PROJECT REPORT ON

“Introduction to Fedora”

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Chandigarh University,

Mohali, Punjab

CERTIFICATE

This is to certify that Reya Kaur Bhatia (UID- 24MCA20302) have successfully completed the project title **"Introduction to Fedora"** at University Institute of Computing under my supervision and guidance in the fulfilment of requirements of first semester, **Master of Computer Application- Specialization in General.** Of Chandigarh University, Mohali, Punjab.

Dr. Abdullah	Mr. Rishabh Tomar
Head of the Department	Project Guide Supervisor
University Institute of Computing	University Institute of Computing

ACKNOWLEDGEMENT

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We shall remain grateful to Dr. Manisha Malhotra, Additional Director, University Institute of Technology, for providing us a strong academic atmosphere by enforcing strict discipline to do the project work with utmost concentration and dedication.

Finally, we must say that no height is ever achieved without some sacrifices made at some end and it is here where we owe our special debt to our parents and our friends for showing their generous love and care throughout the entire period of time.

Date: 23.10.2024

Place: Chandigarh University, Mohali, Punjab

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ABSTRACT

This project explores the installation process of Fedora Linux, a leading open-source operating system renowned for its robustness, innovation, and community support. The objective of this project was to gain hands-on experience with the installation and configuration of Fedora, while also evaluating its features and functionalities in comparison to other Linux distributions.

The installation was performed on a virtual machine, providing an isolated environment to observe the entire setup process. The project began with a thorough review of the system requirements necessary for a successful installation, including hardware specifications such as processor type, RAM, and disk space. Following this, the Fedora ISO image was downloaded from the official website, and a bootable USB drive was created using reliable software tools.

The step-by-step installation process was meticulously documented, covering key stages such as language selection, disk partitioning, network configuration, and user setup. The installation was executed using the graphical interface, allowing for easy navigation and configuration of options. Special attention was given to the different installation choices, such as automatic versus manual partitioning, and the significance of setting a hostname and creating user accounts.

Post-installation, the system was updated and additional software packages were installed to enhance functionality. The project also examined Fedora's package management system, which utilizes the DNF tool, and its Software Center for easy software installation.

In conclusion, this project demonstrated the effectiveness of Fedora Linux as a modern operating system suitable for both personal and professional use. The comprehensive installation guide provided insights into the user-friendly nature of Fedora, while also emphasizing its powerful features that cater to developers and general users alike. This experience not only solidified the understanding of Linux installations but also highlighted the importance of open-source software in today's technological landscape.

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INTRODUCTION

Fedora Linux is an open-source operating system that has gained popularity for its innovative features and commitment to free software principles. Developed by the Fedora Project, which is sponsored by Red Hat, Fedora serves as a testing ground for new technologies that may later be incorporated into Red Hat Enterprise Linux (RHEL). Known for its cutting-edge advancements and strong community support, Fedora is widely used by developers, system administrators, and enthusiasts alike.

The installation process of an operating system is a fundamental step that sets the foundation for its usage. Understanding how to effectively install and configure Fedora not only enhances one's technical skills but also provides valuable insights into Linux-based systems. This project focuses on the step-by-step installation of Fedora, documenting the process and exploring its features and functionalities.

1.1. Objective

The primary objectives of this project are:

1. **To Gain Hands-On Experience**: To familiarize with the installation process of Fedora Linux, gaining practical knowledge in configuring and setting up a Linux operating system.
2. **To Explore Features**: To investigate the features and functionalities of Fedora, assessing its performance and usability compared to other Linux distributions.
3. **To Evaluate System Requirements**: To understand the hardware and software prerequisites for installing Fedora, ensuring compatibility and optimal performance.
4. **To Document the Installation Process**: To create a comprehensive guide detailing each step of the installation, which can serve as a resource for future users.
5. **To Analyze Post-Installation Configuration**: To explore essential post-installation configurations, including system updates, software installation, and network setup.

1.2. Background

Fedora has a rich history that dates back to its initial release in 2003. It was created as a community-driven project with a focus on innovation and the latest software technologies. Unlike some other distributions, Fedora operates on a short release cycle, allowing users to access the latest features and improvements. This characteristic makes it an attractive choice for those who wish to experiment with the newest developments in the Linux ecosystem.

Fedora is known for its strong commitment to security and performance, incorporating advanced technologies such as SELinux (Security-Enhanced Linux) and systemd for efficient service management. The operating system supports a wide range of software packages, thanks to its robust package management system, DNF, which facilitates easy installation and updates.

By installing and configuring Fedora, users can experience firsthand the benefits of an open-source environment, understand the intricacies of Linux systems, and appreciate the freedom that comes with using community-supported software.

1.3. System Requirements

Before installing Fedora, ensure that your hardware and software meet the following minimum requirements:

1. Host System Requirements

- **Operating System:** Any 64-bit operating system (e.g., Windows, Linux, or macOS) that supports virtualization software.
- **Processor:** 64-bit processor (Intel or AMD) with virtualization support (VT-x for Intel or AMD-V for AMD).
- **RAM:** Minimum 2 GB (4 GB recommended for better performance).
- **Hard Disk Space:** Minimum 15 GB of free disk space for the Fedora installation (20 GB or more recommended).
- **Graphics:** Graphics card capable of at least 1024x768 resolution.

2. Guest Operating System Requirements

- **Guest OS**: Fedora Linux (specific version, e.g., Fedora Workstation or Fedora Server).
- **RAM for Guest OS**: Minimum 1 GB (2 GB recommended for better performance).

3. Additional Software Requirements

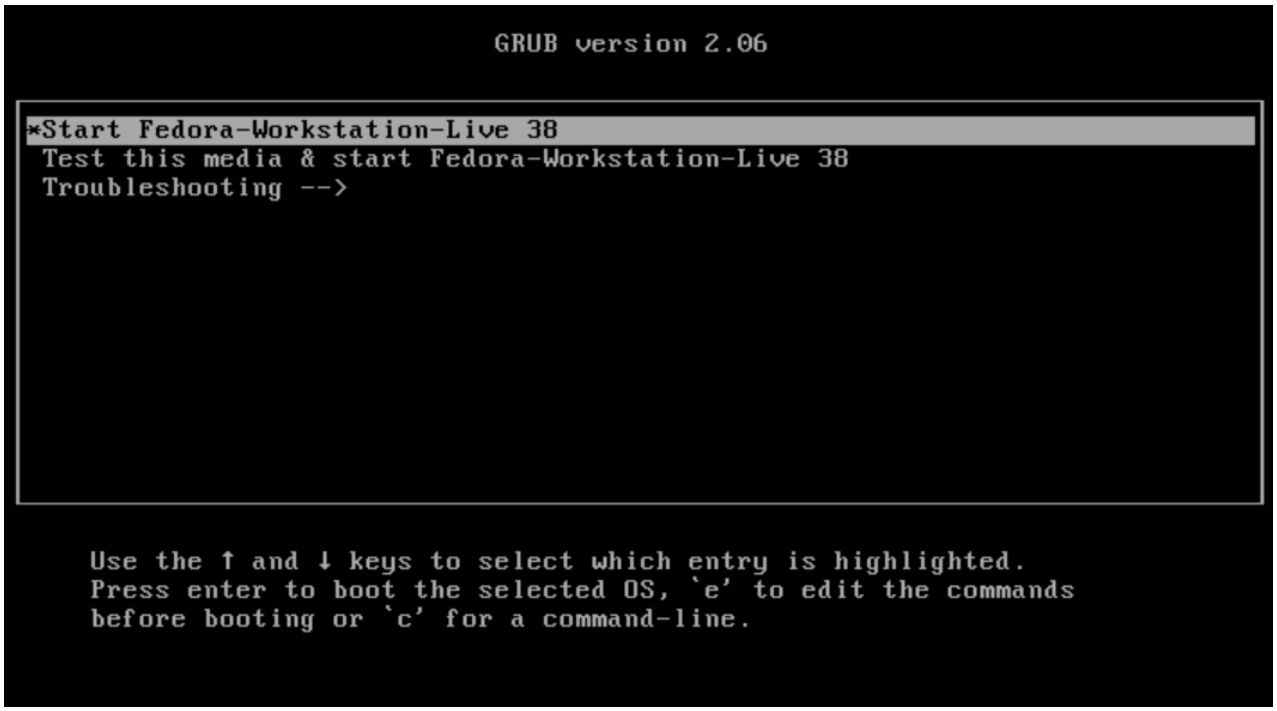
- **Admin Rights**: Administrator or root access is required to install virtualization software, create bootable USB drives, and configure system settings
- **Internet Connection**: An active internet connection is recommended for downloading the Fedora ISO image, accessing updates, and installing additional software packages during and after installation.

IMPLEMENTATION

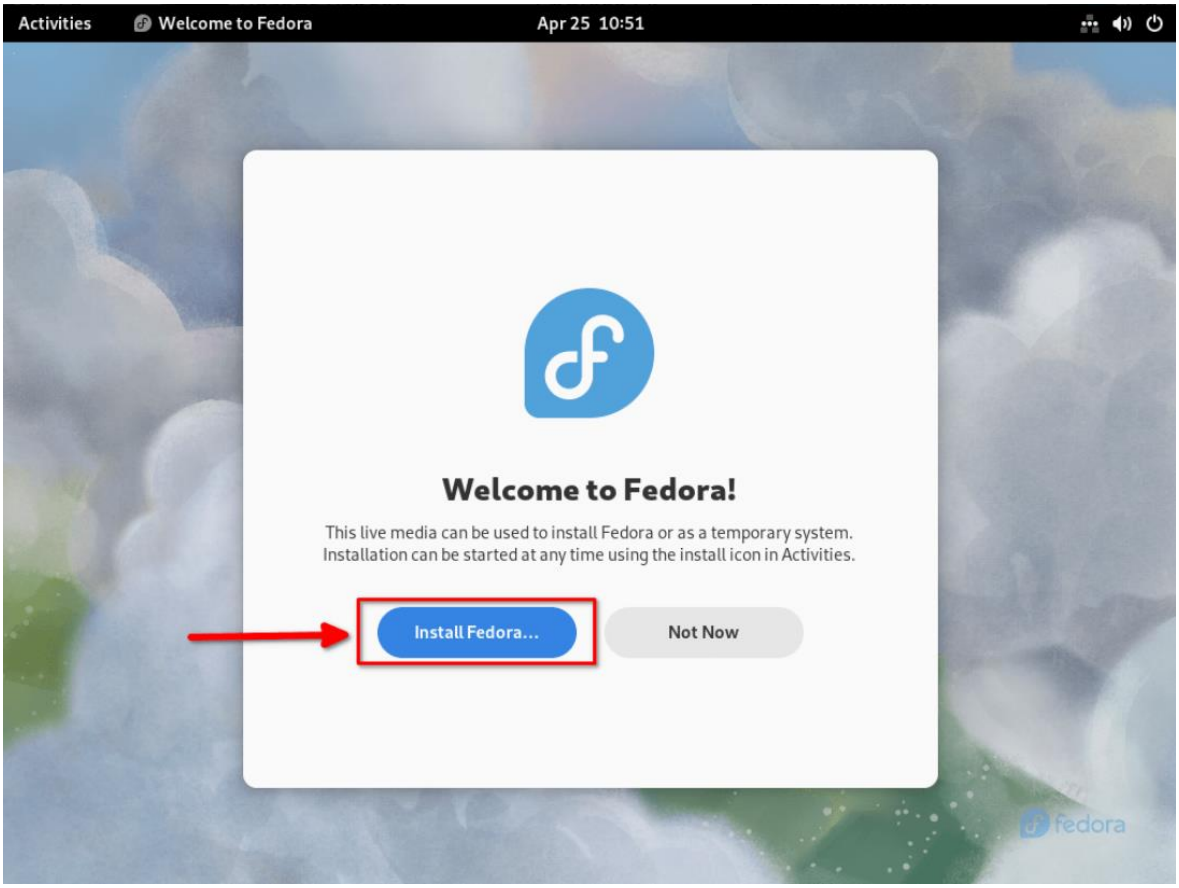
Download and Install Fedora on Windows

Step 1: Boot the system with Fedore ISO

- Boot your system with the newly created Fedora 38 bootable USB drive. You will see the following menu.
- By default, the second option i.e. **"Test this media & start Fedora-Workstation-Live 38"**. If you want to test your Fedora ISO, just go with this option. If you don't want to test the media, choose the first option and boot the Fedora live right away.
- I will go with the first option **"Start Fedora Workstation Live 38"** is automatically selected to boot into the live system.



