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Table Of Content

1. Introduction

Netrunner OS is a Linux-based operating system designed to provide a user-friendly and visually appealing desktop experience. It is based on Debian Stable or sometimes Manjaro (Arch-based) depending on the version, offering a stable, secure, and flexible environment for everyday use. The OS is particularly known for its polished KDE Plasma desktop and integration of essential software out of the box, catering to both new and experienced users.

1.1 Background

Netrunner was first released in 2010 by Blue Systems, a company that also supports KDE and Kubuntu. Initially based on Ubuntu, it shifted its base to Debian Stable in later versions to offer a more robust and consistent experience. There was also a rolling release version based on Manjaro to cater to users who prefer the latest software.

The project aims to bridge the gap between ease of use and advanced Linux features. With a focus on KDE Plasma, Netrunner provides a cohesive and modern desktop environment while maintaining high customizability.

1.2 Motivation

The motivation behind Netrunner OS is to:

Provide a beautiful and functional KDE desktop out of the box.

Deliver a stable, secure, and up-to-date system with a strong Debian base.

Make Linux more accessible to general users who are not necessarily tech-savvy.

Offer a complete set of pre-installed applications for web browsing, multimedia, productivity, and development.

Support the KDE community and ecosystem by promoting KDE software and usability.

Netrunner OS is a user-friendly, visually refined Linux distribution that is based on the rock-solid foundation of Debian GNU/Linux. Developed and maintained by Blue Systems, Netrunner is designed to deliver a complete and polished desktop computing experience right out of the box. It targets both new and experienced users who are looking for a reliable and attractive alternative to mainstream operating systems like Windows or macOS.

2. Objectives

Netrunner OS is a Linux-based operating system designed with the primary objective of offering a complete, user-friendly, and visually appealing computing environment out of the box. Its goal is to bridge the gap between powerful Linux performance and a polished desktop experience that appeals to both beginners and advanced users alike. With a strong foundation in the KDE Plasma desktop and a curated selection of software, Netrunner OS aims to provide a stable, secure, and versatile system for everyday use, while maintaining the freedom and flexibility that open-source software offers.

One of the core objectives of Netrunner OS is **usability and accessibility**. While many Linux distributions are targeted toward tech-savvy users, Netrunner aims to make Linux more accessible to users who are accustomed to commercial operating systems like Windows or macOS. It achieves this by offering a highly intuitive user interface with familiar layouts, clear navigation, and a thoughtfully chosen set of pre-installed applications that cater to common computing needs such as browsing, office productivity, media playback, and image editing.

A second key objective of Netrunner OS is to deliver a **visually rich and modern desktop experience**. Aesthetics play a major role in Netrunner's identity. The operating system comes with a sleek and polished KDE Plasma desktop, custom themes, stylish icon sets, and fine-tuned desktop effects. This emphasis on visual appeal ensures that users not only have a functional system but also one that is enjoyable to use and visually consistent. Netrunner's team takes the time to preconfigure the appearance and behavior of the desktop to create a smooth and refined experience, reducing the need for users to spend time on customization after installation.

Stability and performance are also at the heart of Netrunner's mission. By basing the operating system on **Debian Stable**, Netrunner inherits a solid and time-tested foundation that ensures long-term reliability and security. The choice of Debian allows the system to benefit from one of the largest and most respected communities in the Linux ecosystem, known for its rigorous testing and adherence to open-source principles. This stable base is ideal for users who want a dependable operating system that doesn't require frequent updates or risk breaking due to experimental changes.

In addition to stability, Netrunner aims to strike a balance between **performance and functionality**. While some desktop environments are either too resource-heavy or too minimal, Netrunner's KDE setup is optimized to provide a responsive user experience without sacrificing features. The developers include useful tools and services that enhance productivity while ensuring the system remains lightweight enough for use on a wide range of hardware, including older machines.

Another important objective is **freedom and openness**. Netrunner OS, like many Linux distributions, is committed to the values of free and open-source software (FOSS). This means that users have complete control over their systems, with the ability to modify, distribute, and study the software as they see fit. This commitment empowers users and protects their digital rights, while also fostering a community-driven development model.

Finally, Netrunner also serves an **educational and transitional role**. It is often recommended as a stepping stone for users who are new to Linux. By providing a familiar yet powerful environment, Netrunner helps users transition smoothly into the Linux world, gradually introducing them to concepts like package management, system customization, and open-source culture.

In summary, the objective of Netrunner OS is to offer a beautiful, stable, and user-centric Linux desktop experience that is ready to use out of the box. Through its focus on accessibility, aesthetics, reliability,

and freedom, Netrunner seeks to make Linux a viable and attractive option for everyday desktop users of all skill levels.

3. History

Netrunner OS was first released in March 2010 by Blue Systems, a company known for its support of open-source software, particularly in the KDE ecosystem. The operating system was created to offer a user-friendly, visually appealing, and fully functional Linux desktop environment for both newcomers and experienced users. From the very beginning, Netrunner set out to distinguish itself by focusing on out-of-the-box usability, aesthetic design, and performance.

Originally, Netrunner was based on Ubuntu, using its repositories as a base and integrating the KDE Plasma desktop environment with a customized look and feel. During its early versions (e.g., Netrunner 3 "Blue Sky"), the OS gained attention for its attractive desktop layout, inclusion of multimedia codecs, and ready-to-use software that eliminated the need for users to install basics manually after setup.

Around 2014, Blue Systems made a strategic shift and started basing Netrunner Desktop on Debian Testing (later moving to Debian Stable) instead of Ubuntu. This change was driven by the desire for more stability, control, and consistency in the release cycle. The Ubuntu-based version was then rebranded and continued under the name Netrunner Rolling, using Manjaro (Arch Linux-based) as its foundation, although this variant was eventually discontinued to refocus efforts on the Debian-based version.

Netrunner’s development closely followed the progress of the KDE desktop environment. Each release of Netrunner OS introduced newer versions of KDE Plasma, KDE Frameworks, and related applications, all tailored with unique theming and system tweaks. The OS earned a reputation for offering one of the most polished KDE experiences, with thoughtful defaults and visual enhancements.

In addition to the full-featured Netrunner Desktop, Blue Systems introduced Netrunner Core—a minimal installation option geared toward developers, tinkerers, and users who preferred to build their system from scratch. This edition was lighter, faster, and more suited to low-spec or older hardware, offering maximum flexibility.

Over the years, Netrunner releases have been named after creative themes such as "Blackbird," "Idolon," and more recently, "Shockworm" (2025 release). Each new version brings updated software, visual tweaks, bug fixes, and improved hardware compatibility, while continuing to emphasize ease of use.

Despite its relatively small developer base, Netrunner OS has maintained a loyal following in the Linux community, particularly among fans of the KDE ecosystem. Blue Systems' contributions to KDE, Plasma, and other open-source technologies have further strengthened Netrunner’s position as a respected project in the Linux world.

Today, Netrunner OS continues to be a reliable and attractive Linux distribution, combining the power of Debian Stable with a refined KDE Plasma desktop, appealing to users who want a beautiful, stable, and ready-to-use operating system without unnecessary complexity.

