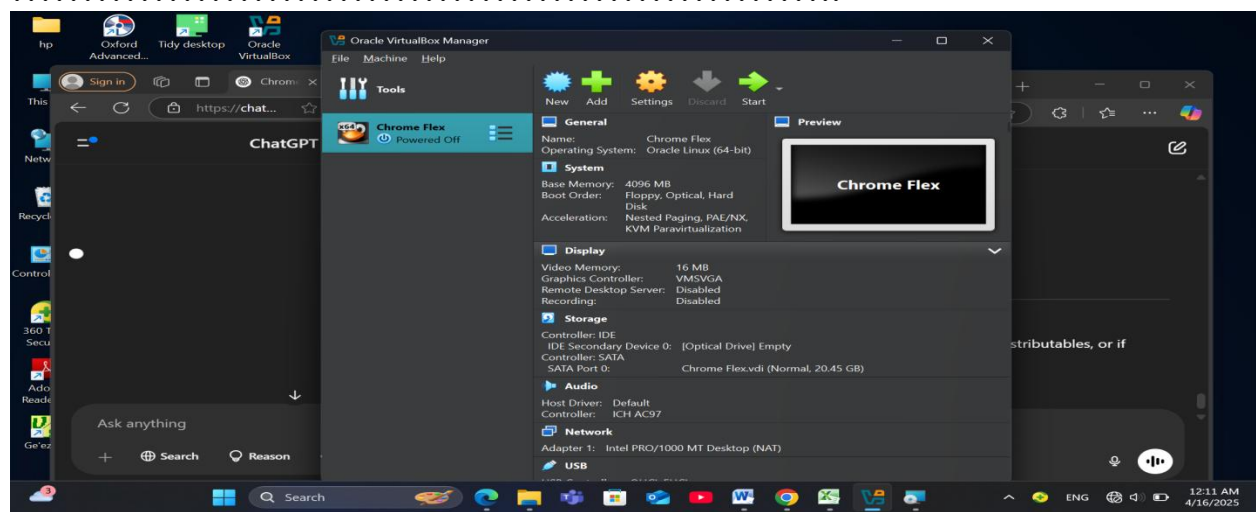
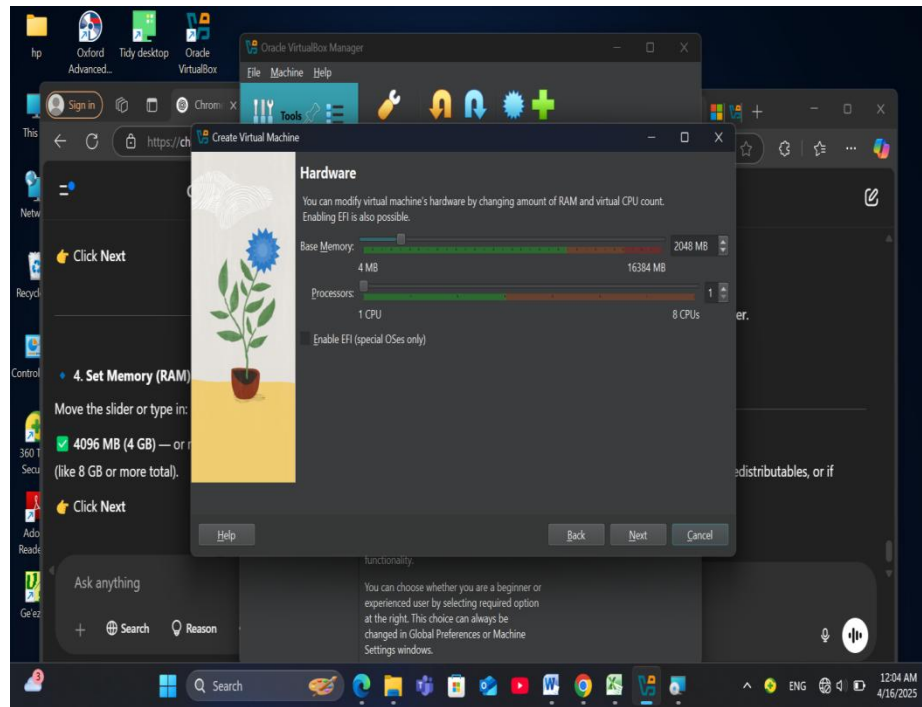
## 1. Launch **VirtualBox**.



## 2. Click **New** and enter:

- **Name:** CloudReady Chrome OS
- **Type:** Linux
- **Version:** Other Linux (64-bit)





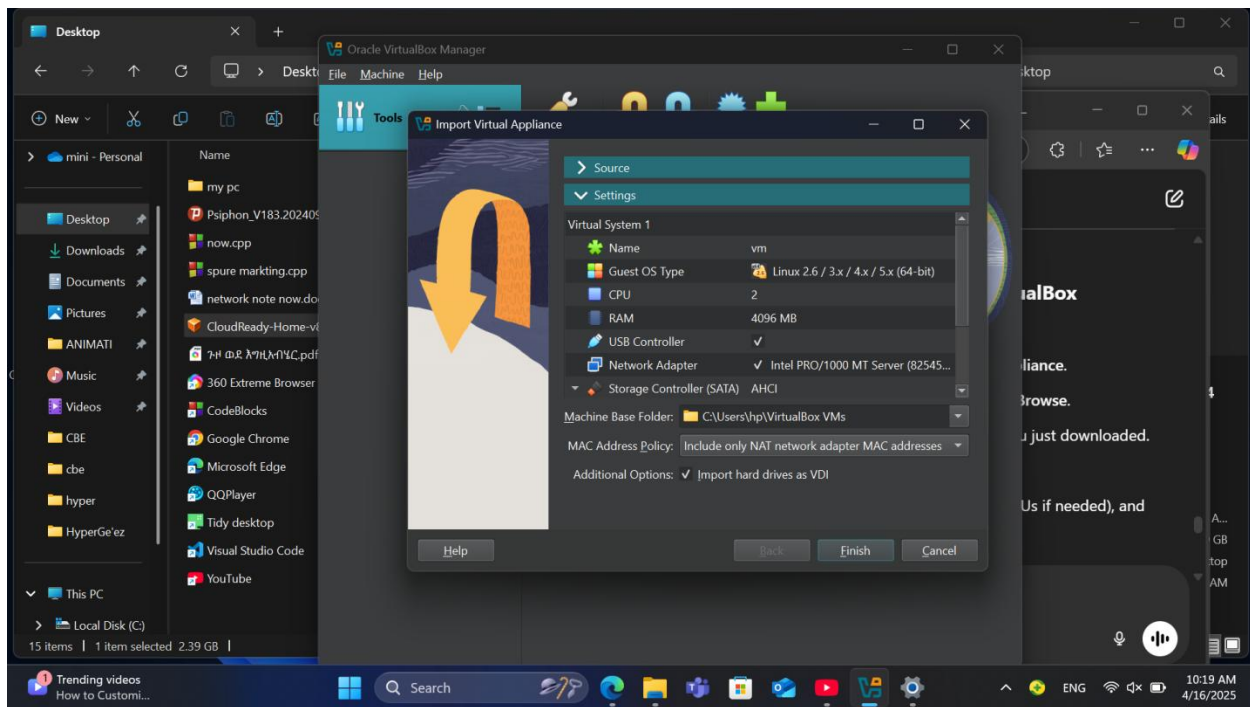
### 3. Click Next

#### □ Step 4: Allocate System Resources

- **RAM:** 4096 MB or more
- **Processor:** Minimum 2 CPUs (enable PAE/NX)