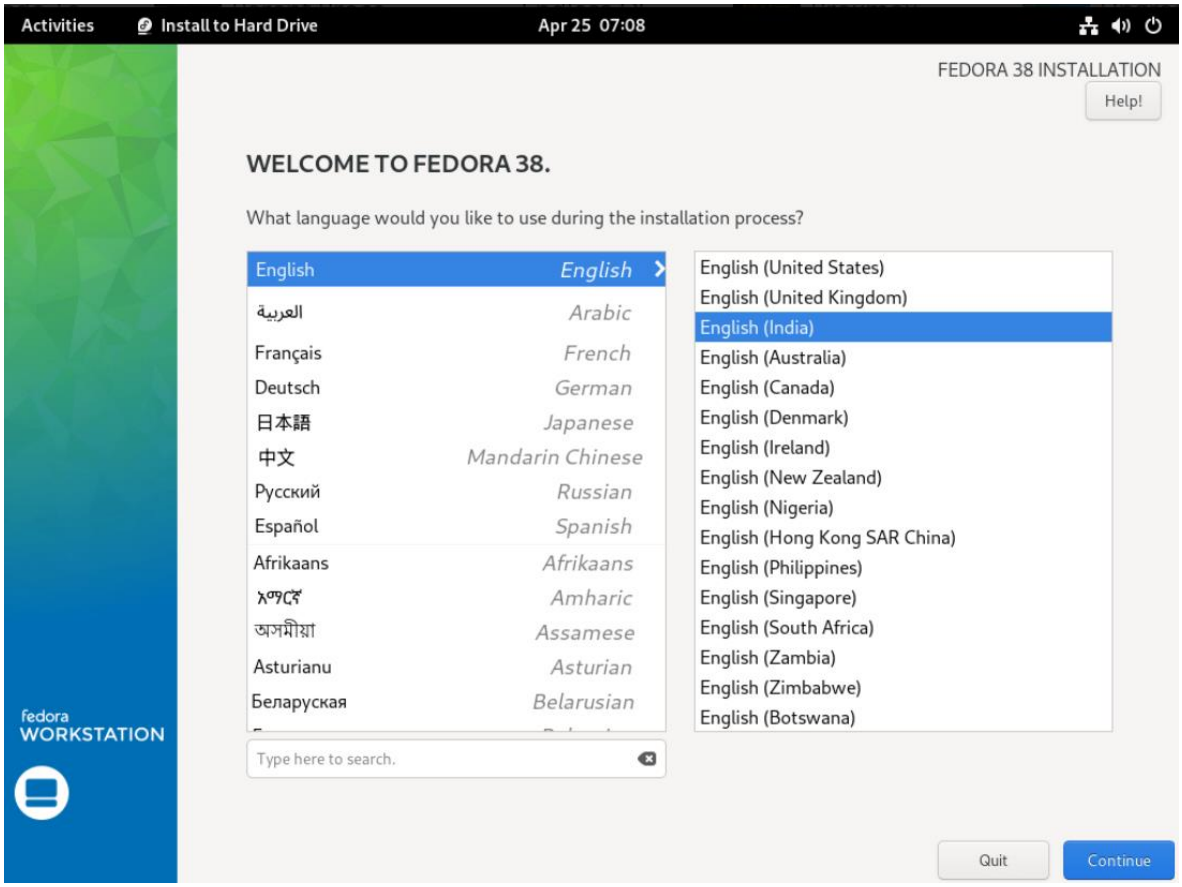
- Now, you will be given two choices. You can start Fedora installation by choosing **"Install Fedora"** to install Fedora on your disk or try the live Fedora version to see what's in there before installing Fedora. I've decided to go with the first option i.e. **Install Fedora**.



- If you wish to know what's actually in the new Fedora version, choose **"Not Now"** option to enter into the Fedora 38 live environment and test it thoroughly.

Step 2: Choose Installation Language

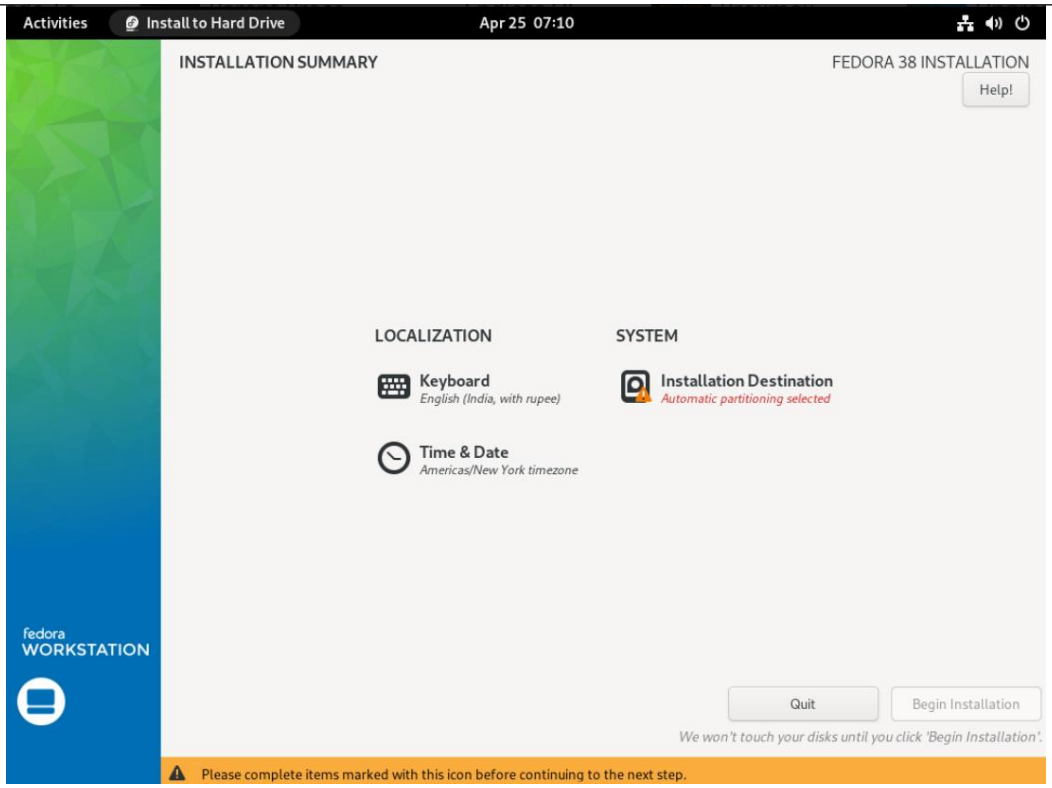
In this step, you should choose the language that you want to use throughout your installation process. After choosing the language, press Continue.



Step 3: Configure Keyboard, Timezone and Partition the Disk Drive

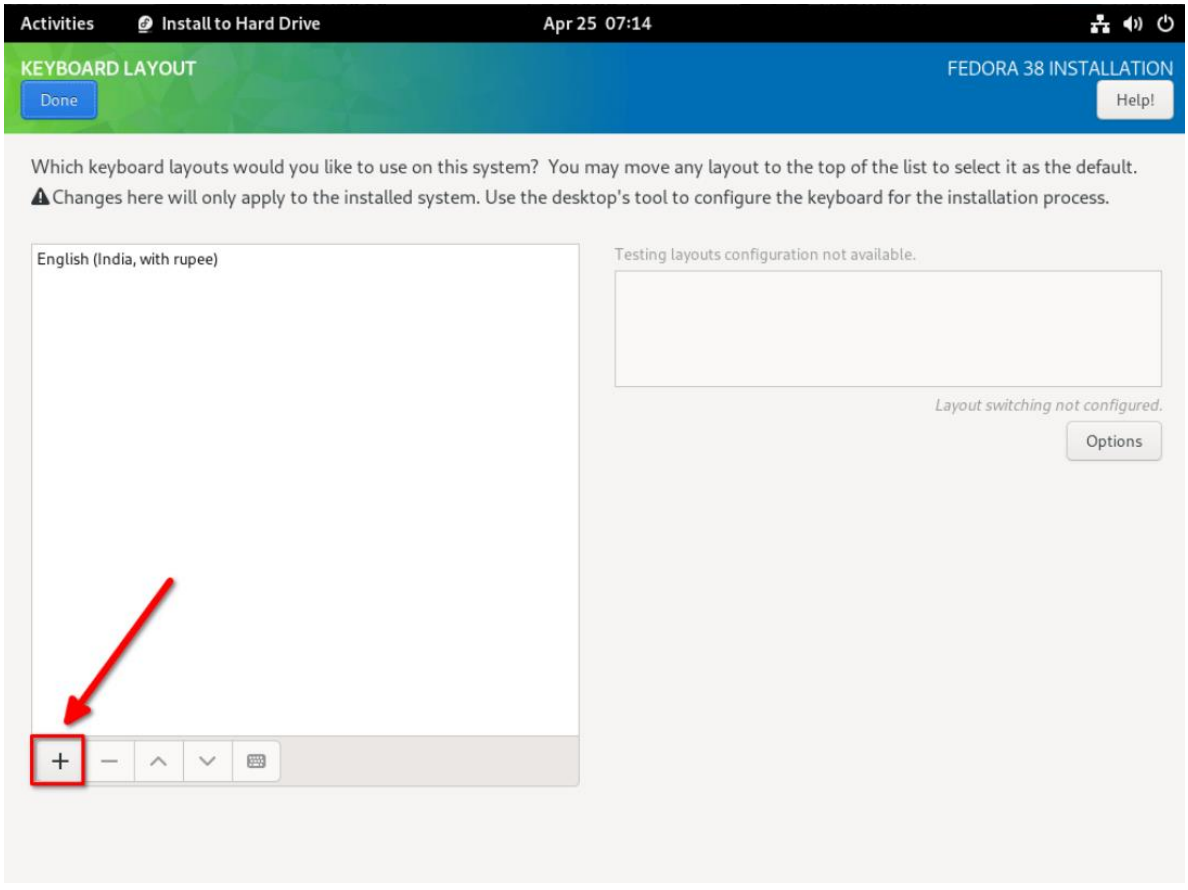
In this step, you need to configure following three important settings before proceeding to the next step.

1. Keyboard Layout
2. Time & Date
3. Hard Disk Partitioning



Step 3.1: Configure Keyboard Layout

In this step, you choose which keyboard layout you want to use. You can choose one or more Keyboard layouts and configure keyboard shortcuts to switch between different layouts.