4. Requirements

Minimum Hardware Requirements

These specs will allow Netrunner OS to install and run, but with limited performance (better suited for light tasks):

- **Processor (CPU)**: 1.6 GHz dual-core (Intel or AMD)
- **Memory (RAM)**: 2 GB
- **Storage**: 20 GB of free disk space
- **Graphics**: Integrated graphics (Intel HD, AMD Radeon, etc.)
- **Display**: 1024x768 resolution
- **USB/DVD drive**: For installation media (optional if using ISO via bootable USB)

Recommended Hardware Requirements

These are the specs for smooth and responsive performance, especially with multimedia and multitasking:

- **Processor (CPU)**: 2.0+ GHz dual-core or quad-core (Intel i3/i5/i7, AMD Ryzen)
- **Memory (RAM)**: 4 GB or more (8 GB recommended for heavy multitasking)
- **Storage**: 40 GB or more of free disk space
- **Graphics**: Dedicated graphics card (NVIDIA or AMD) or newer integrated GPUs
- **Display**: 1366x768 or higher resolution (Full HD recommended)
- **Internet connection**: For updates and software downloads

Software Requirements and Details

- **Base System**: Debian Stable (currently based on Debian 12 "Bookworm")
- **Desktop Environment**: KDE Plasma (with custom Netrunner tweaks and theming)
- **Kernel**: Linux kernel version provided by Debian Stable (usually 6.x series)
- **Init System**: systemd
- **Installer**: Calamares (graphical installer, beginner-friendly)

Pre-installed Software Includes:

- **Web Browser**: Firefox ESR
- **Office Suite**: LibreOffice
- **Media Players**: VLC, SMPlayer
- **Graphics Tools**: GIMP, Krita
- **Utilities**: Dolphin (file manager), KDE Settings, Synaptic Package Manager

- **Package Management**: APT (Advanced Package Tool), Synaptic GUI frontend
- **Software Sources**: Debian repositories + Netrunner's custom enhancements

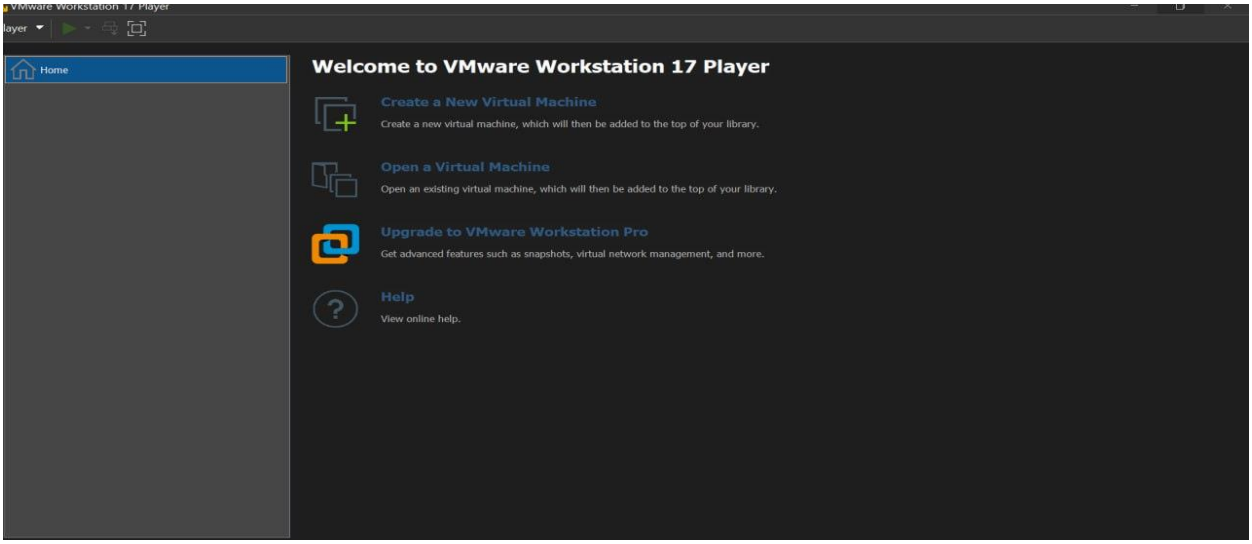
Bootable Installation Requirements

To create a bootable USB:

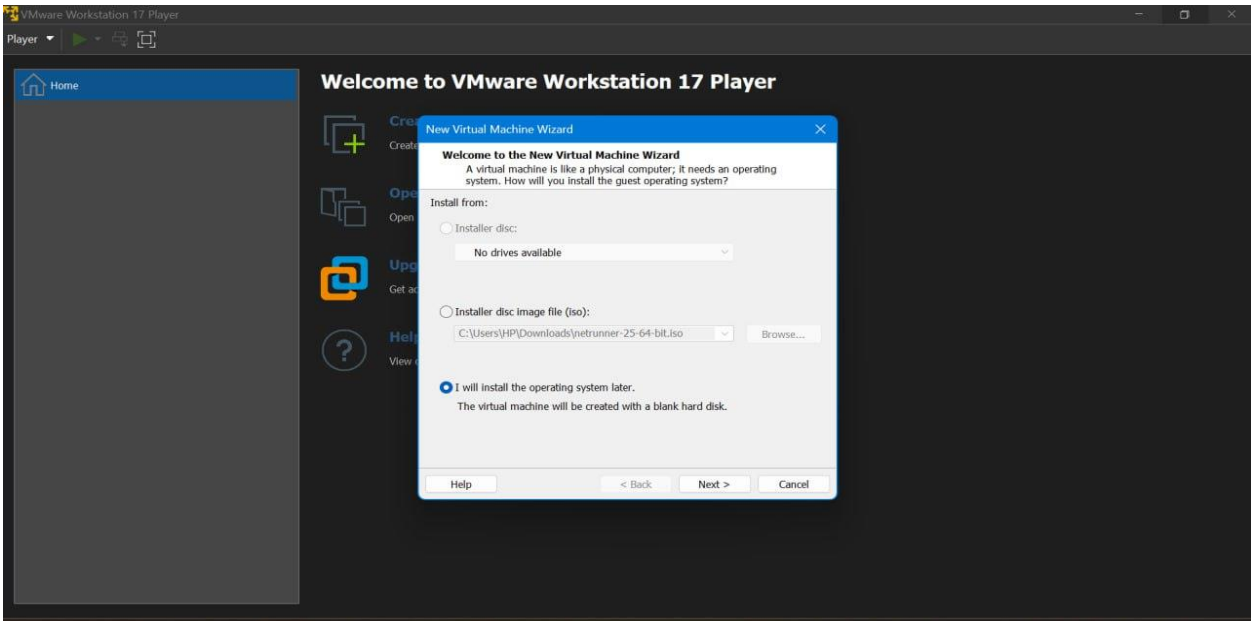
- **ISO File**: Download from [netrunner.com]
- **USB Tool**: Use tools like **Rufus** (Windows), **Etcher**, or **UNetbootin** to create a bootable USB.

5. Installation

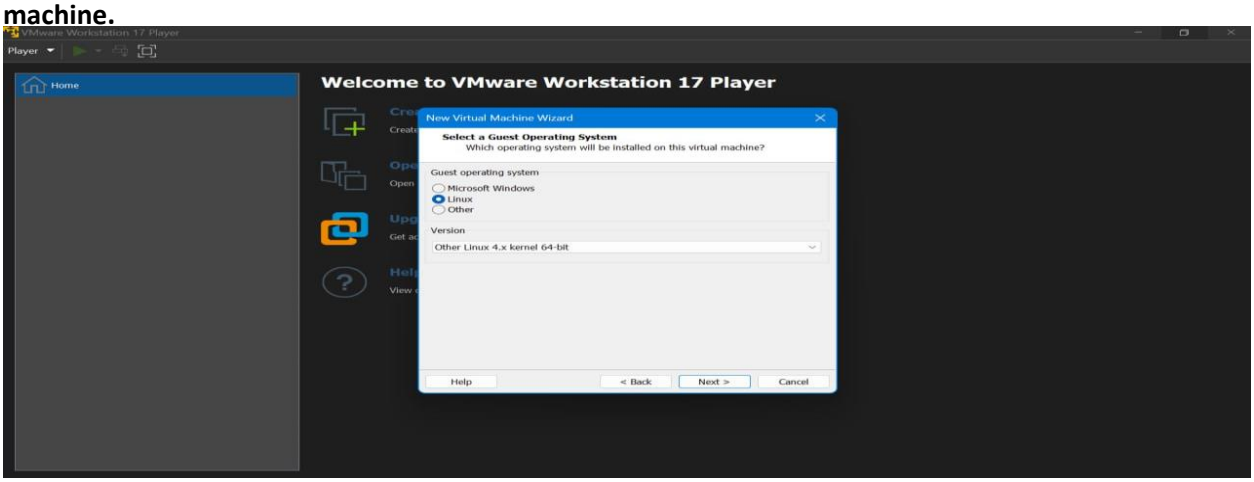
First page displayed when we open Vmware workstation