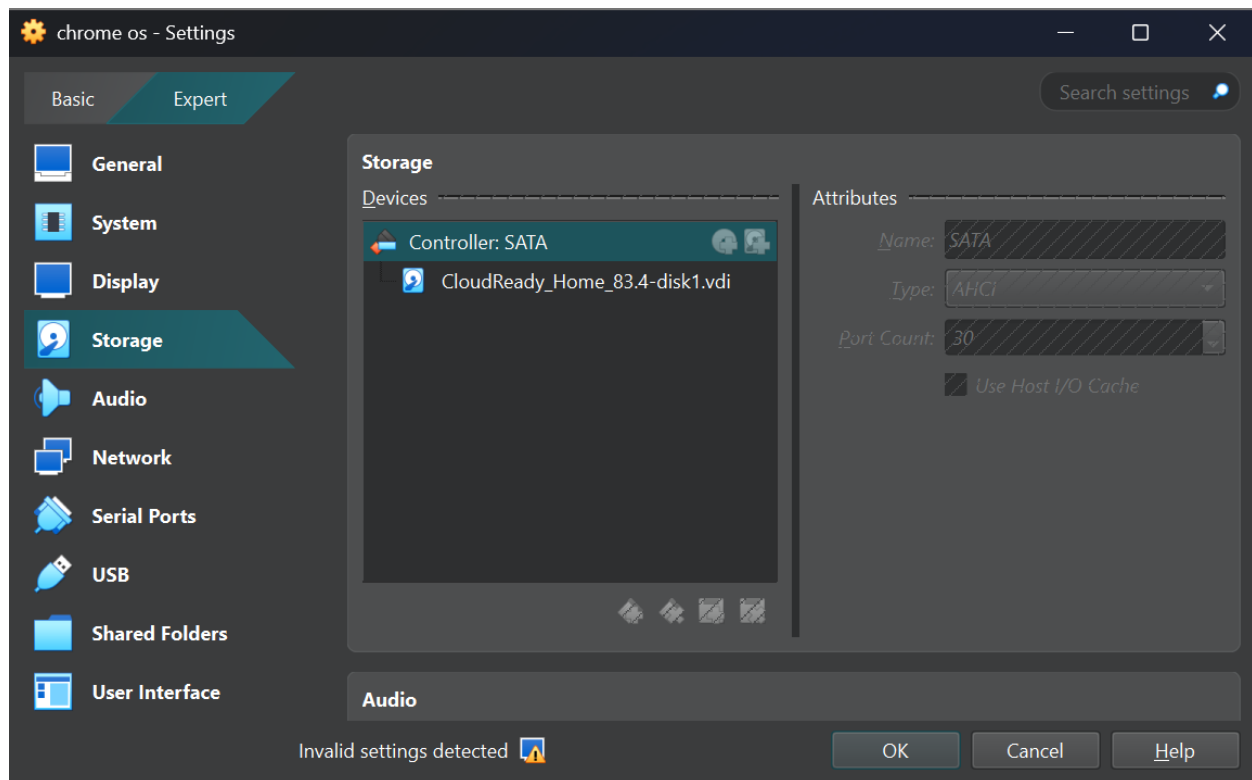


- **Enable EFI:** Go to Settings > System > Motherboard > Enable EFI



## □ Step 5: Attach the Disk

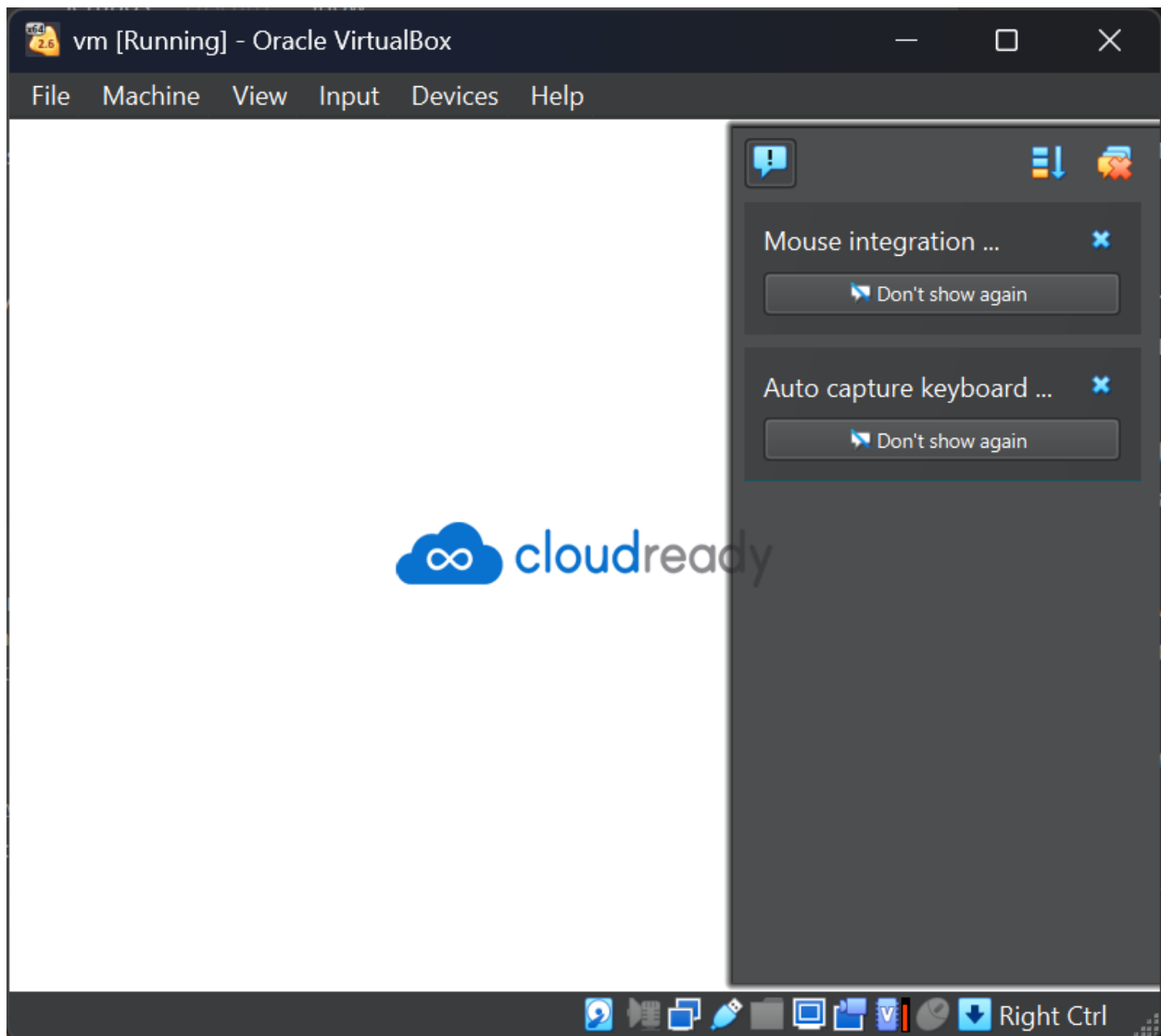
1. Go to Settings > Storage
2. Click on **Controller: SATA > Add Hard Disk**
3. Select Use an existing virtual hard disk file
4. Choose your cloudready.vdi



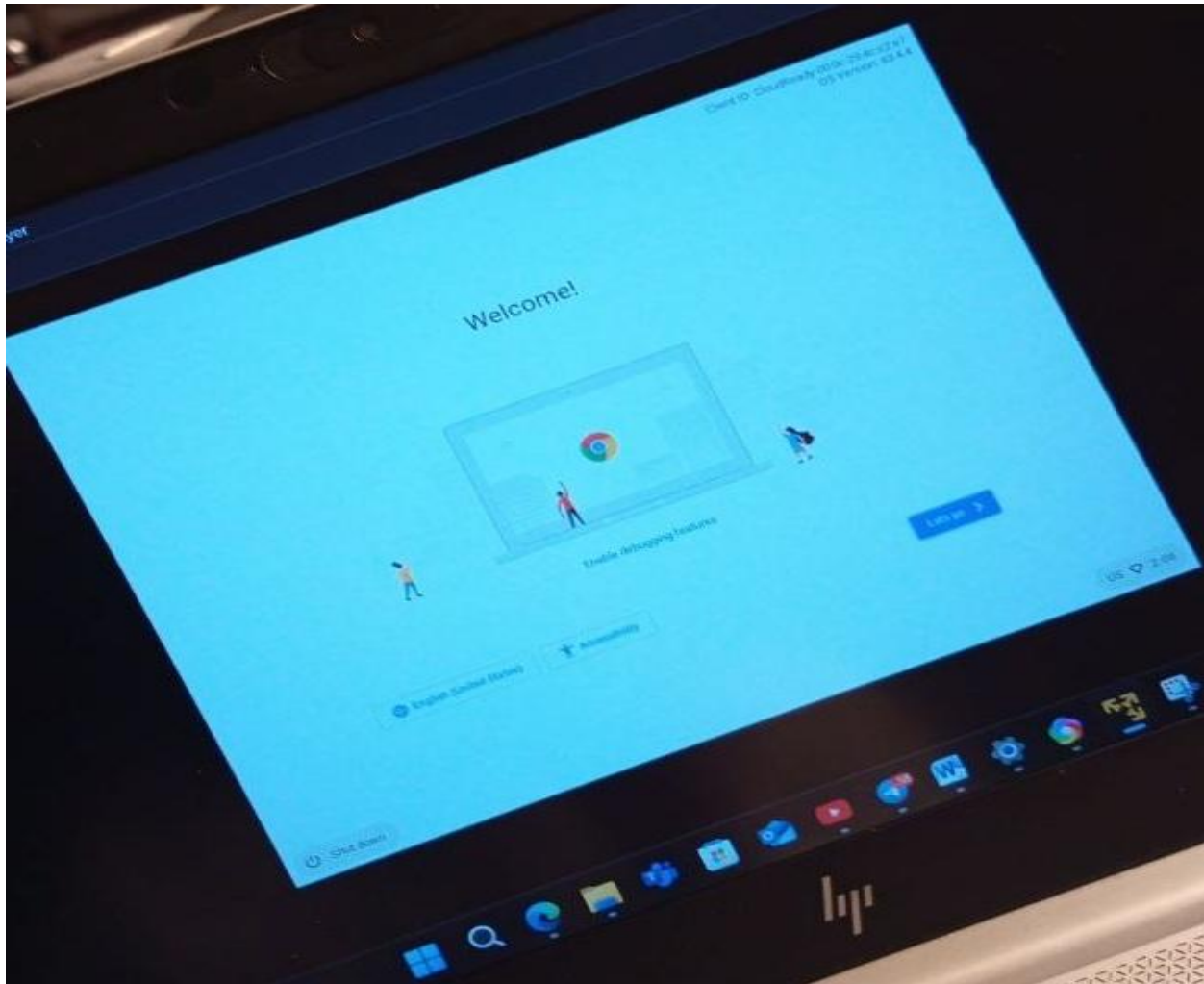
## □ Step 6: Network and Display Settings