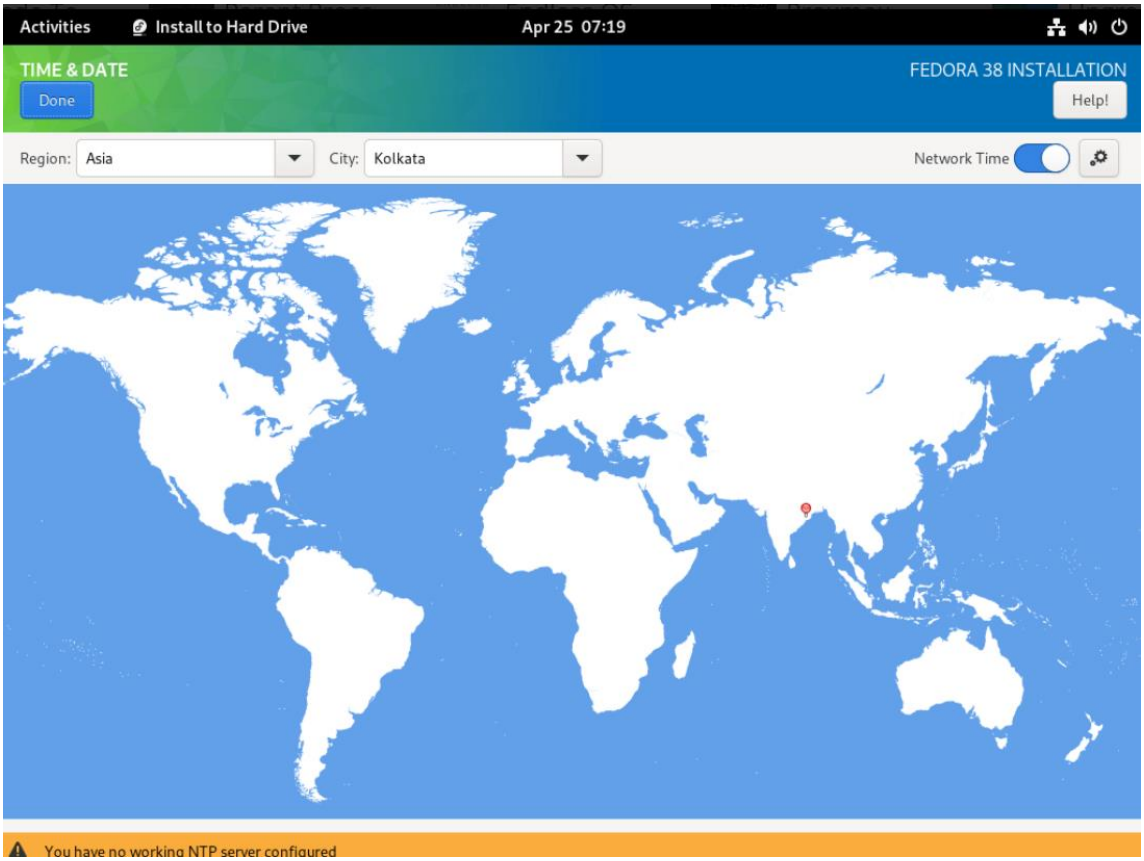


After choosing the Keyboard layouts, click on the **"Done"** button on the top left corner.

Now you will be redirected to the previous screen where you can configure the other two settings.

STEP 3.2 : Configure Timezone

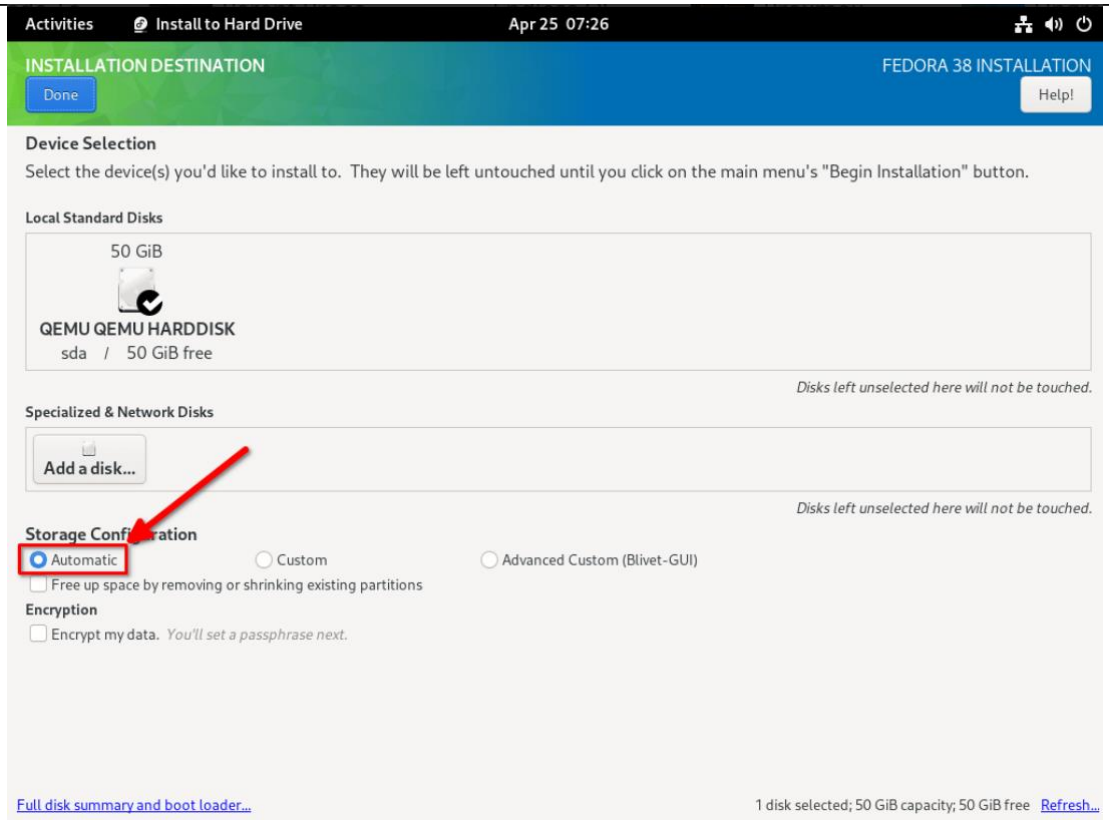
Choose your geographical region and the city based on your selected geographical location. You can either choose the region and city directly from the drop-down boxes or select the location from the map. You can also enable network time protocol (NTP) by toggling it ON.



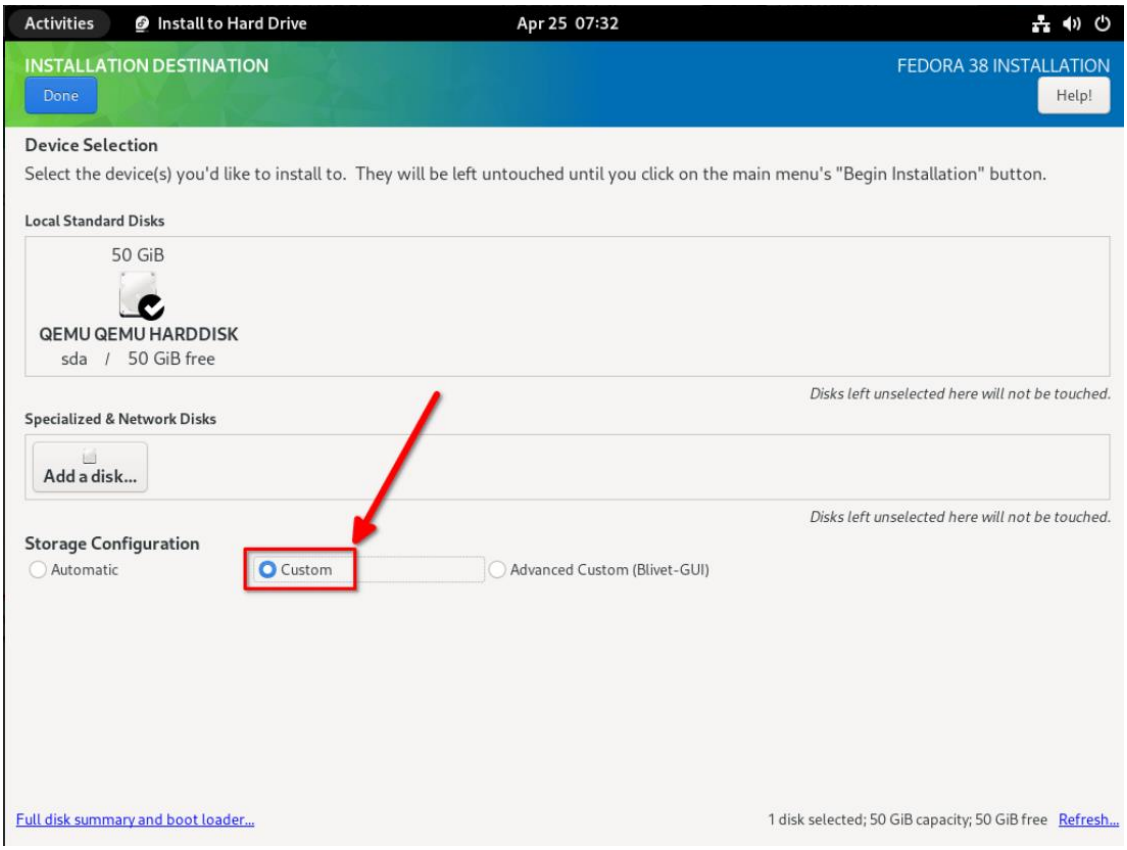
After choosing the region and city, click the "Done" button to apply the setting and go back

STEP 3.3 - Disk Partition

In this step, you should decide your installation destination and how your disk will be partitioned. By default, the **automatic partitioning** method will be chosen for you. If you are a beginner who wish the installer to do a appropriate partitioning scheme for automatically, you can choose this option.

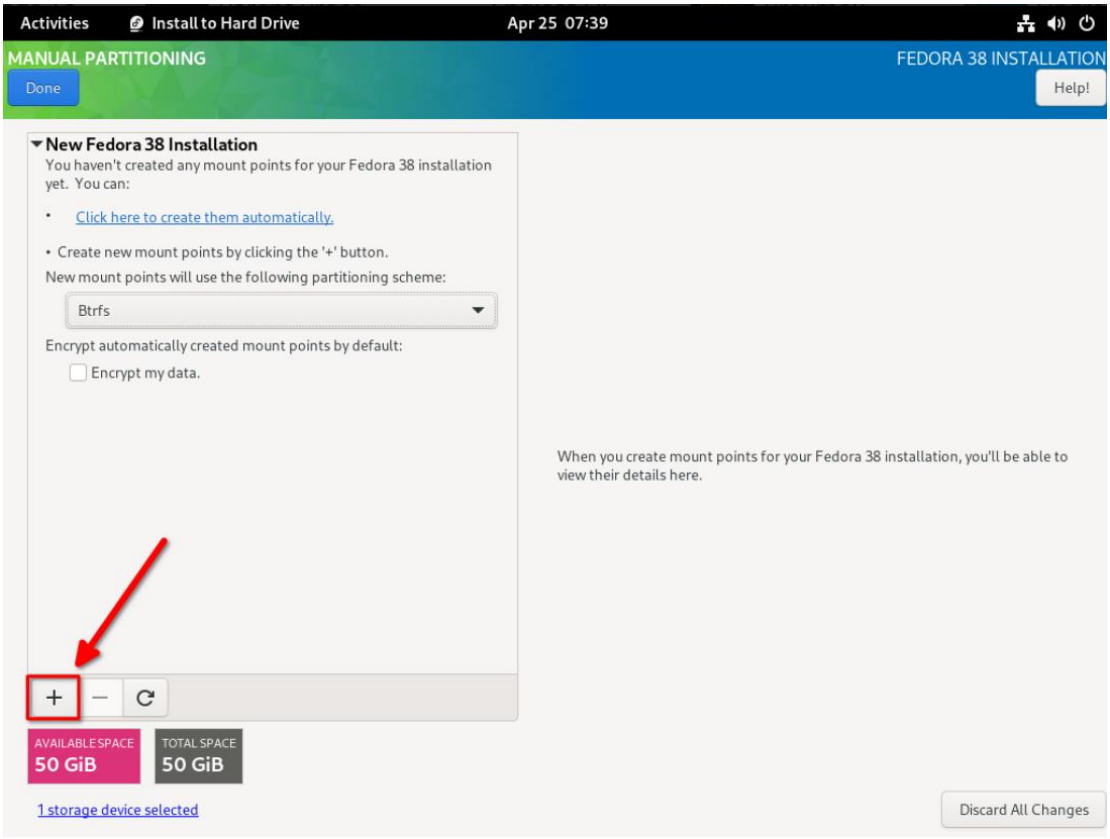


If you're an intermediate or an advanced who wish to partition your disk as per your liking, choose the "**Custom**" option and press "Done" to start creating custom partitions.