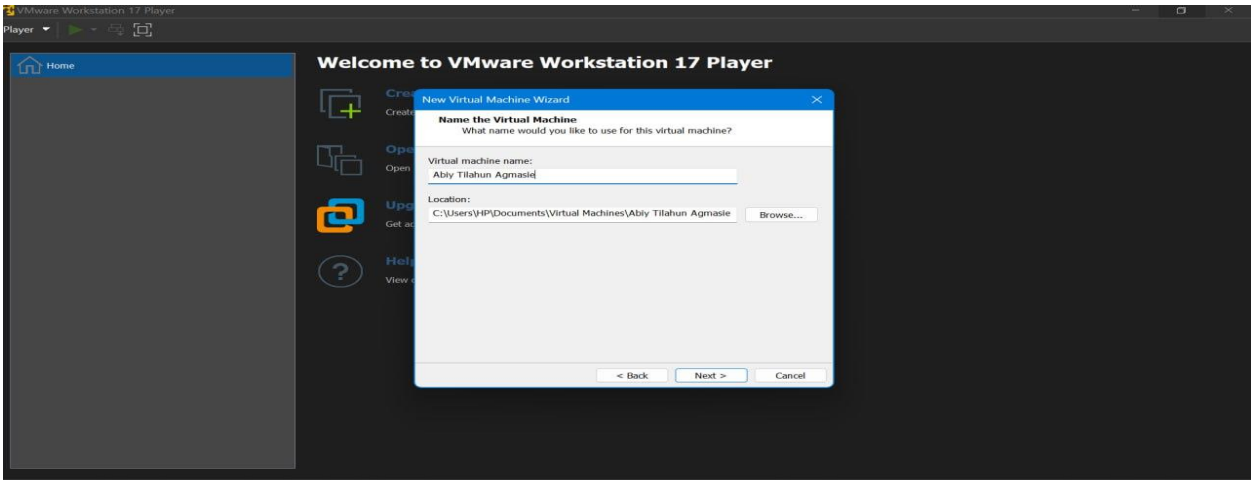
This screenshot shows write we choose the selected icon which say I will install the os later



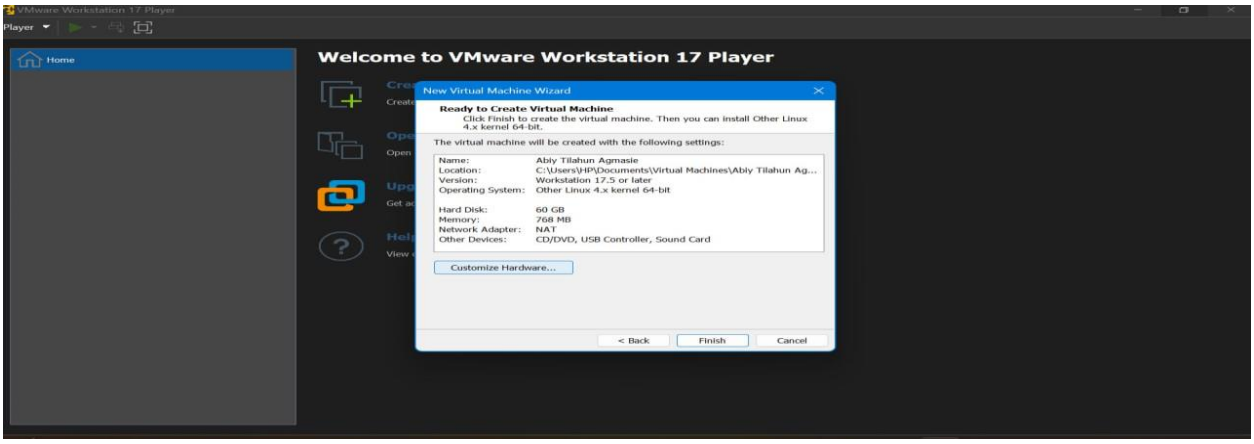
This screenshot shows select the guest operating system type and version for the new virtual machine.



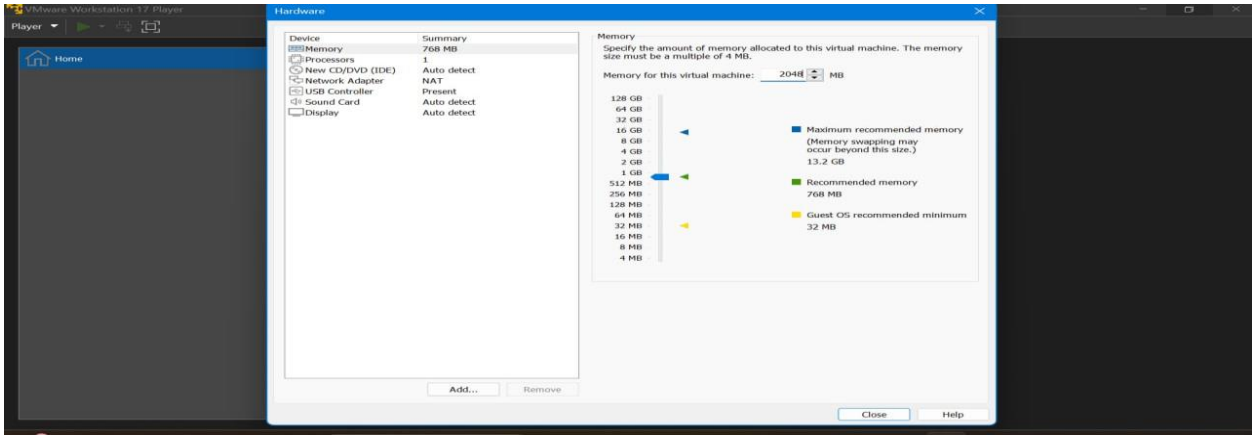
This screen allows you to name the virtual machine and choose the folder location where it will be stored



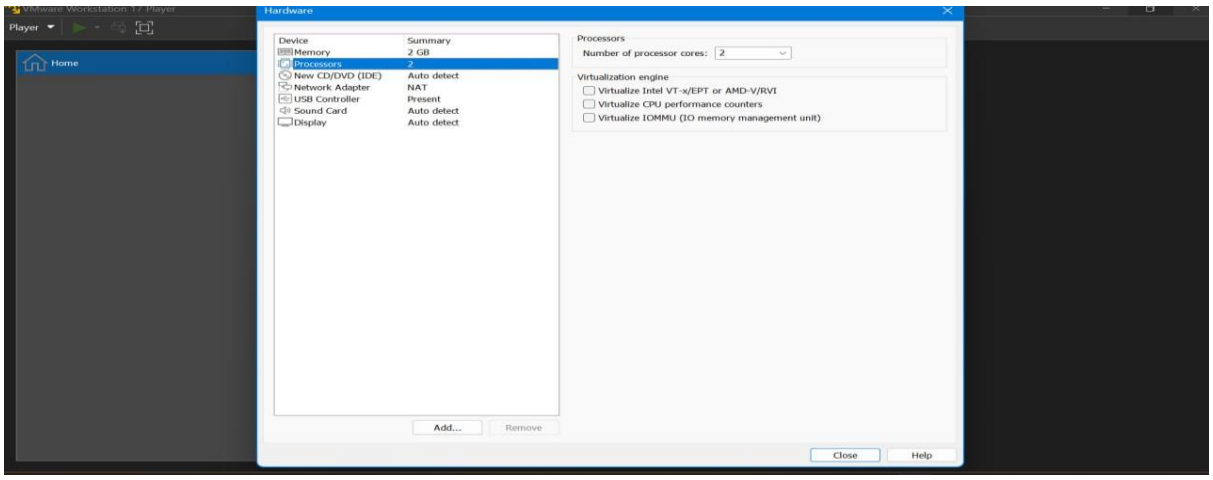
This screenshot shows The final step of creating a new virtual machine in VMware workstation