- **Network:**
  - Adapter 1: NAT (or Bridged for better internet access)
- **Display:**
  - Video Memory: 128 MB

## ► □ Step 7: Boot and Setup



1. Click **Start** to launch the VM
2. Wait for CloudReady to load (can take 1–3 minutes)
3. Follow on-screen setup:
  - Language, Keyboard
  - Wi-Fi or Ethernet Connection
  - Sign in with Google Account
4. Chrome OS interface should now load



(sorry for camer qaulity I can't take screnshoot in the chrome os. )

## *Troubleshooting*

<i>Issue</i>	<i>Solution</i>
No Bootable Device	Enable EFI, reattach <code>.vdi</code> , ensure it's under SATA
Black Screen on Boot	Ensure CPU virtualization is enabled in BIOS
No Internet Access	Switch to Bridged Adapter in Network Settings
Freezing or Lagging	Increase RAM or CPUs, enable 3D acceleration (optional)

## *Filesystem Compatibility in Chrome OS*

### File System Usage

ext4	Native filesystem for system and apps
FAT32	Common external drive format
exFAT	Large external storage (USB/SD cards)
NTFS	Read-only support

## *Conclusion*

You've successfully installed Chrome OS in VirtualBox using CloudReady. It's now ready to be used for lightweight development, browsing, or testing. Though limited compared to full installations, it's an excellent way to explore Chrome OS features without needing a Chromebook.

## *Bonus: Future Enhancements*

- Try dual-booting CloudReady with Windows/Linux
- Explore FydeOS or Brunch framework for more flexibility
- Add extensions or Linux beta inside Chrome OS for development

For further assistance or a VMware version of this guide, just ask!

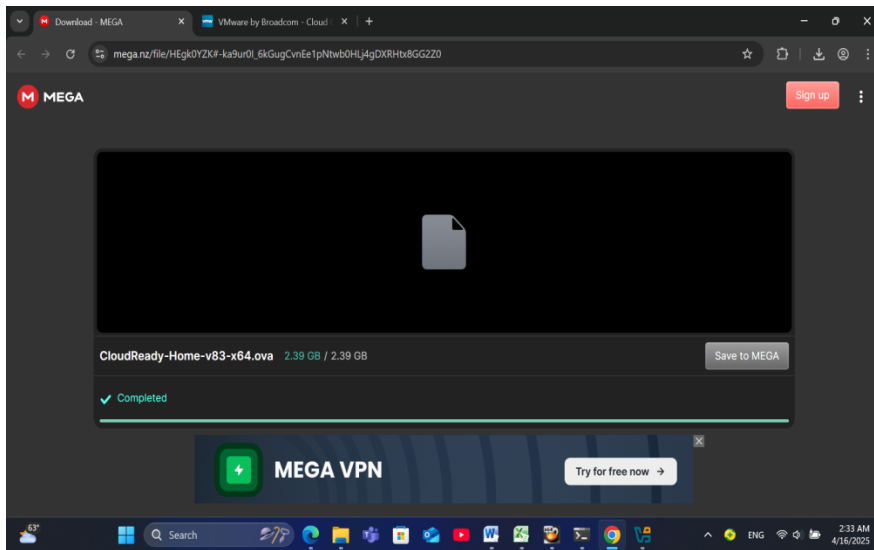
## **Chrome OS Installation Guide for VMware (Using CloudReady by Neverware)**

### **Installation Steps**

#### **Step 1: Download Required Files**

##### **1.1 Download CloudReady VMware OVA Image:**

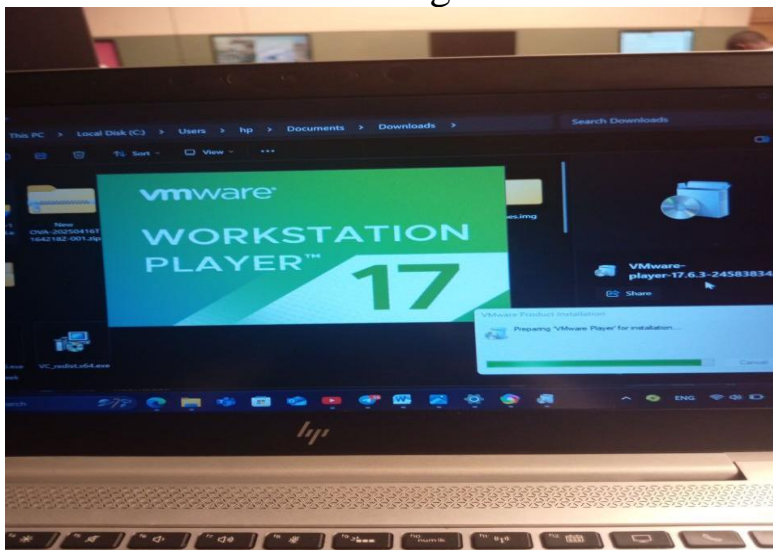
- Visit <https://www.neverware.com/freedownload>
- Scroll to "Download USB Maker or OVA image"
- Click "Download VMware OVA file"
- Save the .ova file (e.g., CloudReady-Home-VMware64.ova)



## Step 2: Install and Launch VMware Player

### 2.1 Install VMware Workstation Player (if not already):

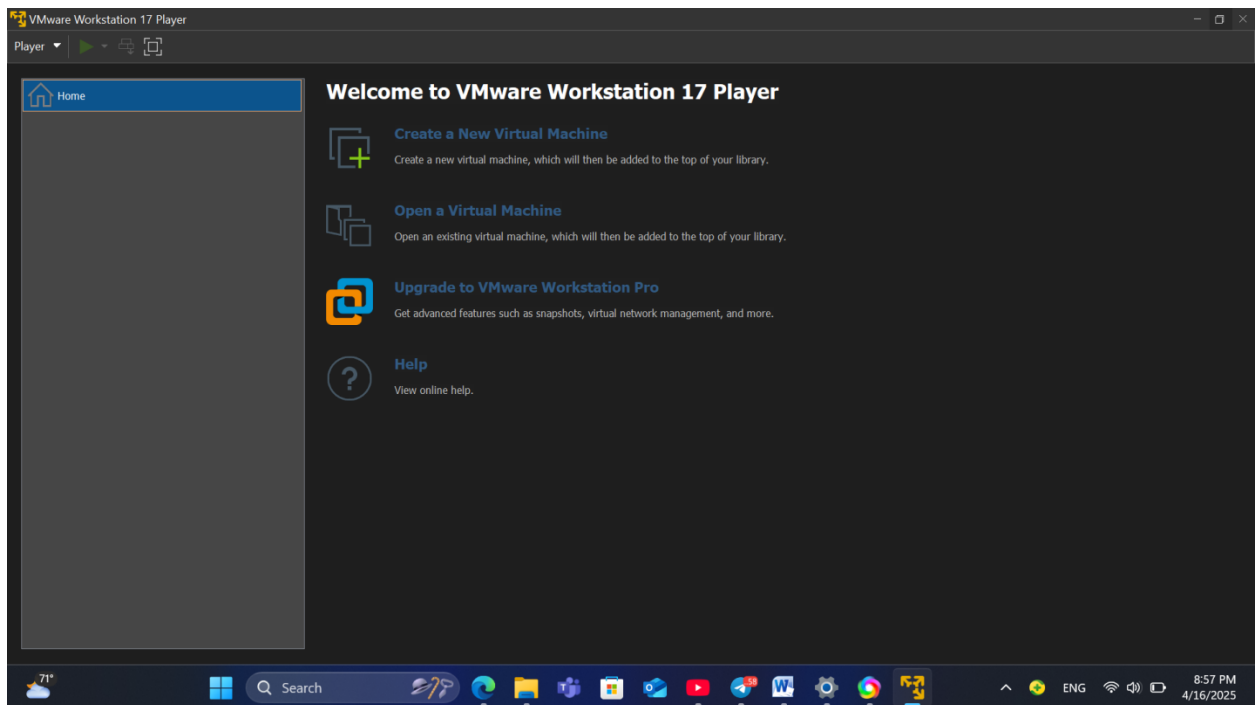
- Download from <https://www.vmware.com/products/workstation-player.html>
- Install with default settings