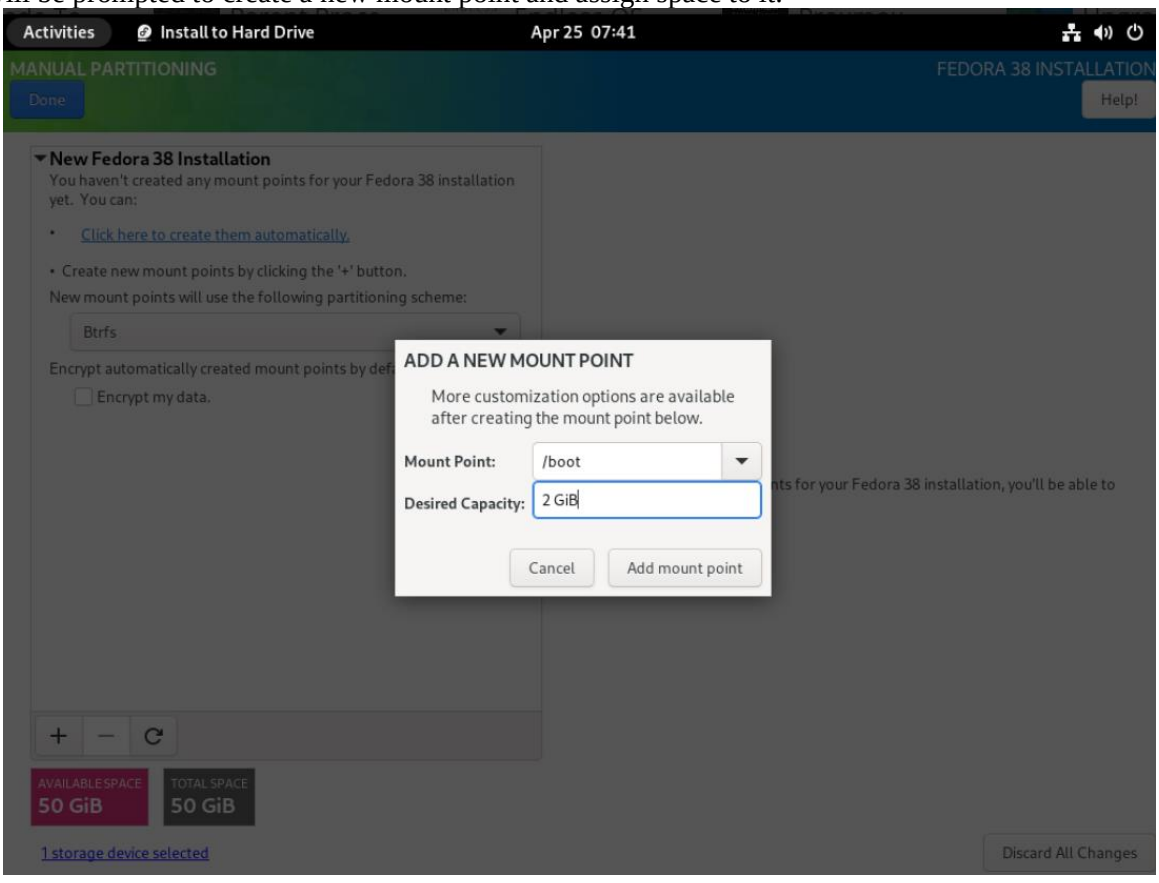


In Fedora 38, the **Btrfs** filesystem type is automatically selected. You can also choose other options, such as **Standard**, **LVM** or **LVM thin provisioning**. In the next step, you'll have to choose either standard partition or LVM and press the (+) symbol to add a new partition. You can also check the "**Encrypt my data**" check-box if you wish to automatically encrypt the partitions.

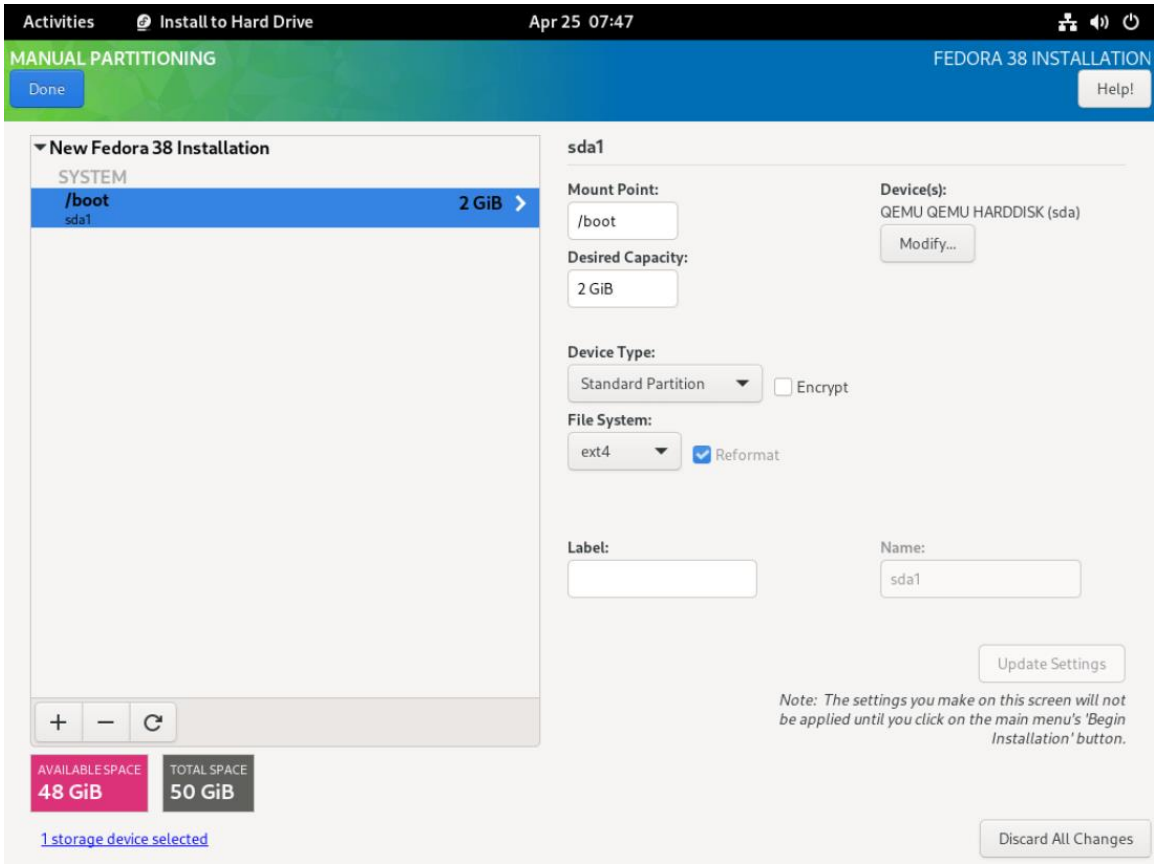
For the purpose of this guide, I go with Btrfs partitioning scheme with no encryption.
To create a new mount point, click the + (plus) button.



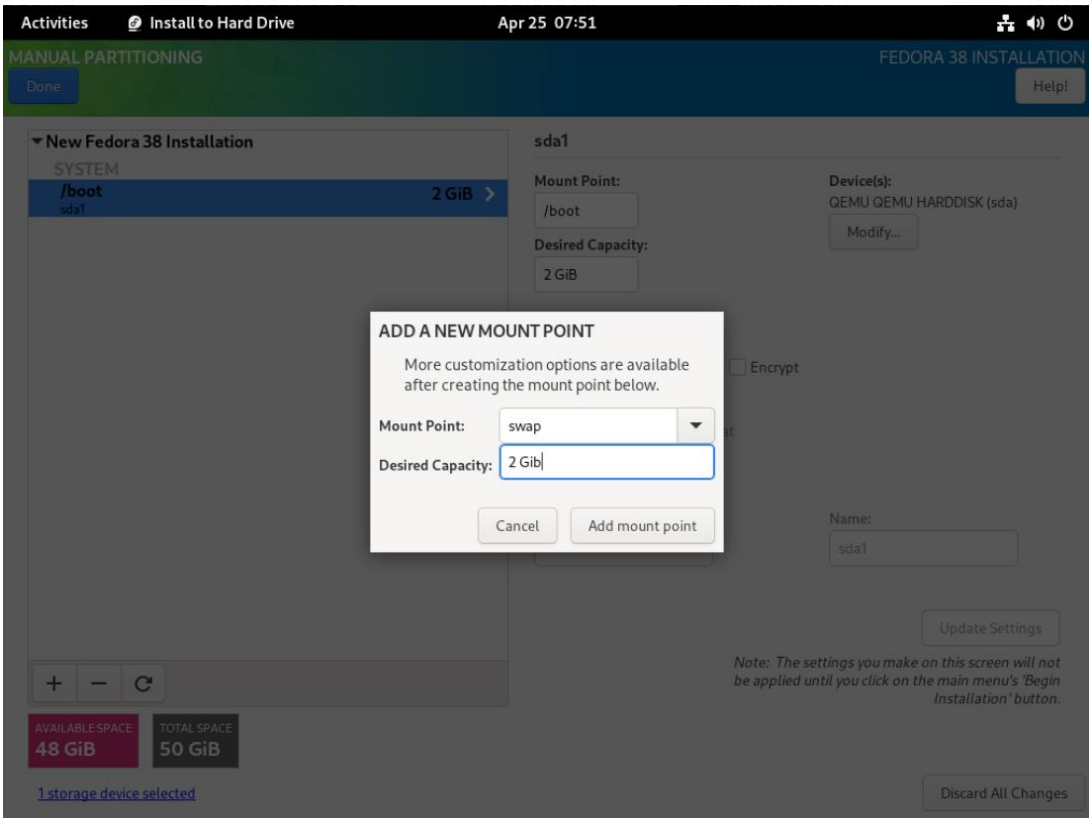
In the next screen, choose the mount point type (E.g. /boot) and the desired size (E.g. **2** GB) for the mount point.
you will be prompted to create a new mount point and assign space to it.