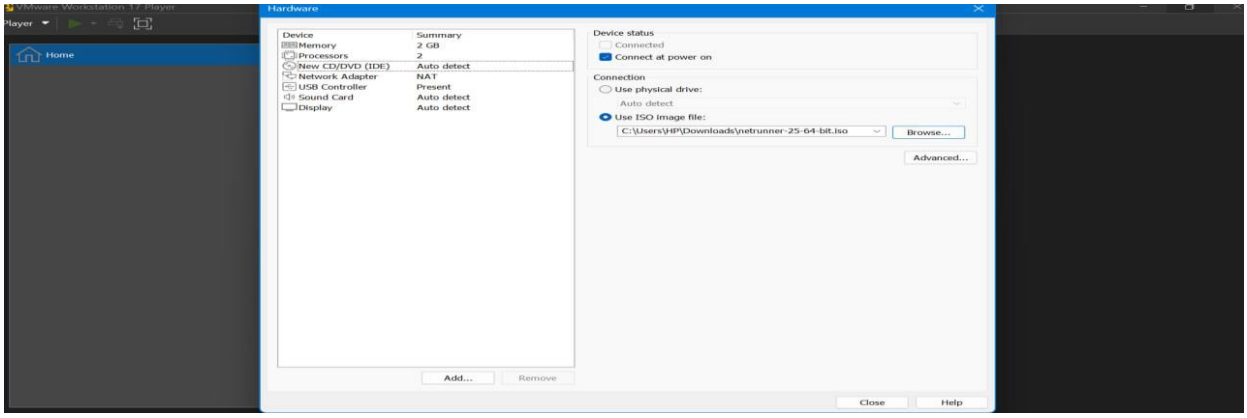
This screenshot shows the memory configuration setting in VMware workstation



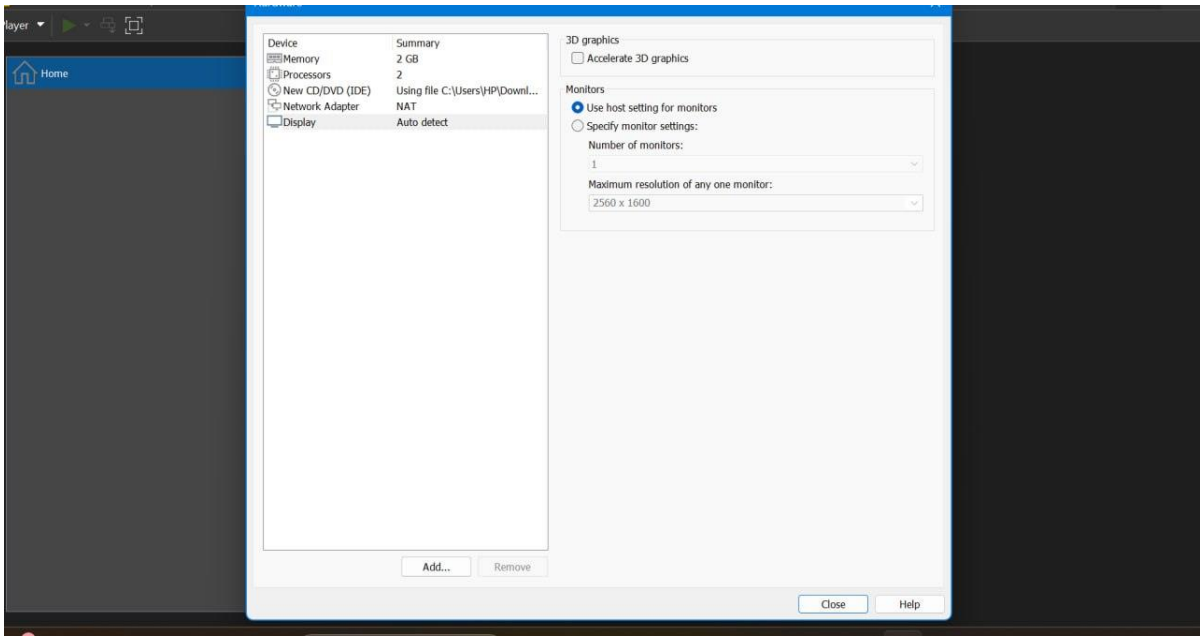
This screenshot shows processer configuration in VMwaer workstation in,2 processor cores allocated to virtual machine



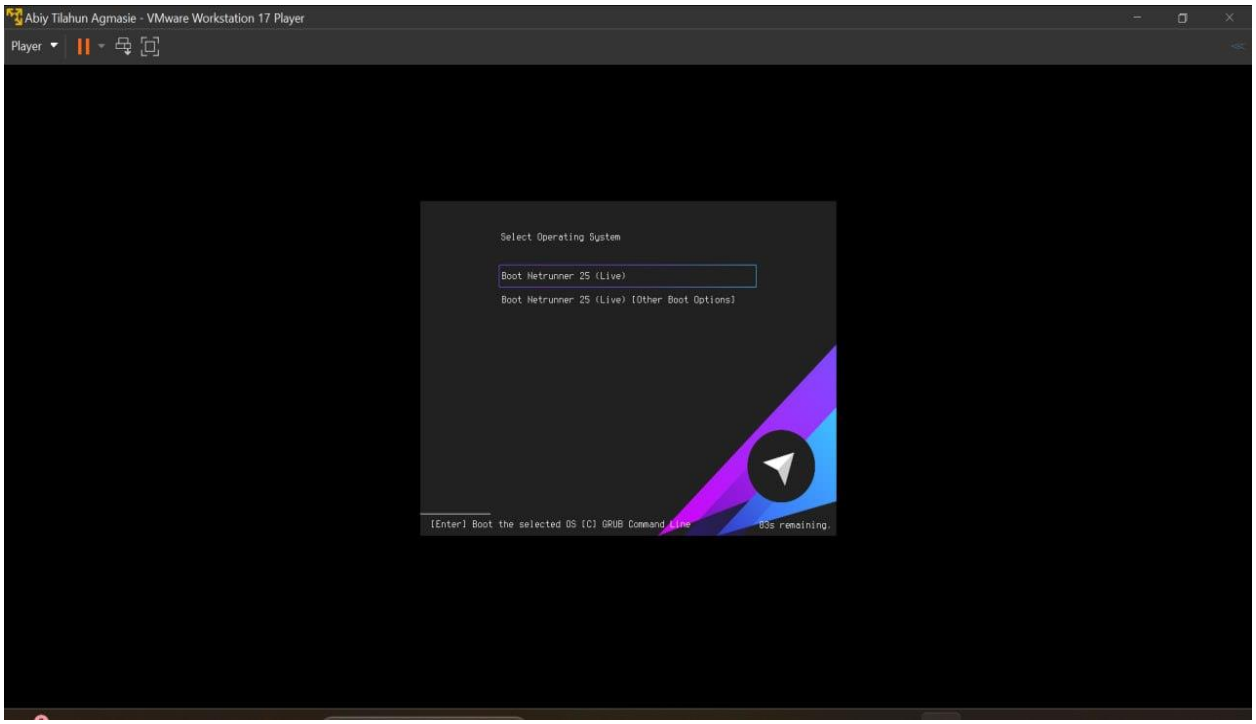
This screenshot shows The CD/DVD drive setting in VMware