## Step 3: Import the CloudReady OVA File

### 3.1 Open VMware Player:

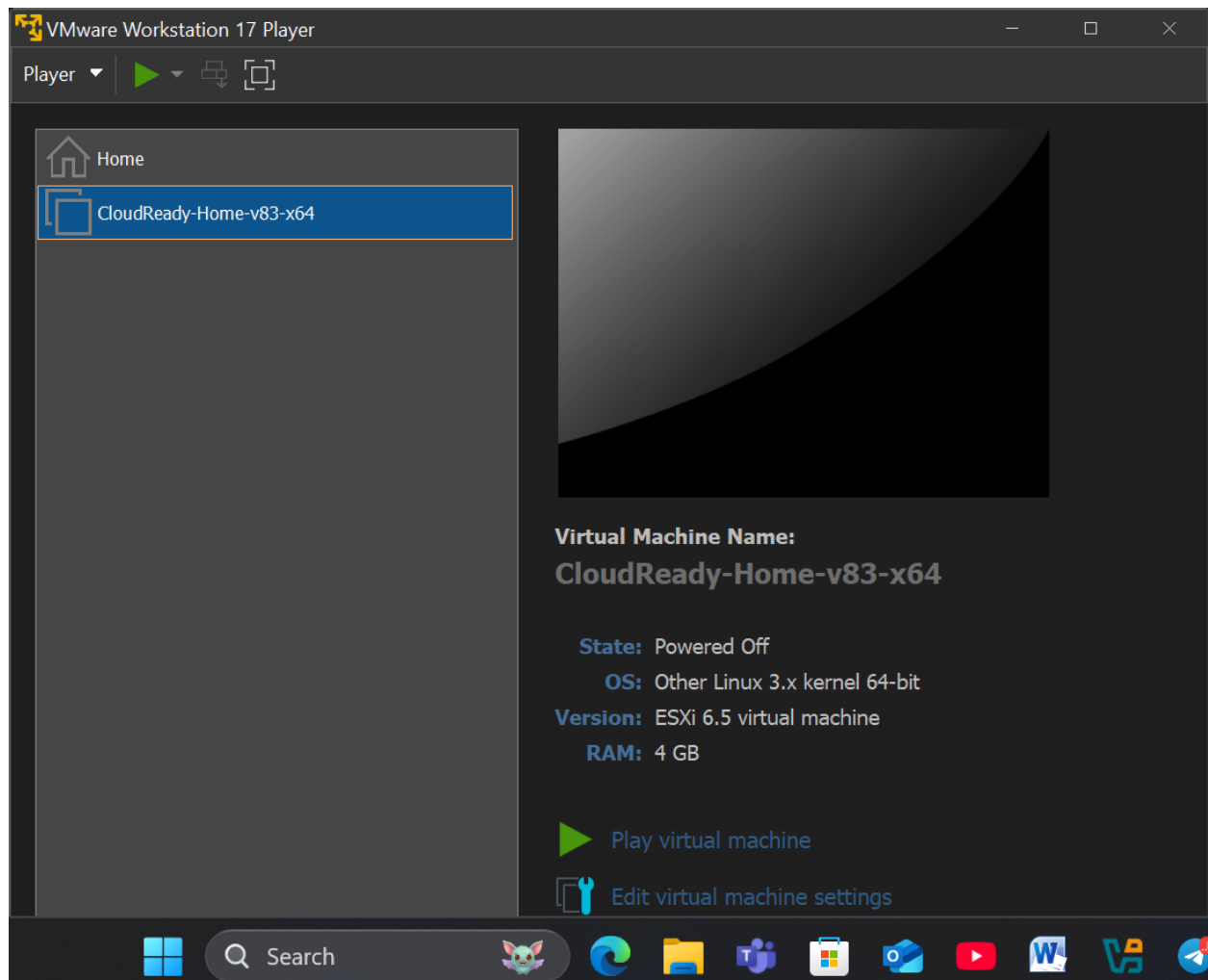
- Click `Open a Virtual Machine`
- Browse to the downloaded `.ova` file
- Name your VM (e.g., " `CloudReady-home-v83-x64`") and click `Import`



## Step 4: Adjust VM Settings (Optional but Recommended)

### 4.1 Adjust Memory and CPU:

- Select the VM > Click `Edit Virtual Machine Settings`
- Increase memory to 4096 MB or more
- Increase processors to 2 (if possible)



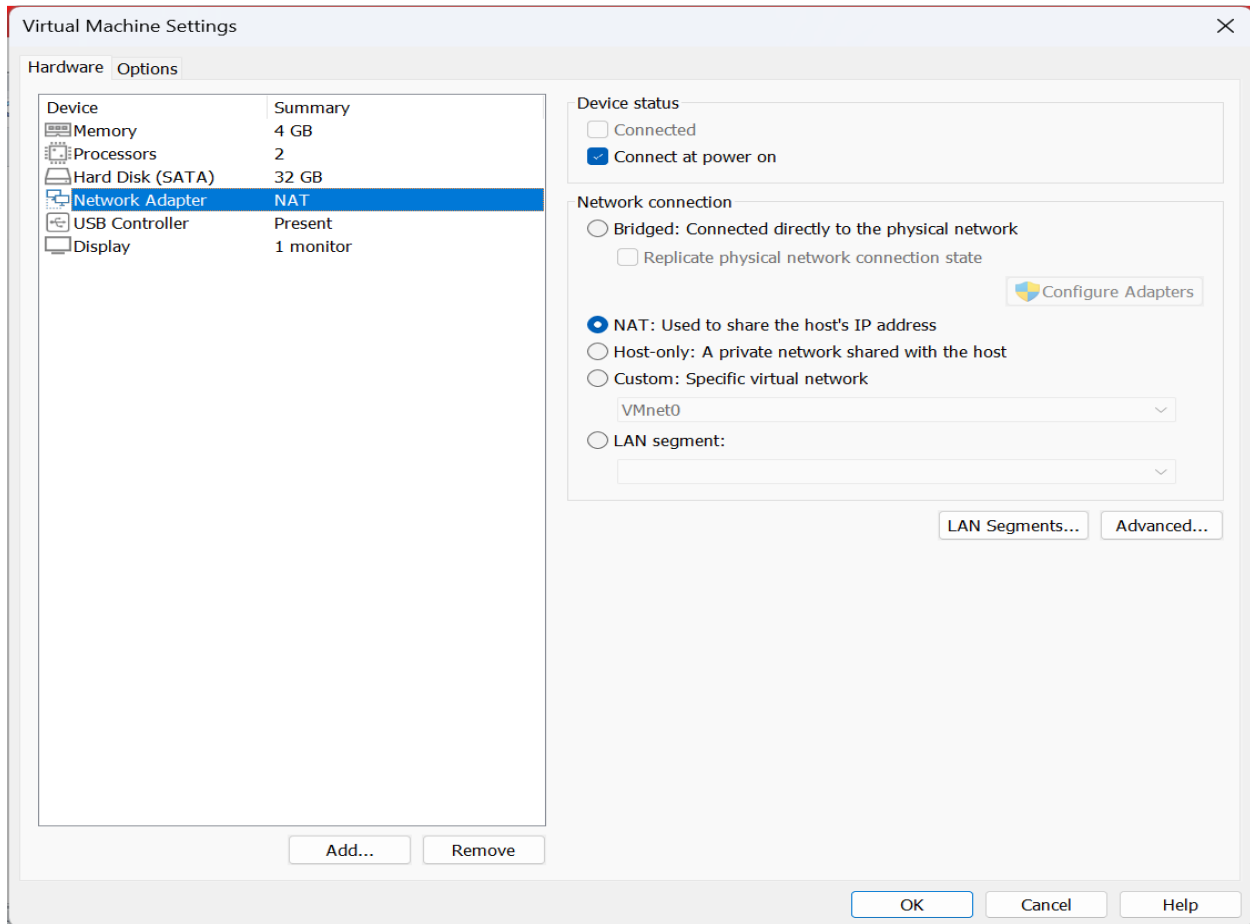
## 4.2 Enable Virtualization Features:

- Under Processor settings: Check `Virtualize Intel VT-x/EPT` or `AMD-V/RVI`

## 4.3 Network Adapter Configuration:

- Set network mode to `NAT` or `Bridged` for internet access





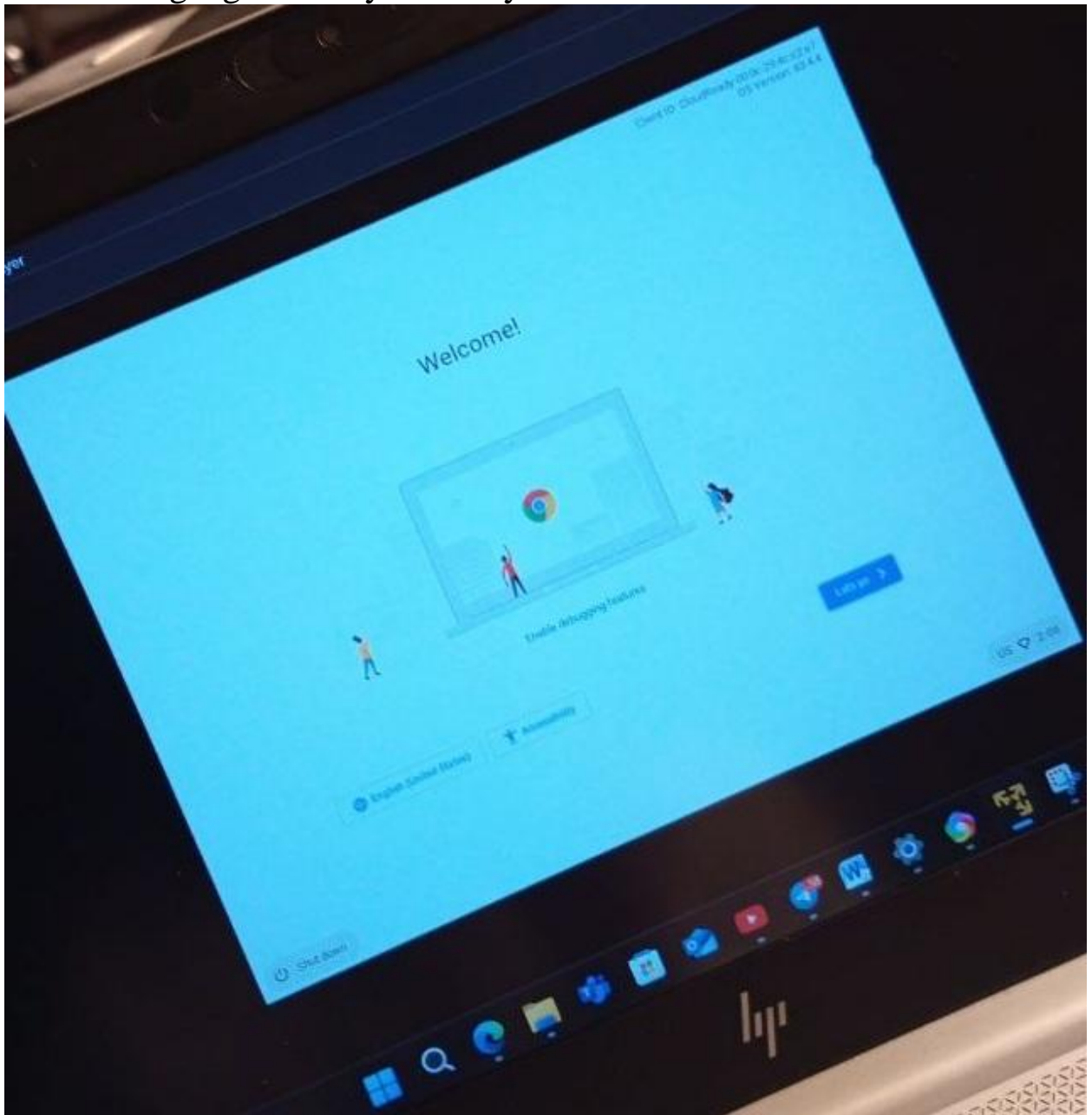
### ###. First Boot and Setup

#### 5.1 Start the VM:

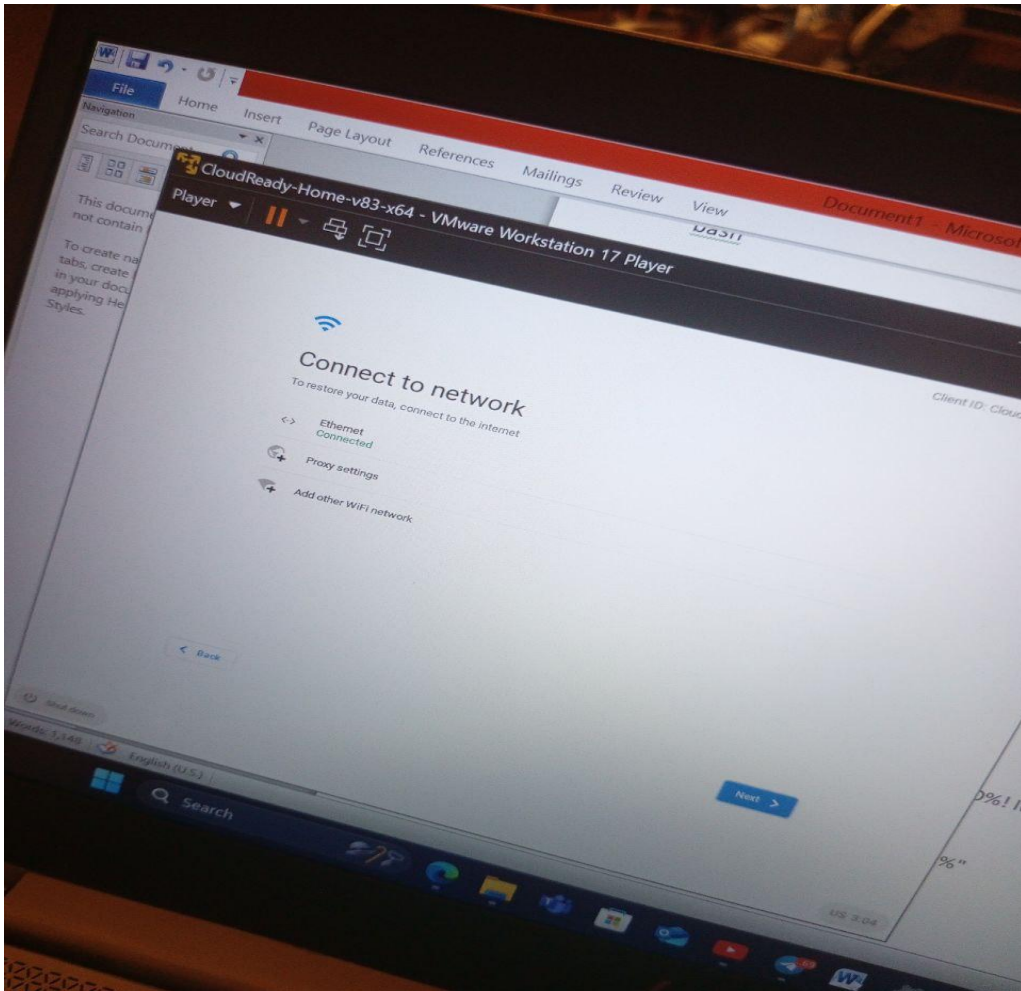
- Click Play virtual machine
- CloudReady will boot and take you through a setup wizard