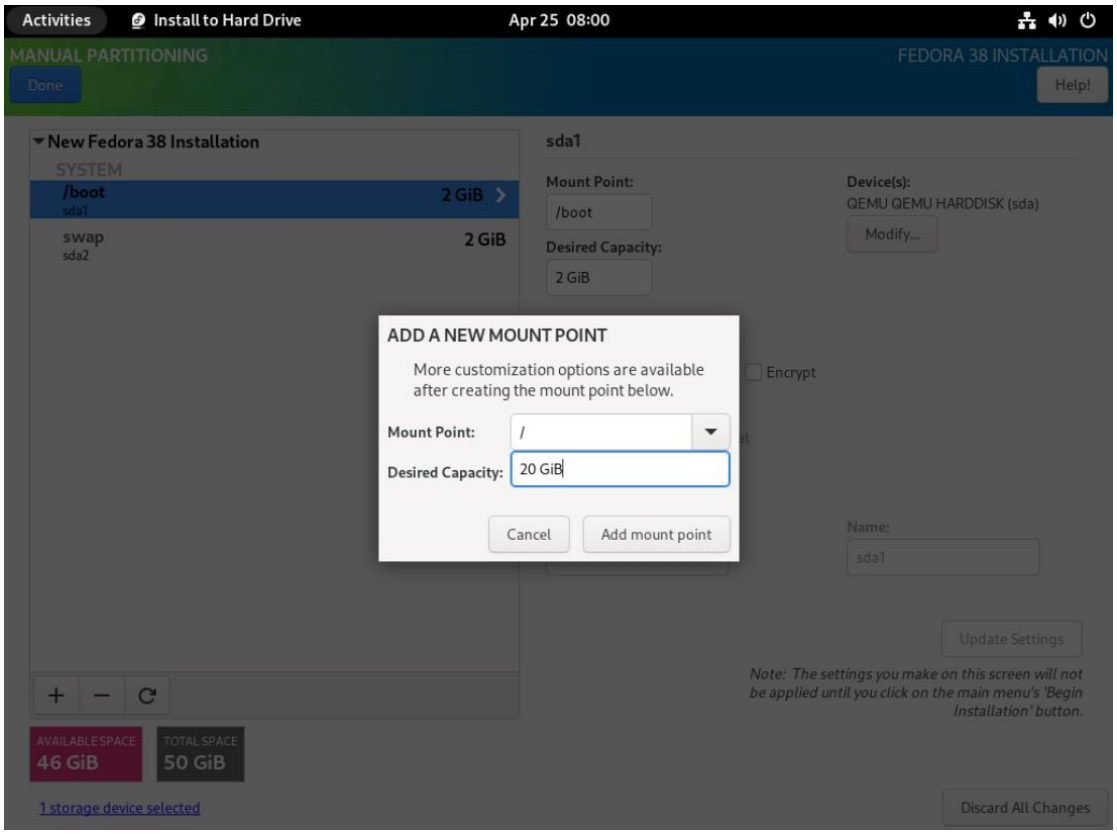
Now we have created /boot partition and assigned space to it. By default, the /boot partition will pick ext4 as its default filesystem type. You can also change the filesystem as you wish. You will see the newly created mount point details on the right hand side of the installer window.



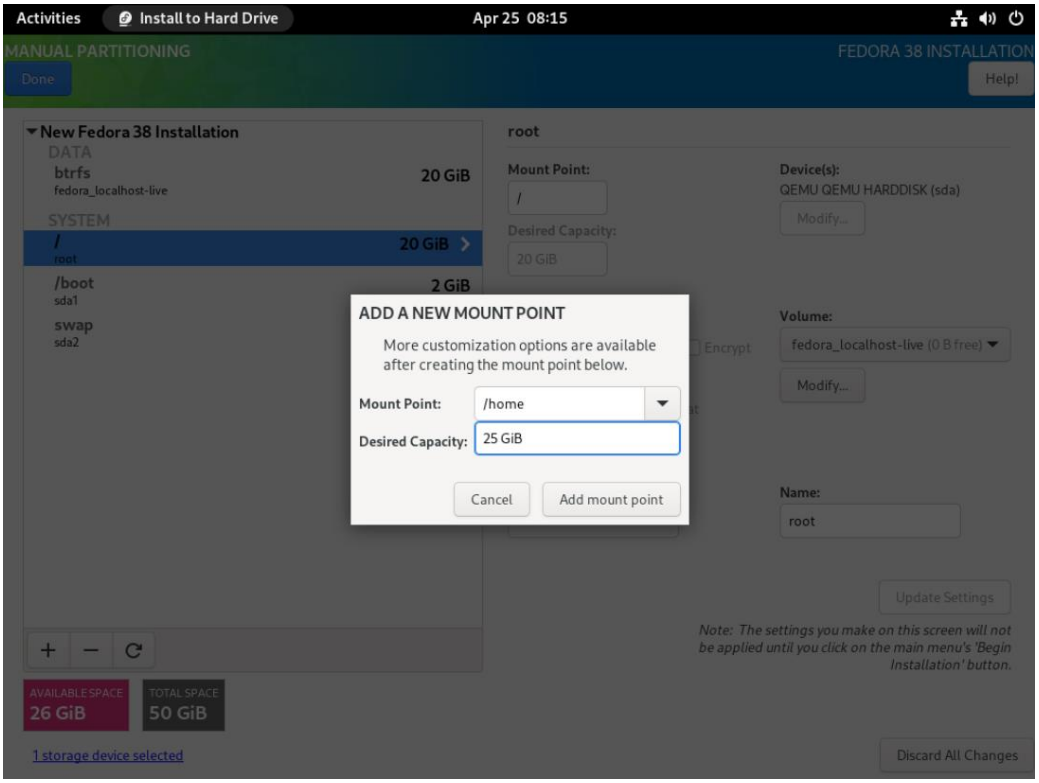
Again click the + (Plus) button and create other partitions. Choose **"swap"** as mount point and assign desired size to the swap partition and click **"Add mount point"** button.



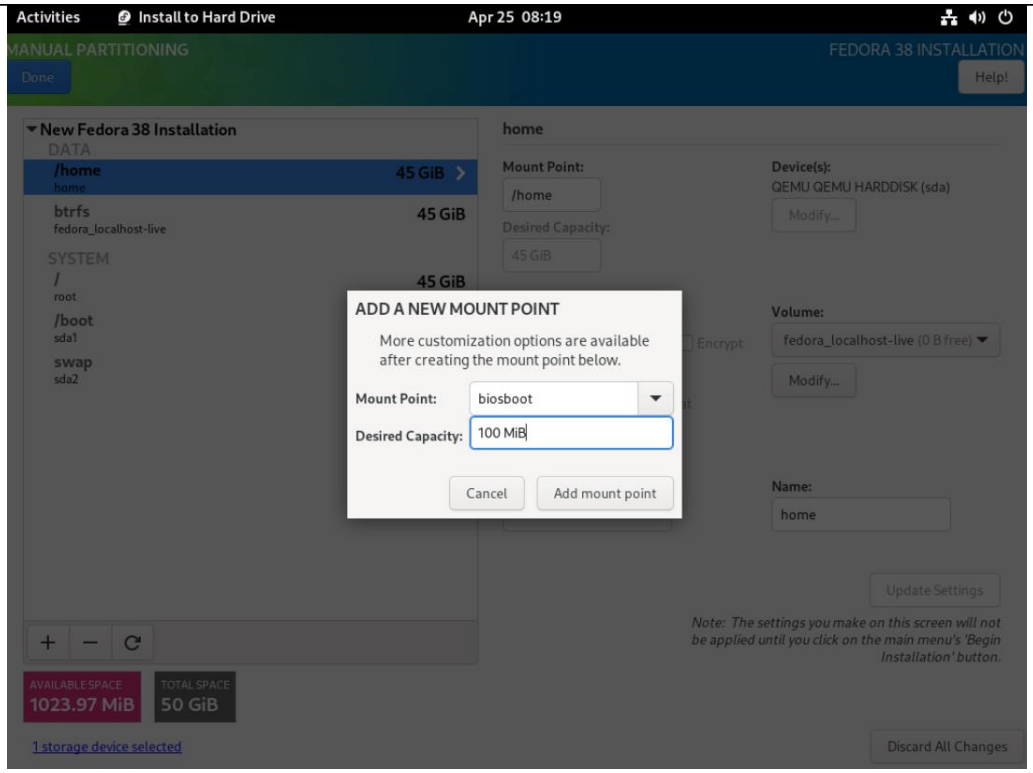
Next, we need to create root partition which is required for the fedora installation. To do so, click the + (Plus) button, choose / as mount point and assign desired size (E.g. 20 GB) to it.



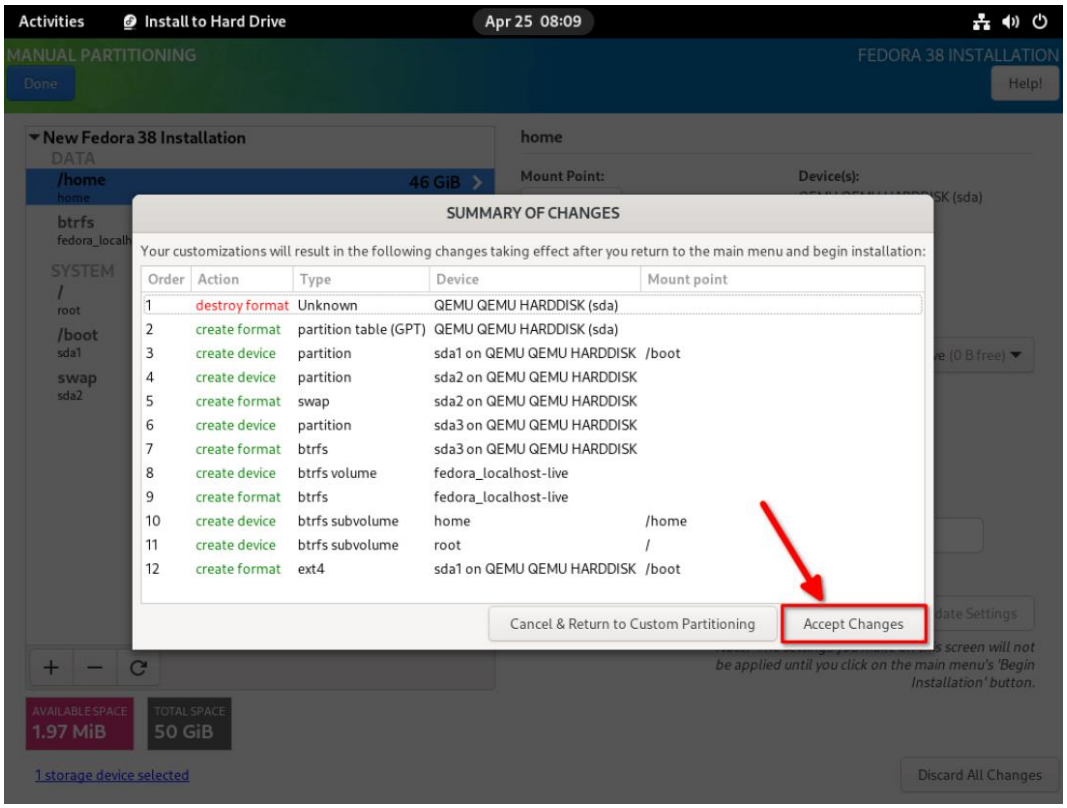
Again, click the + (Plus) button, choose the mount point type (E.g. /home) and assign desired size to it.



Next we need to create one more partition called biosboot, which is required for GPT disks. You can assign a minimal size (1 MB) to this partition. Since I have more space left on the disk, I assigned 100 MB.