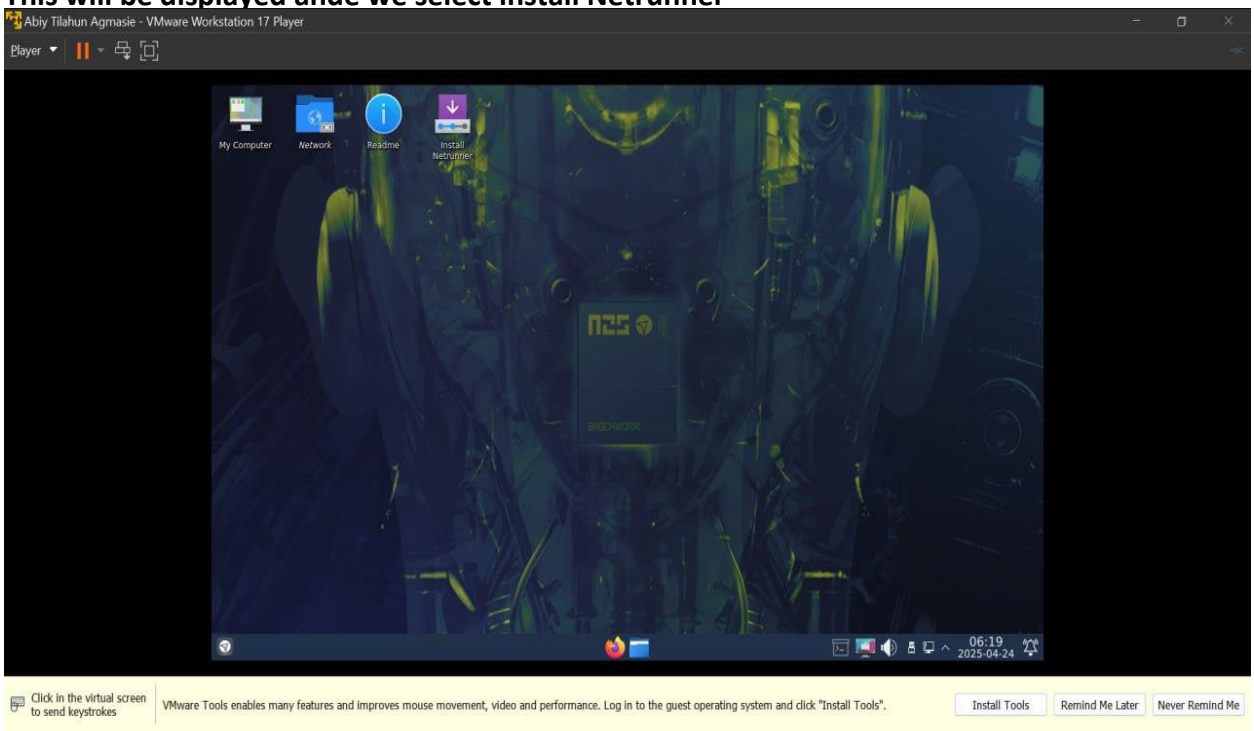
This screenshot shows the display setting in VMware workstation



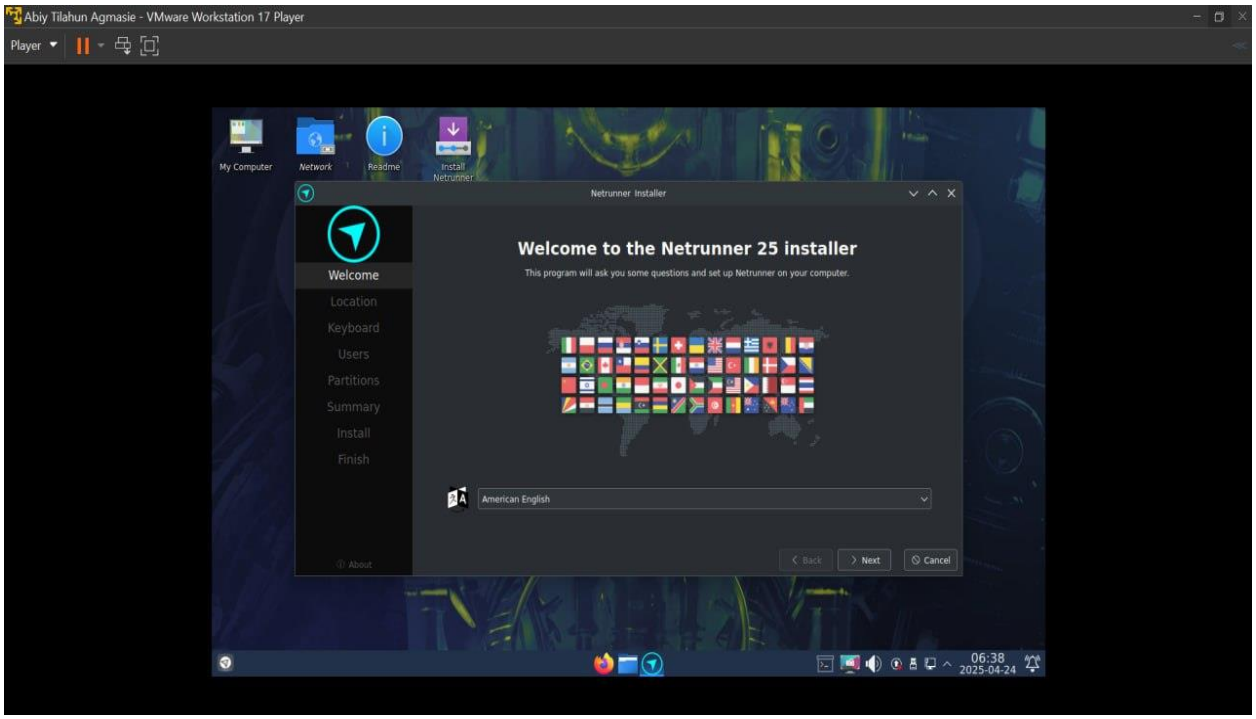
This screenshot shows bottom right corner shows how many minute takes



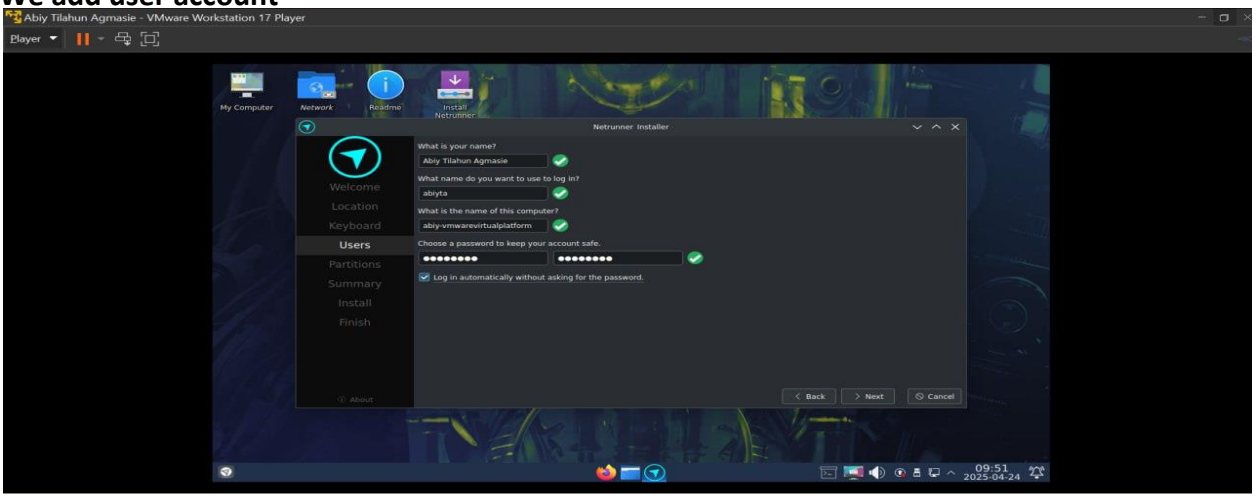
This will be displayed ande we select install Netrunner



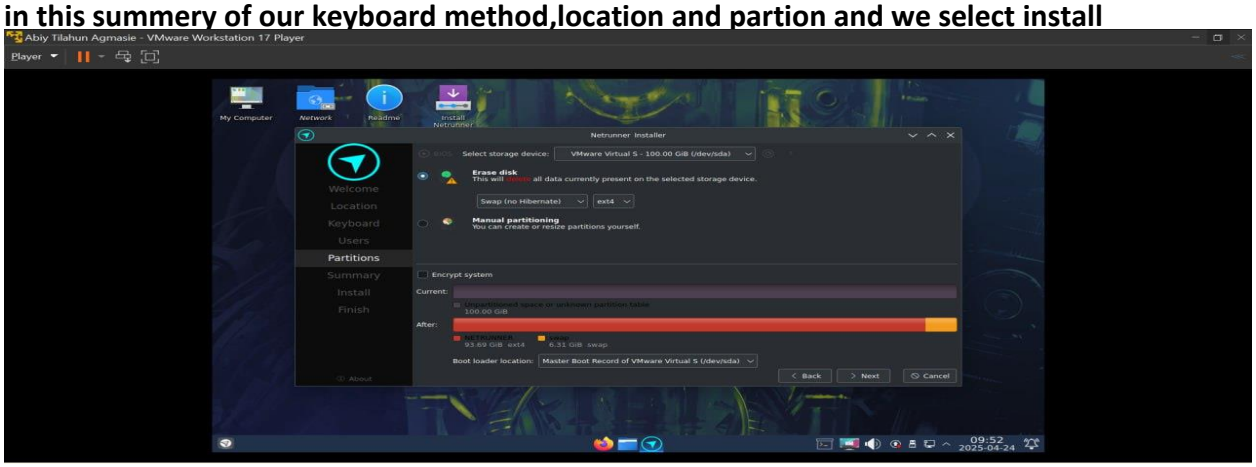
From this we are going to select country and keyboard input method which is us