#### 5.2 Initial Setup:

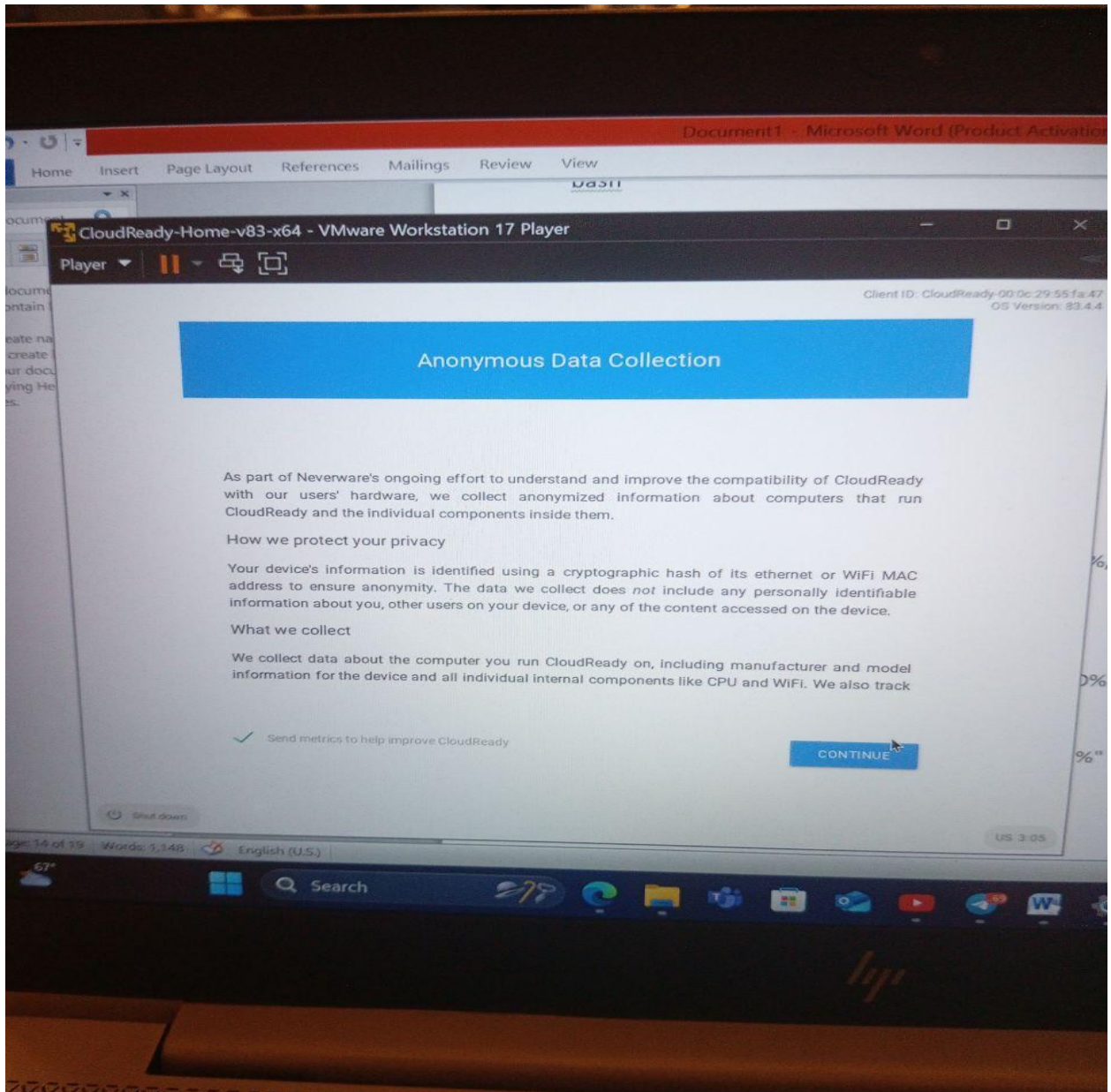
- Choose language and keyboard layout



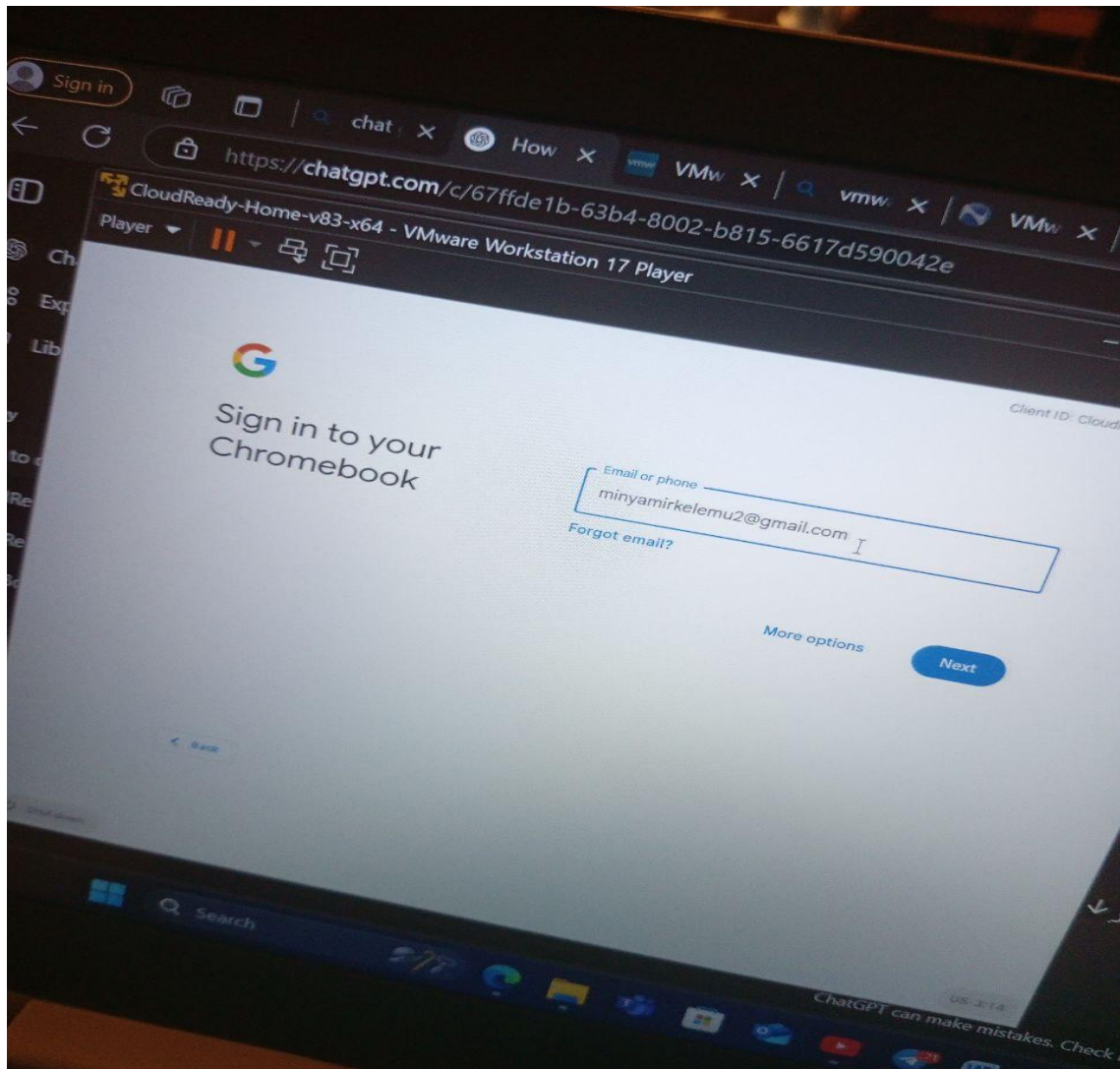
- Connect to Wi-Fi (if required)