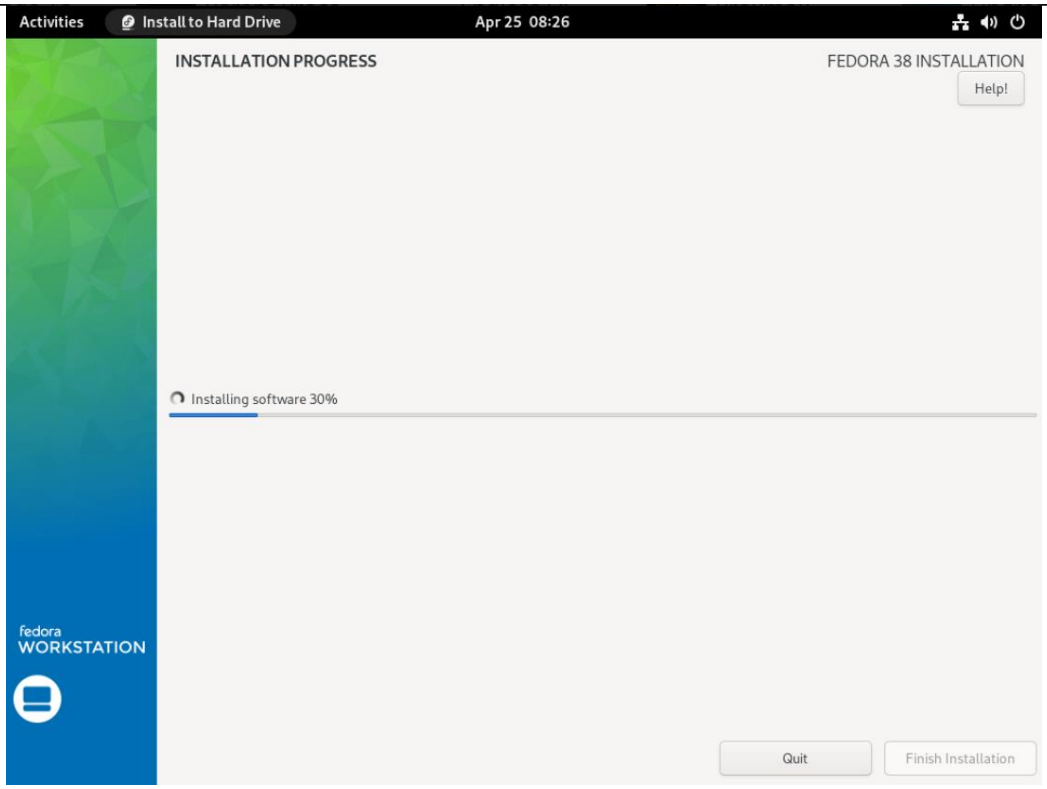


If there is any free space left on the drive, you can create additional partitions (E.g. /var) and assign a size to it.
Once you created all required partitions, press **"Done"** twice. You will now see the summary of changes in the partitions. If you're OK with it, click **Accept Changes** to save the partition scheme and proceed to next step.

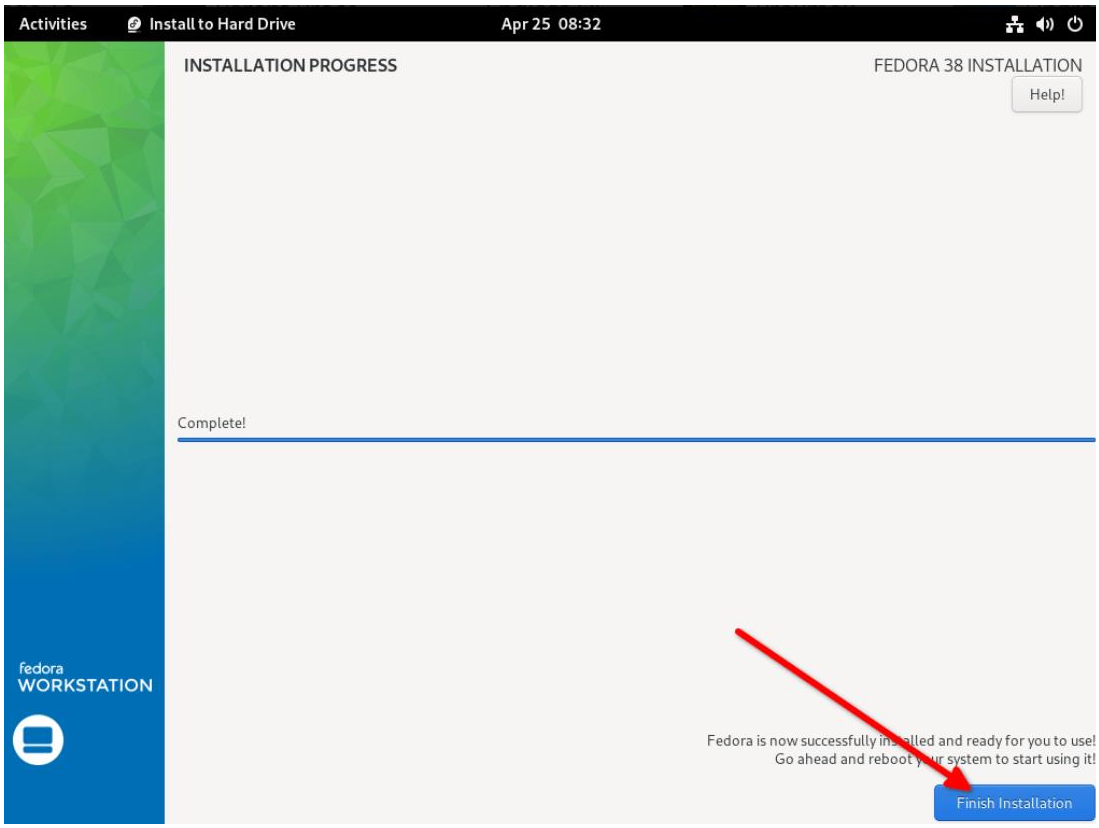


STEP 4 : Start Fedora Installation

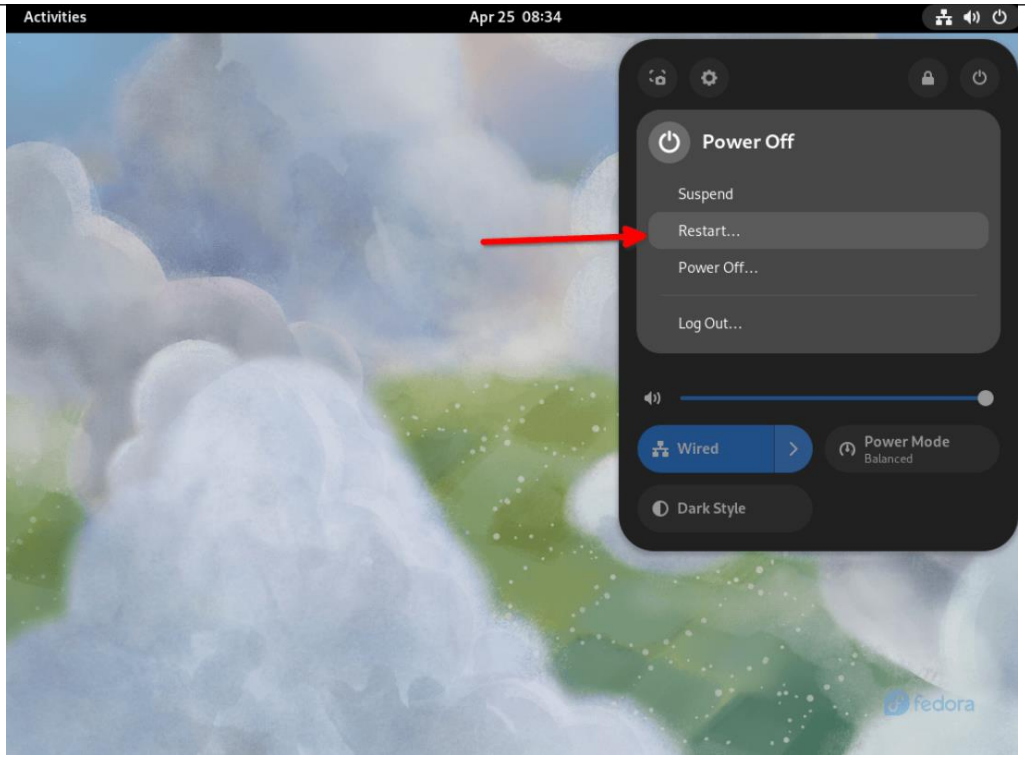
Now all the three parameters from the installation summary are configured. Press "Begin Installation" to **start installing Fedora 38 workstation** desktop edition.



Once the Fedora 38 installation is completed, press "Finish Installation".



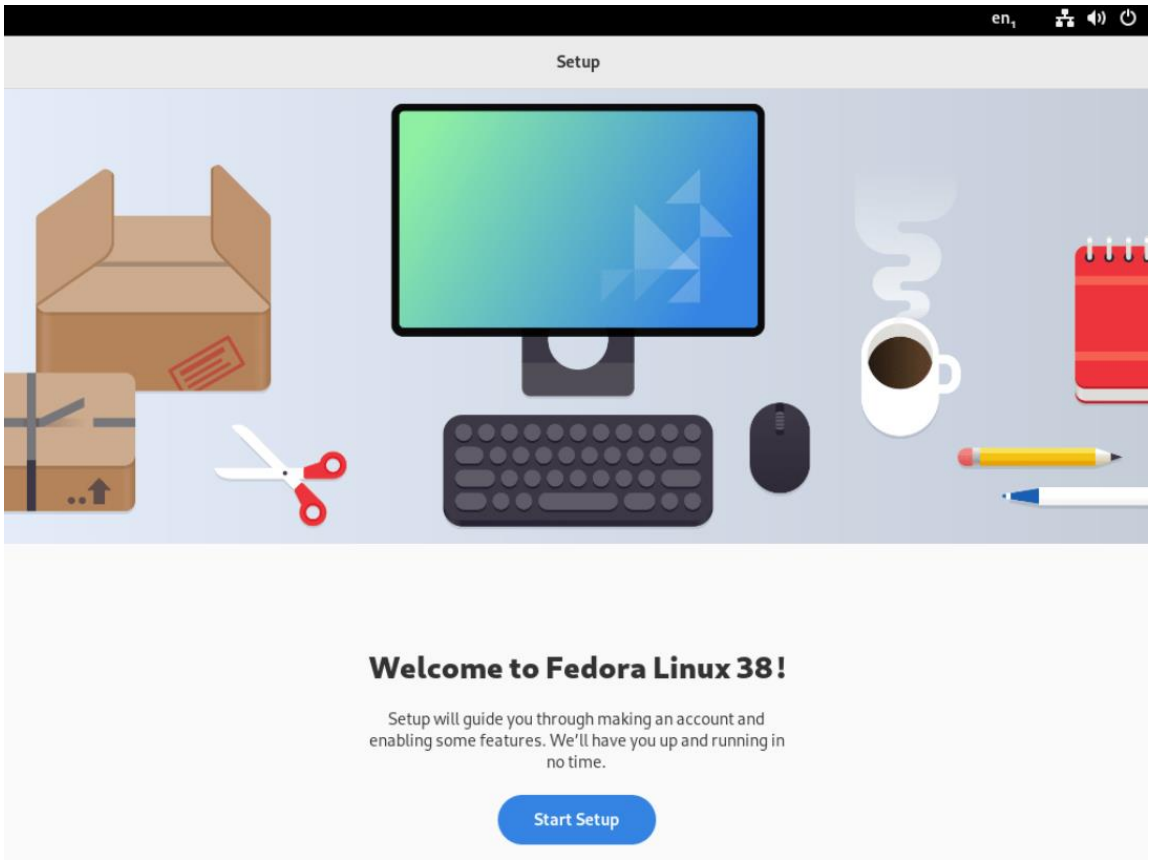
Reboot the machine to start using Fedora 38 desktop.