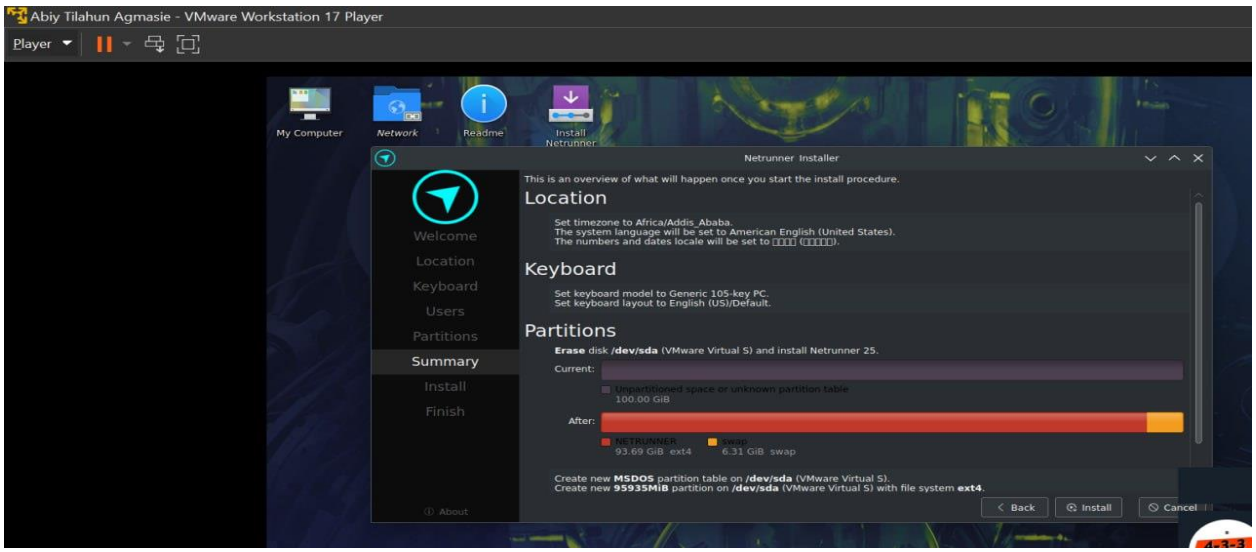
We add user account



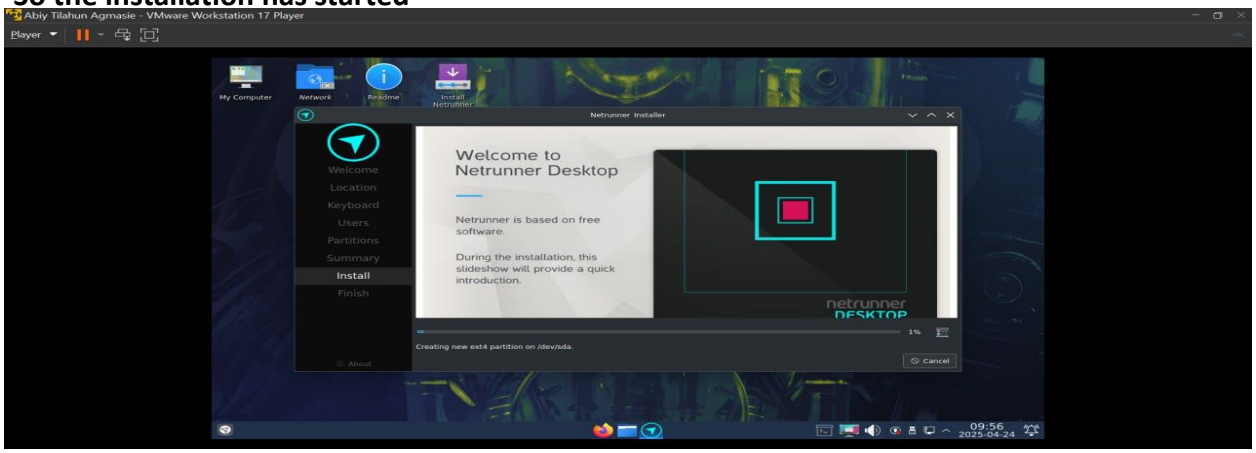
in this summery of our keyboard method,location and partion and we select install



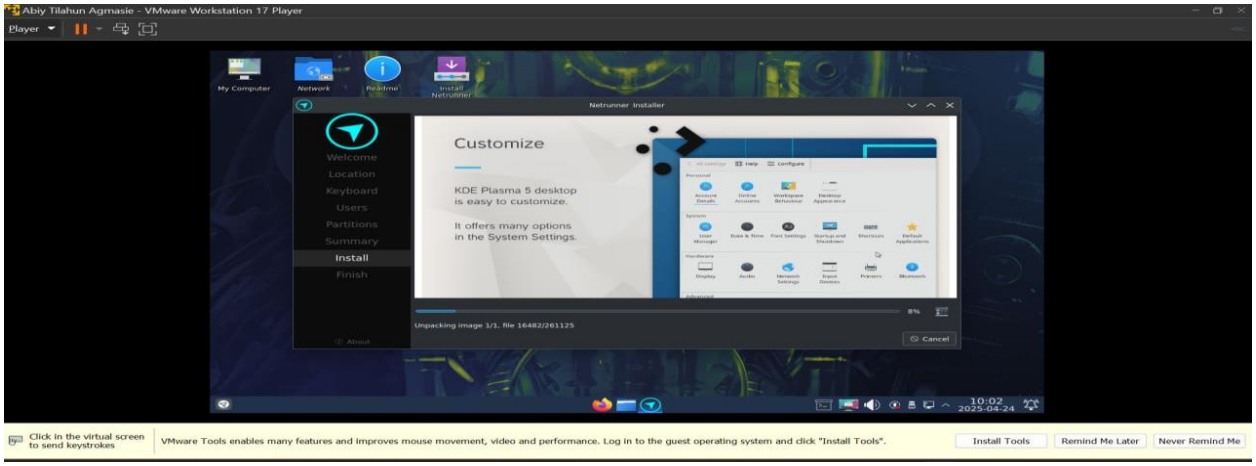
This screenshot shows the Netrunner os installer summary