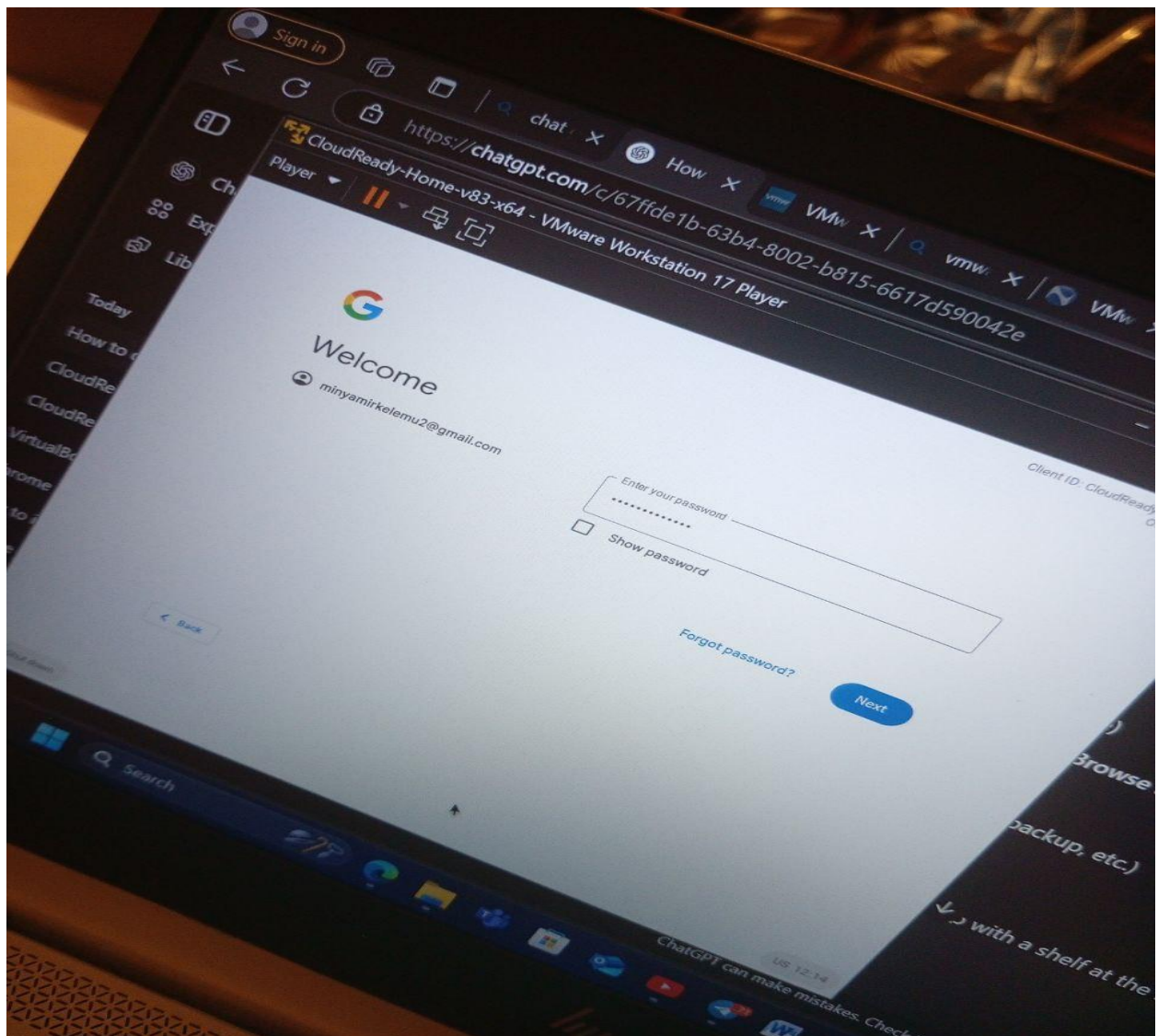
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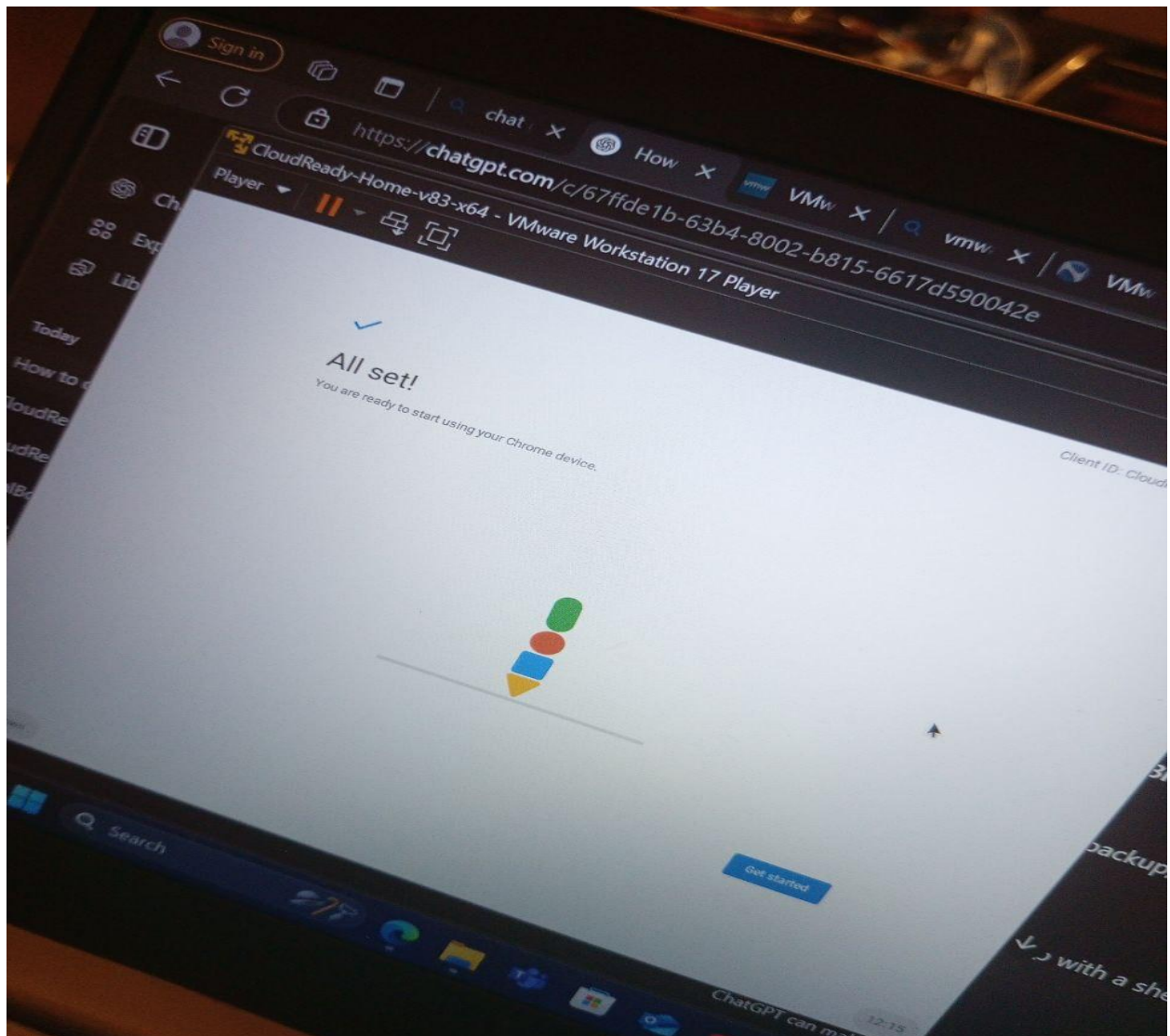