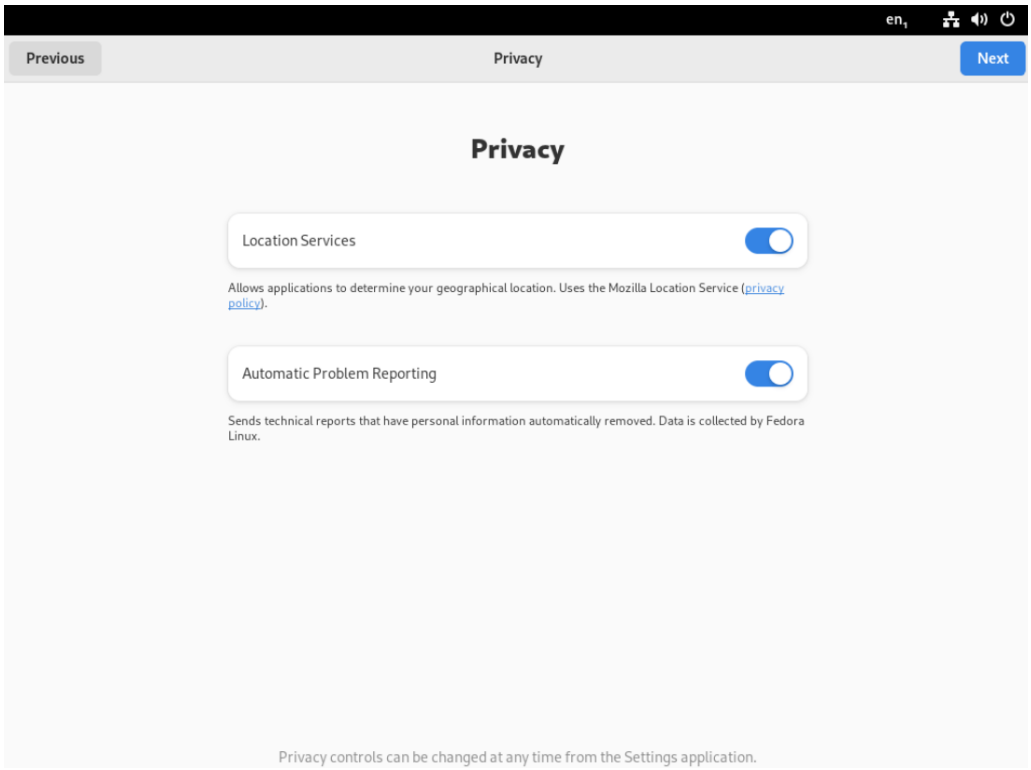
STEP 5 : Fedora Post Installation

After rebooting the machine, you will get a new setup wizard. It will ask you to set a few parameters like location features, bug reporting, new user creation, etc.
Click "Start Setup to" continue.

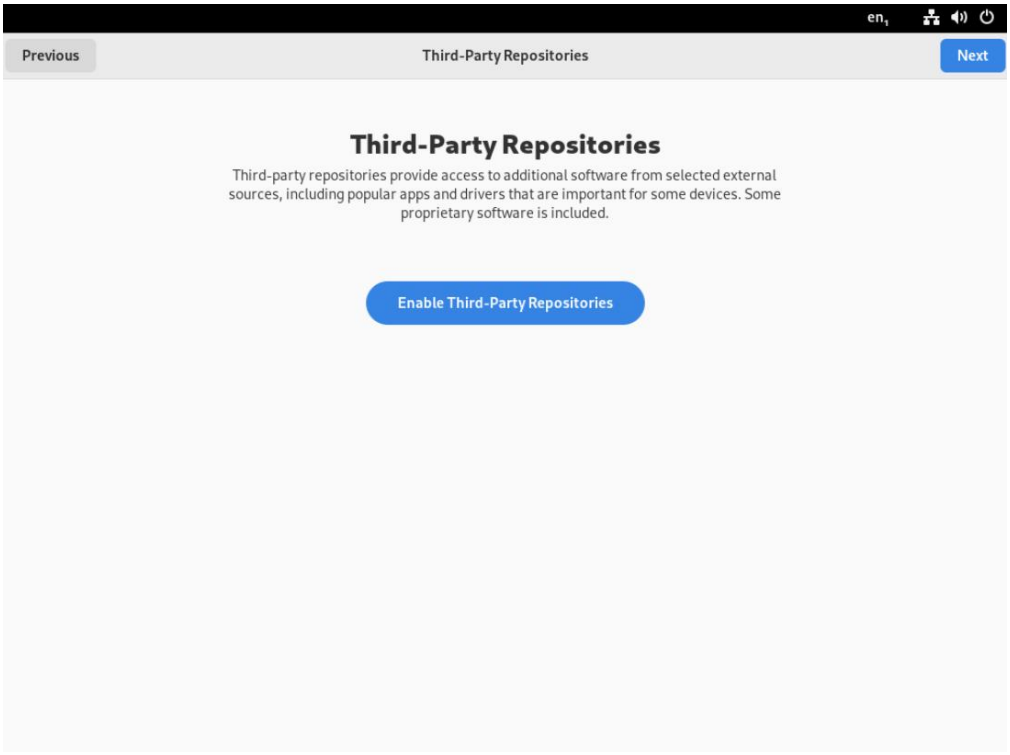
RESULT



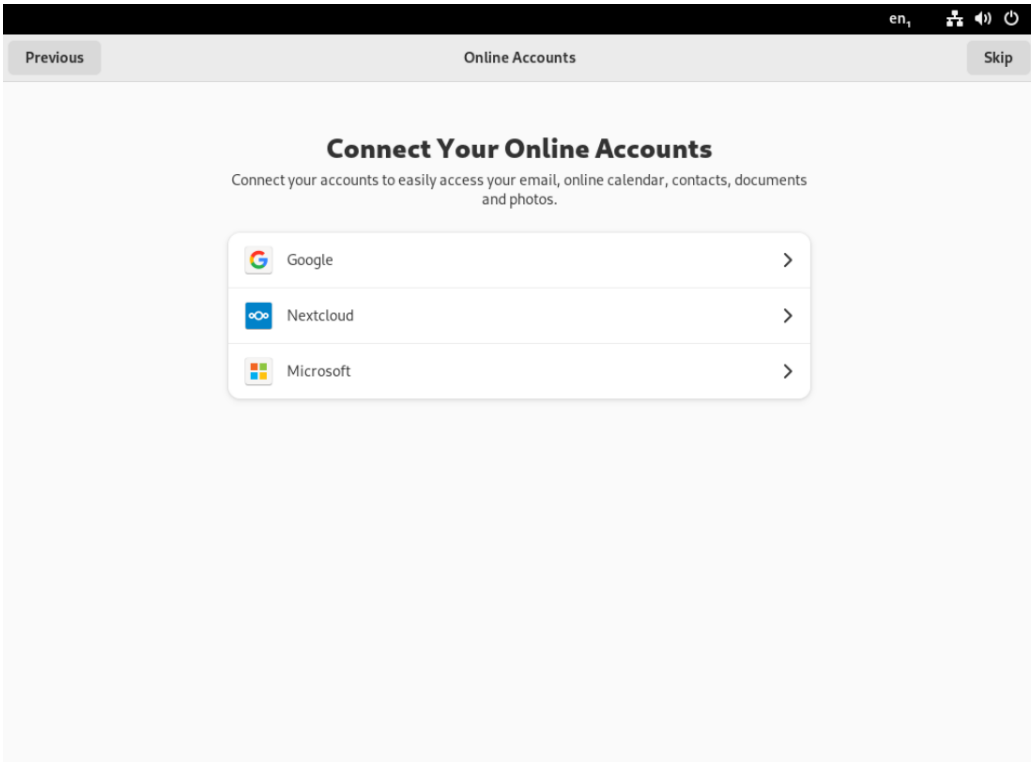
In the next screen, you will have the options to configure privacy related settings like enable location services and automatic error reporting. Toggle the ON/OFF switch to enable or disable these services. By default, both will be set to ON.



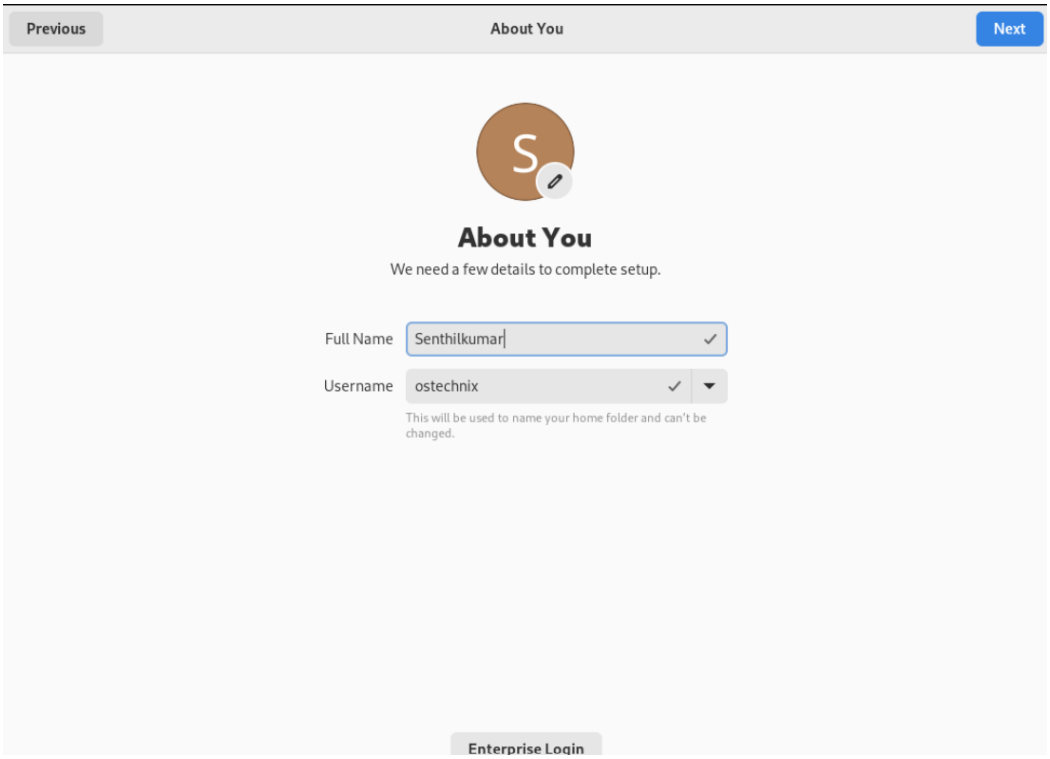
Next, you can enable or disable third-party repositories. The third-party repositories provides additional applications or proprietary software from external sources. By default, this option is disabled. Click Enable to enable the third-party repositories.