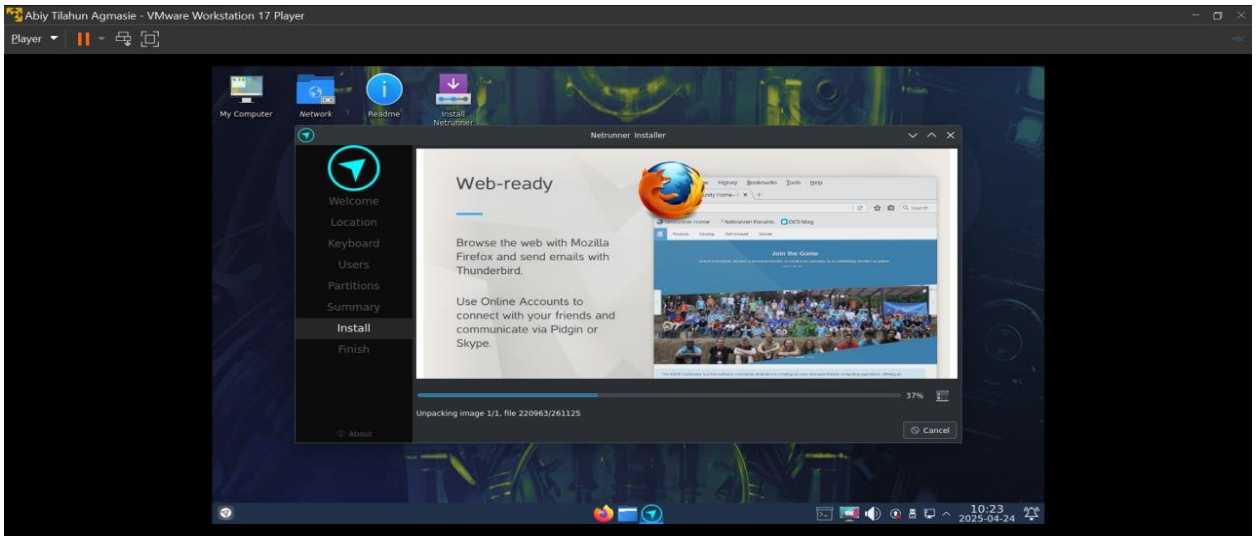
So the installation has started



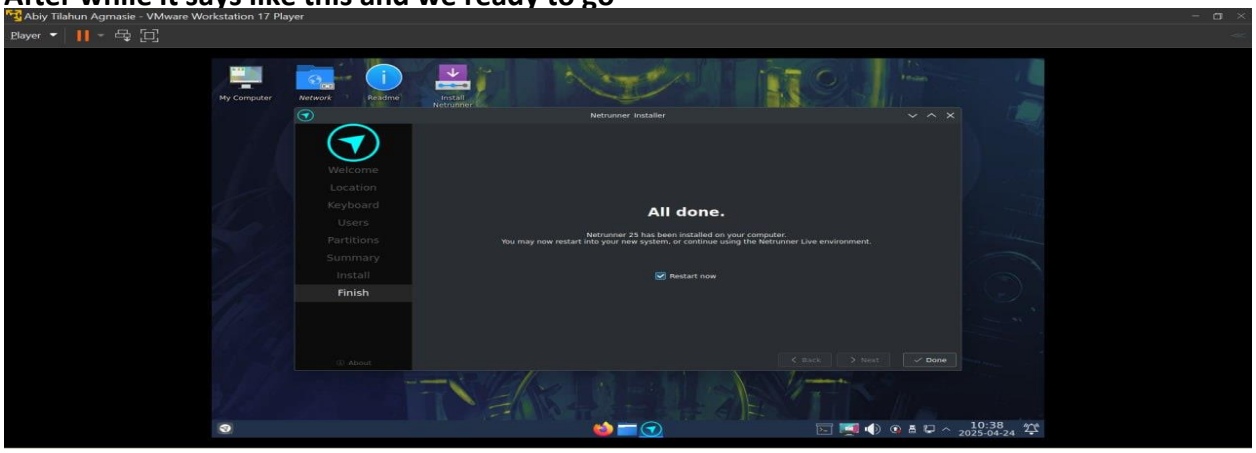
This screenshot shows Netrunner os installation is in progress on virtual machie



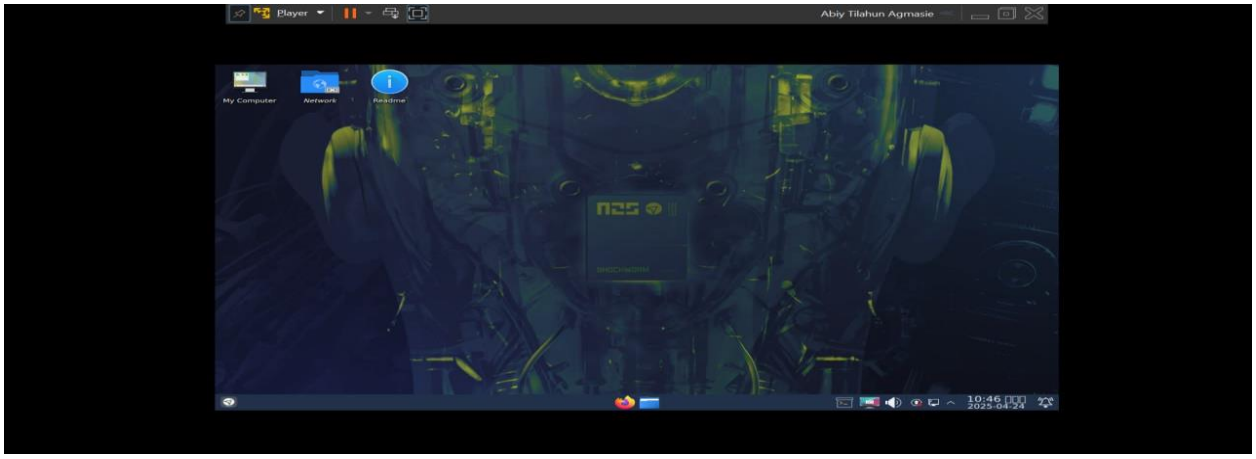
This screenshot shows Netrunner os installation is 37% complete



After while it says like this and we ready to go



Finally our home desktop looks like this



6. Problem faced(issues)

Installer Freezes or Crashes (Calamares Installer)

- **Cause**: Hardware incompatibility, low RAM, or corrupted ISO/USB.
- **Solution**:
  - Make sure your system meets minimum RAM requirements (2 GB+).
  - Check the integrity of the ISO file using SHA256 checksum.
  - Recreate the bootable USB using a reliable tool like **Etcher** or **Rufus**.
  - Try booting with "safe graphics mode" if you're using older or unsupported GPUs.

Black Screen After Boot or During Installation

- **Cause**: Graphics driver issues (especially with NVIDIA or AMD cards).
- **Solution**:

- Boot with the **"nomodeset"** kernel parameter (available in advanced boot options).
- For NVIDIA, consider installing proprietary drivers after installation.
- Try switching to a different display output if using HDMI/DisplayPort.

Grub Bootloader Not Installed or Fails

- **Cause**: Dual-booting with Windows, UEFI/Legacy BIOS conflicts.
- **Solution**:
  - Ensure you're installing in the correct mode (UEFI vs Legacy BIOS).
  - If dual-booting with Windows, disable **Secure Boot** and **Fast Boot** in BIOS.
  - Use a separate EFI partition if needed and install GRUB there.
  - Use a live session to reinstall GRUB manually using `chroot`.

No Internet Connection After Installation

- **Cause**: Missing or unsupported Wi-Fi drivers.
- **Solution**:
  - Use Ethernet temporarily to install missing drivers.
  - Use `lspci` or `lsusb` to identify the Wi-Fi chipset and install firmware manually.
  - For Broadcom, install `broadcom-sta-dkms` or `firmware-brcm80211`.

Slow Installation or Freezes Midway

- **Cause**: Low system resources or slow USB media.
- **Solution**:
  - Use a faster USB drive (USB 3.0 if possible).
  - Avoid multitasking during installation.
  - Disable unnecessary peripherals (external drives, printers, etc.).

Installation Completes but System Fails to Boot

- **Cause**: Bootloader not installed correctly or installed to wrong disk.
- **Solution**:
  - Ensure that you installed GRUB to the correct drive (usually `/dev/sda`).
  - Boot from live USB, open terminal, and use boot repair tools or reinstall GRUB manually.
  - Double-check boot order in BIOS/UEFI settings.

7. Solutions

Installer Freezes or Crashes Midway

- **Check ISO integrity** using SHA256 checksum before creating boot media.
- Use reliable tools like **Etcher** or **Rufus** to create a bootable USB.
- Ensure your system has **at least 4GB RAM** for smooth installation.

Black Screen During or After Boot

- When booting the live USB, choose the option with **"nomodeset"** to bypass graphics issues.
- For NVIDIA users, install proprietary drivers after installation using:

```
bash
CopyEdit
sudo apt install nvidia-driver
```

- Update system after install to ensure latest drivers for AMD/Intel GPUs.

GRUB Bootloader Not Installed or Not Working

- In BIOS/UEFI settings, **disable Secure Boot and Fast Boot**.
- Make sure you're installing in the correct mode (UEFI or Legacy).
- If GRUB fails, reinstall it manually via a live session:

```
bash
CopyEdit
sudo mount /dev/sdXn /mnt
sudo grub-install --boot-directory=/mnt/boot /dev/sdX
```

(Replace `sdXn` and `sdX` with your actual root and disk identifiers)

No Wi-Fi After Installation

- Connect with Ethernet temporarily to download necessary Wi-Fi drivers.
- Identify your Wi-Fi hardware with `lspci` or `lsusb`.
- For Broadcom cards, run:

```
bash
CopyEdit
sudo apt install broadcom-sta-dkms
sudo modprobe wl
```

Installation is Slow or Freezes

- Use a **high-speed USB** (preferably USB 3.0) for installation.
- Disconnect unnecessary peripherals (external drives, printers, etc.).