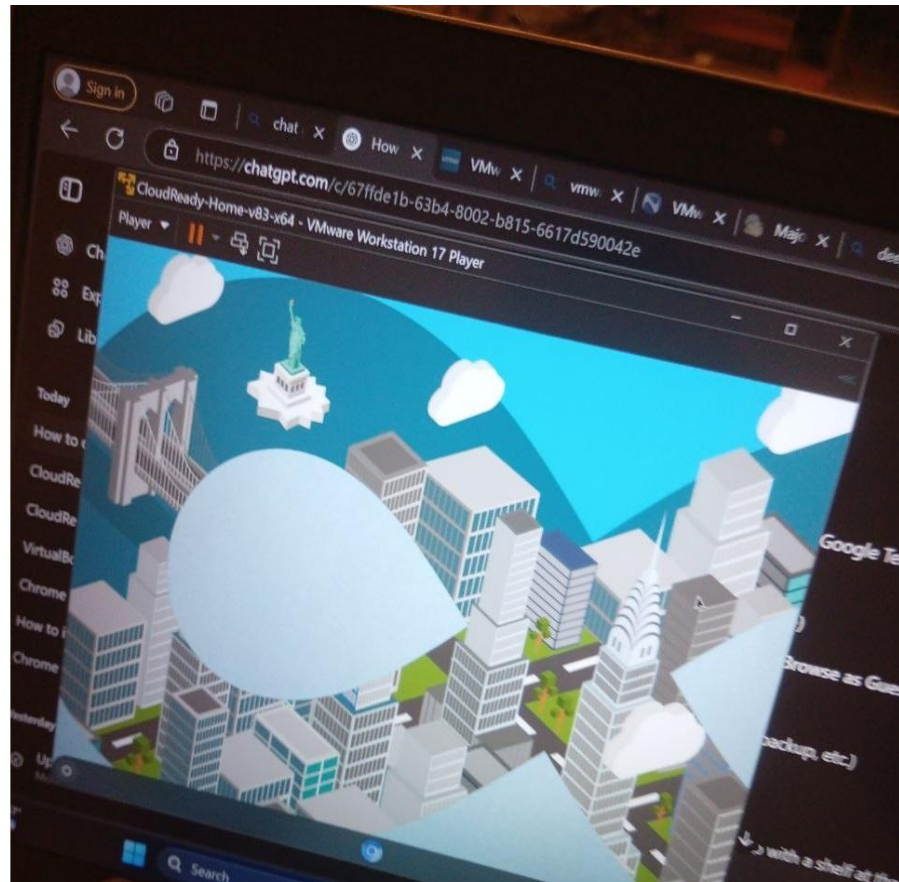
- Sign in with your Google Account





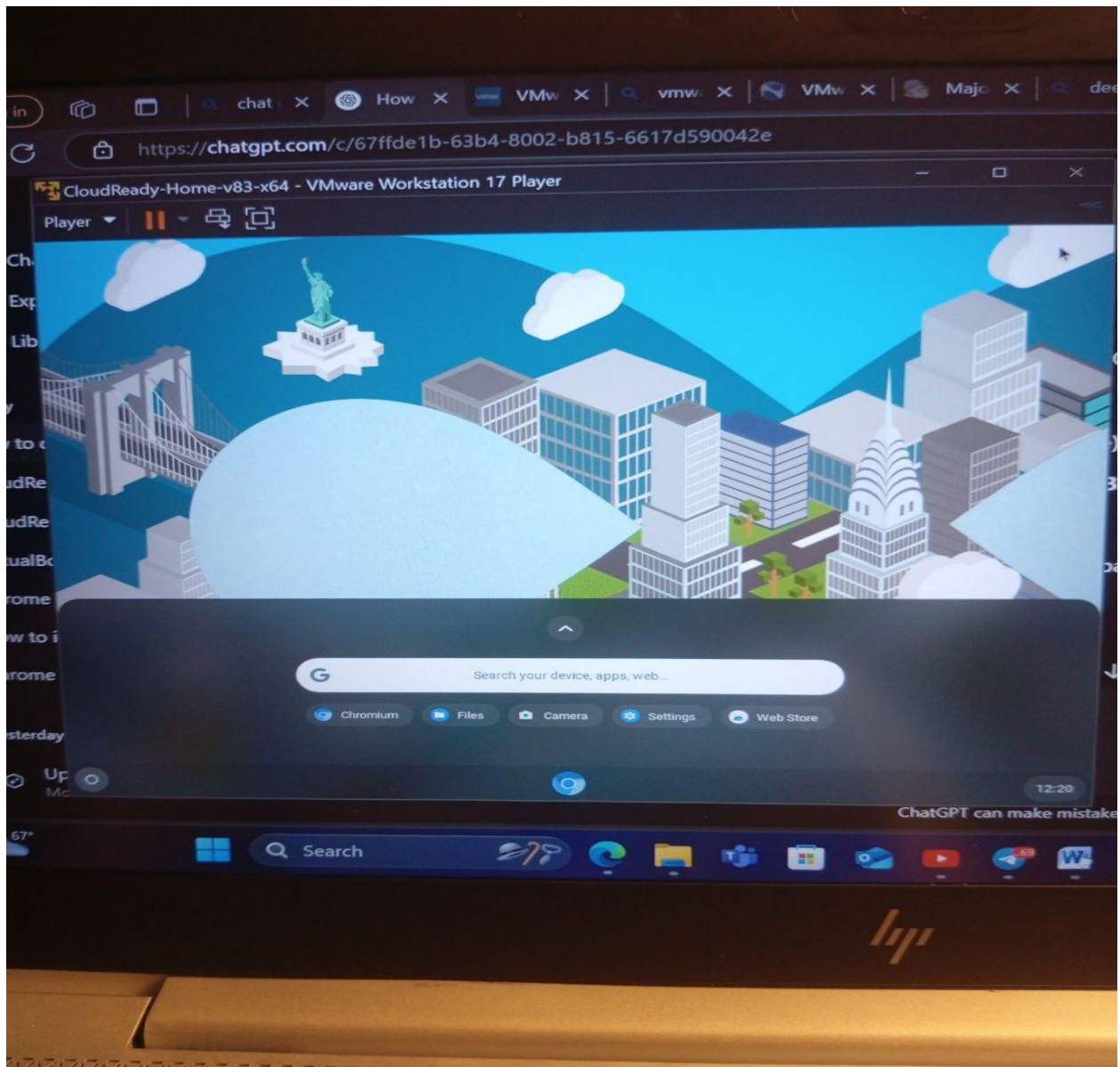






**(this is the interface of the chrome os in the vm ware)**





## *Issues Faced & Troubleshooting*

Issue	Solution
Black screen / Stuck boot	Enable virtualization in BIOS, ensure .ova is intact
No internet access	Switch network adapter to Bridged or NAT
Performance lags	Increase RAM and CPU allocation in VM settings
Can't sign in	Use a valid Google account, check internet

## *File System Support in CloudReady*

- **ext4:** Main Linux-based internal file system
- **FAT32, exFAT:** External storage device support
- **NTFS:** Read-only support for Windows partitions

## *Advantages and Disadvantages*

### **Advantages:**

- Free to use (Home edition)
- Light and fast
- Easy to set up on VMware
- Safe environment for web apps and testing

### **Disadvantages:**

- Limited offline capabilities
- Not all Chrome OS features available (e.g., Play Store not in Home edition)
- Hardware acceleration limitations in VM

### **e. Issues Faced**

- "No bootable device" error:
- Occurs when EFI is disabled or disk file is not attached properly.
- Black screen during boot:
- Due to incompatible image file or missing CPU virtualization.
- No internet access:
- Happens if network adapter is not configured properly.
- Low resolution / display glitches:

- Guest Additions not supported on Chrome OS.

## Issues Faced & Troubleshooting

Issue	Cause	Solution
Black screen / Stuck boot	Virtualization not enabled or corrupted OVA file	Enable virtualization in BIOS, redownload OVA file
No internet access	Incorrect network configuration	Switch network adapter to Bridged or NAT mode
Performance lags	Limited resources allocated	Increase RAM and CPU allocation in VM settings
Can't sign in	Network or Google account issues	Check network connection and use a valid Google account
Mouse/keyboard lag	VMware tools not fully supported	Reboot the VM or adjust input settings in VMware
Chrome OS doesn't boot after update	Incompatibility or corrupted update	Re-import OVA or revert snapshot if available
OVA import fails	VMware version conflict	Update VMware Player or use another compatible version

## Snipped Errors (Examples):

- Screenshot: Black screen during boot
- Screenshot: "No internet access" page in Chrome OS setup
- Screenshot: "This account cannot be used" when login fails

## f. Solutions

- Enable EFI in VM settings.
- Ensure virtualization is enabled in BIOS.
- Use a compatible image (FydeOS or Brunch-based).
- Use SATA controller for hard disk instead of IDE.
- Set network adapter to Bridged or NAT.

- Increase video memory to 128 MB.

## **. File System Support in CloudReady**

- **ext4:** Primary internal file system used by Chrome OS (Linux-based).
- **FAT32 & exFAT:** Supported for external drives and USBs.
- **NTFS:** Read-only access for compatibility with Windows file systems.
- **Other Filesystems (Btrfs, ZFS, HFS+, APFS):** Not officially supported or read-only if mounted manually via shell.

## **Why?**

Chrome OS is optimized for web usage and simplicity. It uses ext4 for stability and performance and only partially supports other filesystems to avoid complexity and ensure reliability.

## **h. Advantages and Disadvantages of VMware and VirtualBox**

### **VMware**

- **Advantages:**
  - Superior performance and resource management
  - Excellent support for 3D graphics and hardware acceleration
  - Robust USB and device support
  - User-friendly and professional interface
- **Disadvantages:**
  - Pro version is paid
  - Less open than VirtualBox
  - Some features not available in free version

### **VirtualBox**

- **Advantages:**
  - Completely free and open-source

- Wide range of OS support including Linux, macOS, Windows
- Good community support
- **Disadvantages:**
  - Performance may lag under heavy load
  - Weaker support for 3D graphics
  - Requires extension pack for USB support

## i. Conclusion

Chrome OS installation using CloudReady on both VMware and VirtualBox is feasible and efficient. VMware offers a smoother experience with better hardware support, while VirtualBox provides a free, open-source option suitable for basic use. Depending on the user's needs, both tools provide a secure way to explore Chrome OS without altering their primary system.

## j. Future Outlook

- **Chrome OS Flex** is the future of CloudReady and brings better performance and security. Users are encouraged to transition to Chrome OS Flex.
- **For Beginners:** Use VirtualBox due to its simplicity and cost-free nature.
- **For Professionals or Long-Term Use:** VMware is recommended for its performance, stability, and enterprise features.
- Stay updated on Chromium OS and Chrome OS Flex developments.
- Contribute to open-source builds of Chromium OS for better feature support in VirtualBox.

## *Virtualization in Modern OS*

What: Virtualization allows multiple OS instances to run on the same hardware via software abstraction (hypervisor).

Why: Efficient resource use, testing different OSs, isolation for security, cost-saving.

How:

Install hypervisor (VirtualBox, VMware)

Create a virtual machine

Load ISO/image to install OS

Use snapshots, dynamic disk allocation, shared folders, etc.

## What is Virtualization in Modern Operating Systems?

Virtualization is a technology that allows multiple virtual machines (VMs) to run on a single physical machine (host), each running its own independent operating system (OS). It is achieved by using a software layer known as a **hypervisor**. The hypervisor abstracts and allocates physical resources (like CPU, RAM, storage) to each VM, allowing them to operate as if they were separate physical computers.

### Why is Virtualization Important?

1. **Resource Optimization:** Virtualization allows more efficient use of hardware resources by running multiple OSes on a single machine. This leads to better utilization of CPU, memory, and storage.
2. **Isolation and Security:** Each VM is isolated from others, preventing one VM's problems from affecting others. This isolation is useful for security, testing, and development.
3. **Cost Savings:** Running multiple VMs on a single physical server reduces hardware costs, lowers power consumption, and minimizes physical space requirements.

4. **Flexibility and Scalability:** Virtualization enables easy creation, management, and scaling of virtual environments, useful for testing, development, and disaster recovery.

## How Does Virtualization Work?

1. **Hypervisor Type:**
  - **Type 1 (Bare-metal):** The hypervisor runs directly on the host hardware. Examples include VMware vSphere and Microsoft Hyper-V.
  - **Type 2 (Hosted):** The hypervisor runs as a software application on an existing OS. Examples include VMware Workstation and Oracle VirtualBox.
2. **VM Creation:** A VM is created by defining the amount of resources (CPU, RAM, storage) it will use, and an operating system is installed in the VM.
3. **Resource Allocation:** The hypervisor manages the physical resources and allocates them dynamically to VMs based on their needs, ensuring each VM has access to the resources it requires to run.
4. **Virtual Machine Operations:** Once a VM is set up, it operates independently, allowing users to run different operating systems or configurations without impacting the host OS.

In summary, virtualization is a foundational technology for efficient resource management, flexibility, and cost-saving in modern IT environments.