- Avoid multitasking during install to prevent system overload.

System Installed But Won't Boot

- Make sure GRUB was installed on the **correct disk (e.g., /dev/sda)**.
- Use the live USB to boot into the system and **reinstall GRUB** as shown above.
- Verify that BIOS boot order prioritizes the correct drive.

8. Advantages of Netrunner OS

1. User-Friendly Interface

Uses the KDE Plasma desktop, which is modern, highly customizable, and visually appealing.

Pre-configured with a polished look and intuitive layout for a smooth user experience.

2. Out-of-the-Box Usability

Comes with essential applications and multimedia codecs pre-installed (like Firefox, LibreOffice, VLC, and GIMP).

Reduces the need for post-install setup, making it great for beginners.

3. Stable and Reliable Base

Built on Debian Stable, which is known for its robustness, long-term support, and wide hardware compatibility.

4. Regular Updates

Though based on a stable system, it includes updated KDE components, giving users a balance between stability and modern features.

5. Two Editions Available

Desktop (full-featured) and Core (lightweight/minimal), offering flexibility depending on user needs and hardware capability.

9. Disadvantages of Netrunner OS

1. Limited Community Size

Netrunner is not as widely used as Ubuntu or Fedora, so community support and online troubleshooting resources may be limited.

2. Less Frequent Updates

Being based on Debian Stable means core software is updated less frequently compared to rolling releases like Arch or Manjaro.

3. Large Installation Size (Desktop Edition)

The full-featured version comes with many pre-installed applications, which may be unnecessary for some users and take up more space.

10. Supported File Systems in Netrunner OS

1. Ext4 (Default and Recommended)

- Default file system during installation.
- Journaling supported (helps recover from crashes).
- Most stable, widely used, and best supported.
- Recommended for root (`/`), home (`/home`), and general partitions.

2. Ext3 / Ext2

- Supported but outdated.
- Ext3 has journaling, Ext2 does not.
- Good for USBs or special partitions, but Ext4 is preferred.

3. Btrfs

- Supported with manual setup.
- Offers advanced features like snapshots, compression, subvolumes.
- Requires more manual configuration and care.
- Can be useful for advanced users who want features like rollback.

4. XFS

- Supported.
- High-performance file system, great for large files and servers.
- Not ideal for root partition in desktop systems.

5. F2FS (Flash-Friendly File System)

- ✅ Supported with manual partitioning.
- ✅ Optimized for SSDs and flash storage.
- ⚠️ Not commonly used by default in desktop distros.

6. NTFS / exFAT / FAT32 (Windows File Systems)

- ✅ Fully supported for read/write (for data sharing with Windows or USBs).
- **NTFS**: Read/write via `ntfs-3g`.
- **exFAT**: Requires installing exFAT tools:

```
bash
CopyEdit
sudo apt install exfat-fuse exfat-utils
```

- **FAT32**: Great for small USBs, limited to 4 GB file size.

❌ Not supported or discouraged:

- **ReiserFS**: Deprecated.
- **ZFS**: Technically possible but not included by default due to licensing issues; advanced setup needed.

During Installation

If you're using the **Calamares installer** (the default GUI installer in Netrunner):

- You'll mostly see and work with **Ext4** by default.
- Manual partitioning lets you choose other file systems like Btrfs, XFS, etc.

Summary Table

File System	Supported	Best Use Case	Notes
Ext4	✅ Yes	Default for Linux systems	Stable, reliable, journaling
Btrfs	✅ Yes	Advanced users (snapshots)	Requires manual setup
XFS	✅ Yes	Large files, servers	Not ideal for root partition
FAT32	✅ Yes	USB drives, small files	4 GB file size limit
exFAT	✅ Yes	USBs/shared drives	Install `exfat-fuse` for support

File System	Supported	Best Use Case	Notes
NTFS	□ Yes	Windows data partitions	Uses `ntfs-3g`
Ext3/Ext2	□ Yes	Legacy support	Ext4 is preferred

11. Conclusion

Netrunner OS stands out as a user-friendly, visually polished, and feature-rich Linux distribution, particularly suited for both beginners and experienced users who want a stable and elegant desktop environment. Built on the solid foundation of **Debian Stable** and powered by the **KDE Plasma** desktop, it delivers a balance of performance, customization, and ease of use.

One of Netrunner's biggest strengths is its "out-of-the-box" readiness — with essential software pre-installed, attractive theming, and a system that just works without requiring extra configuration. Its support for a wide range of file systems, hardware compatibility, and flexibility make it a reliable daily driver for general users, students, and even developers.

Whether you're transitioning from Windows, exploring Linux for the first time, or looking for a clean KDE experience with strong community support, Netrunner OS offers a complete and satisfying desktop computing experience. It promotes the values of open-source while ensuring convenience, beauty, and functionality.

In summary, Netrunner OS is a great choice for users seeking a stable, attractive, and ready-to-use Linux distribution that emphasizes simplicity without compromising power.

12. Future Outlook

Netrunner OS has made impressive strides as a Linux distribution by offering a polished and user-friendly KDE Plasma experience, and it continues to grow as a valuable alternative to mainstream operating systems. Here's a look at its future potential:

1. **Improved Hardware Support**
    - As Linux adoption continues to grow, Netrunner OS is likely to see further improvements in hardware compatibility, particularly for newer hardware (such as the latest graphics cards, processors, and peripherals). A focus on better integration with upcoming hardware will attract more users to the OS.
2. **Increased Focus on Stability and Performance**
    - Building on the solid foundation of **Debian Stable**, Netrunner OS will continue to be a reliable and stable choice for users who prioritize security and performance. Future updates may include optimizations for better system performance, especially for users on SSDs or lower-end hardware.
3. **Enhanced User Experience**
    - Netrunner OS could continue to refine and enhance its **KDE Plasma desktop**, adding features that improve the overall user experience. We might see more intuitive interface

elements, better touch support, and continued customization options to match the needs of modern desktop users.

4. **Community and Ecosystem Growth**
    - The future of Netrunner OS largely depends on community support and contributions. Expanding the ecosystem with more software and integrations, as well as building an active user base, will ensure that it remains relevant and up-to-date with the ever-evolving Linux ecosystem.
5. **Increased Focus on Privacy and Security**
    - As privacy and security concerns grow globally, Netrunner OS could benefit from incorporating more built-in security features and privacy-focused tools. This would make it a more attractive option for users concerned about data security.

13. Virtualization

What is Virtualization in Netrunner OS?

In Netrunner OS, **virtualization** refers to running multiple operating systems or environments on a single computer using software like **VirtualBox**, **KVM**, or **QEMU**. Even though Netrunner is a desktop-focused OS, it fully supports virtualization tools due to its Linux base (Debian or Ubuntu, depending on the version).

Why Use Virtualization in Netrunner OS?

1. **Testing Other Operating Systems:** Try out Windows, other Linux distros, or even BSD without leaving Netrunner.
2. **Safe Experimentation:** Test software or make changes in a virtual environment without risking your real system.
3. **Development Use:** Developers can simulate different systems to build and test cross-platform applications.
4. **Resource Efficiency:** Run multiple environments without needing multiple computers.

How Does It Work in Netrunner?

1. **Install a Hypervisor:**
    - Most common in Netrunner: **VirtualBox** (GUI-friendly), or **KVM/QEMU** (more advanced).
2. **Create Virtual Machines:**
    - Set up VMs with their own disk space, RAM, and CPU settings.
    - Install any OS inside each VM.
3. **Netrunner as Host:**
    - Netrunner runs as the host OS, managing hardware.
    - The VM (like Windows or another Linux) runs as a guest OS.

Tools Netrunner Supports for Virtualization:

- **VirtualBox:** Easy to use, GUI-based.
- **KVM (Kernel-based Virtual Machine):** High performance, good for power users.
- **QEMU:** Can emulate different CPU architectures.