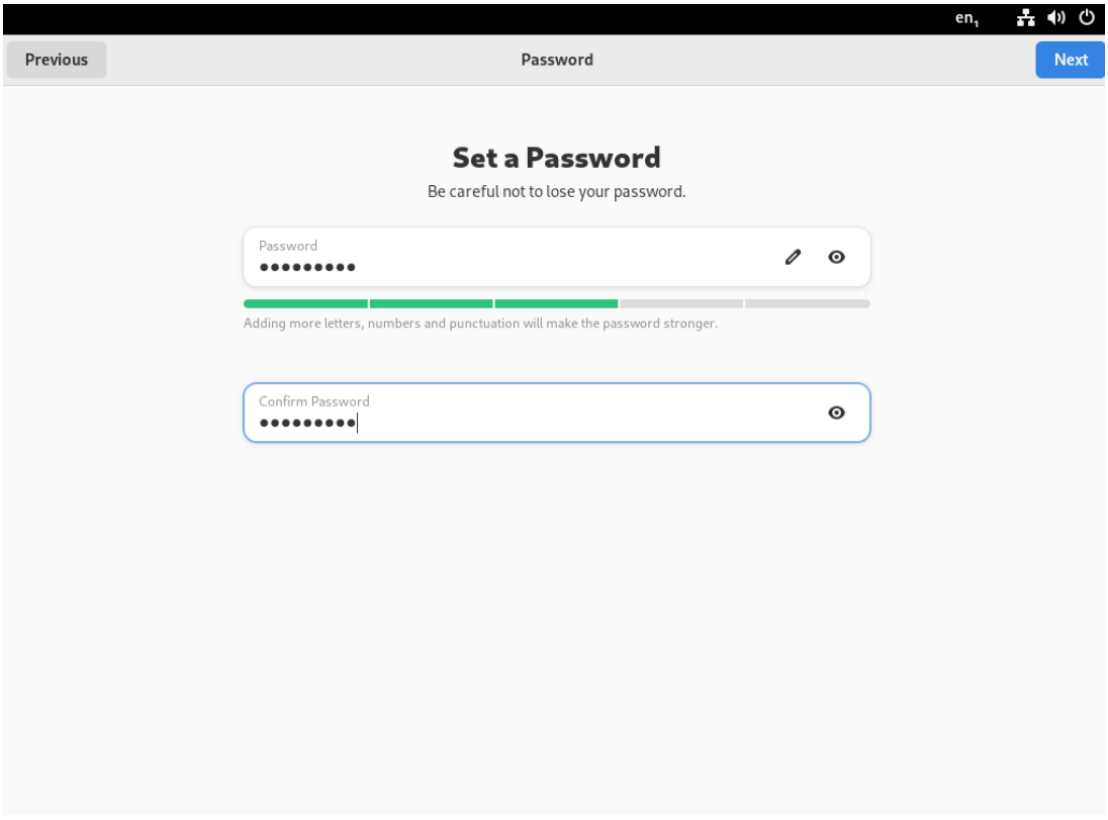
In the next step, you can connect one or more online accounts in-order to access your mail, contacts, calendar, documents and photos from the cloud. You can also do this later from Settings section.



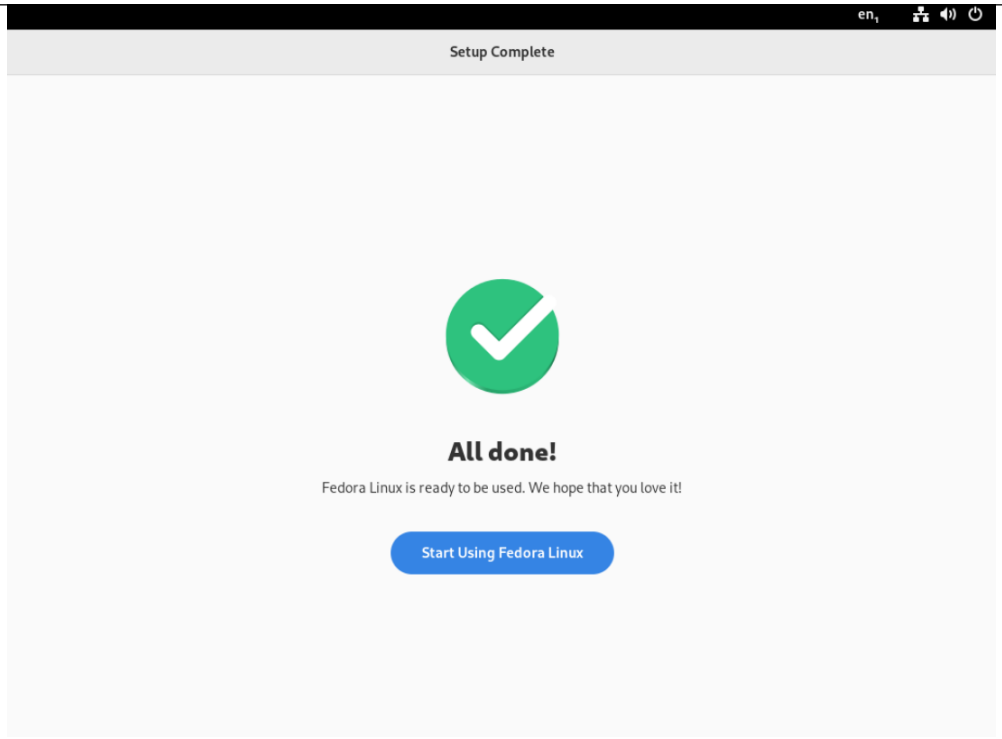
Enter your user account details here. This user will be automatically added to the sudoers list.



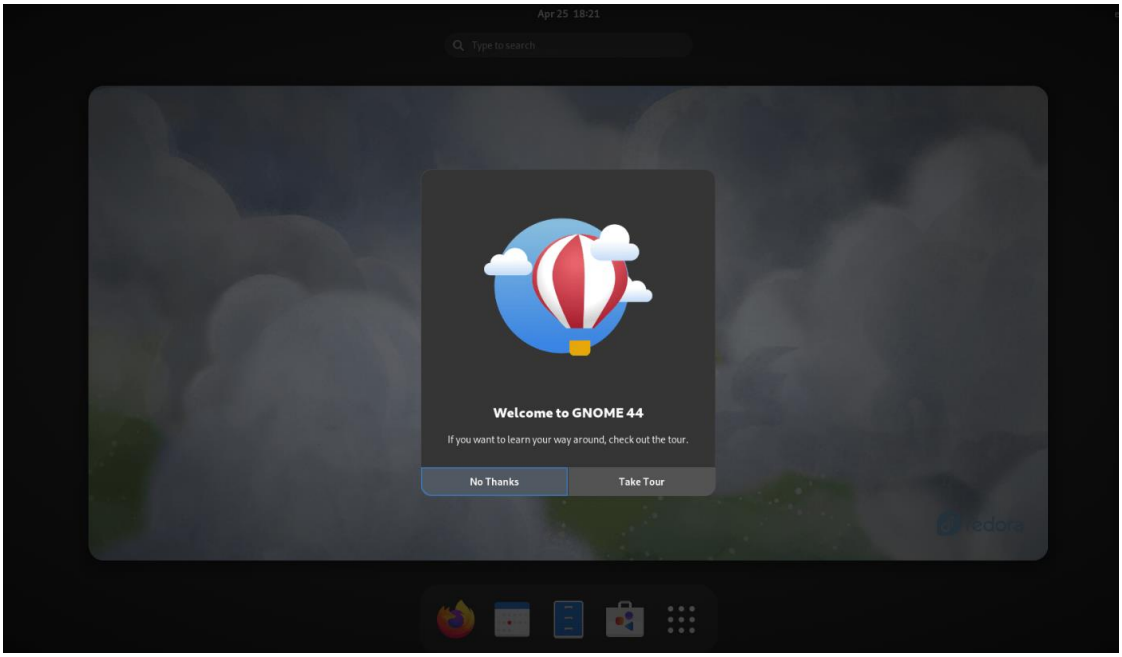
Enter user password twice.



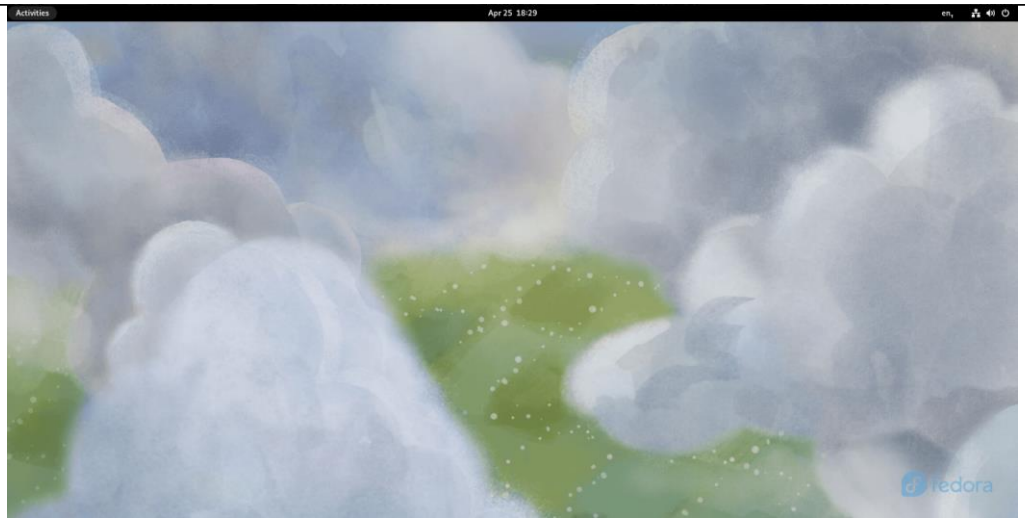
Congratulations! Fedora 38 desktop setup is completed and it is ready to use!



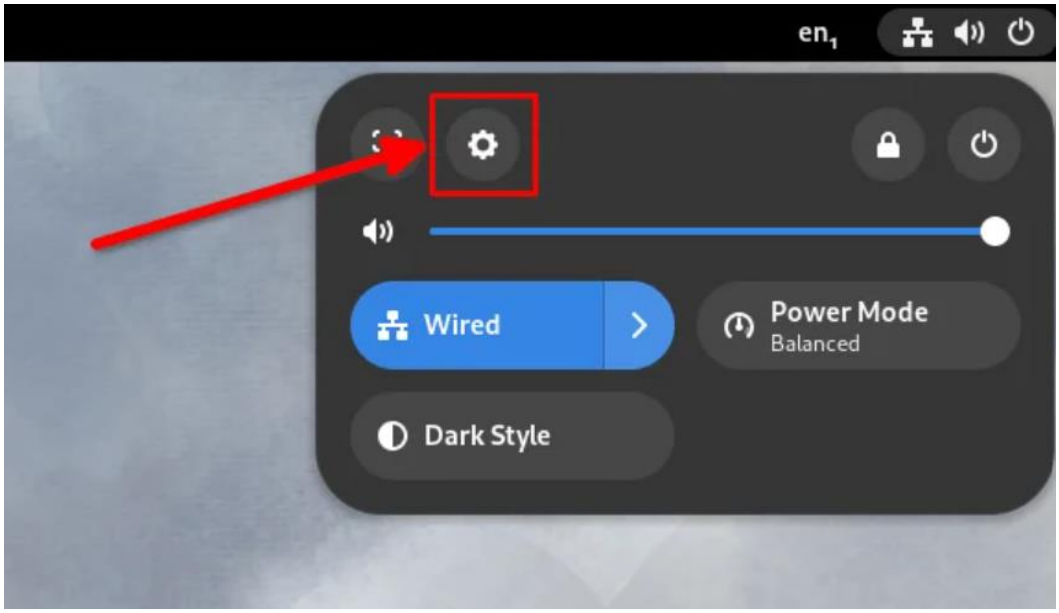
As stated already, Fedora 38 is shipped with the latest GNOME 44 Desktop Environment. On first login, GNOME 44 tour pop-up message will appear. If you want to know what is new in the GNOME 44, click "Take Tour" button and learn your way around. This will take a visual tour, so you can learn about the key features in Fedora 38 Workstation edition.



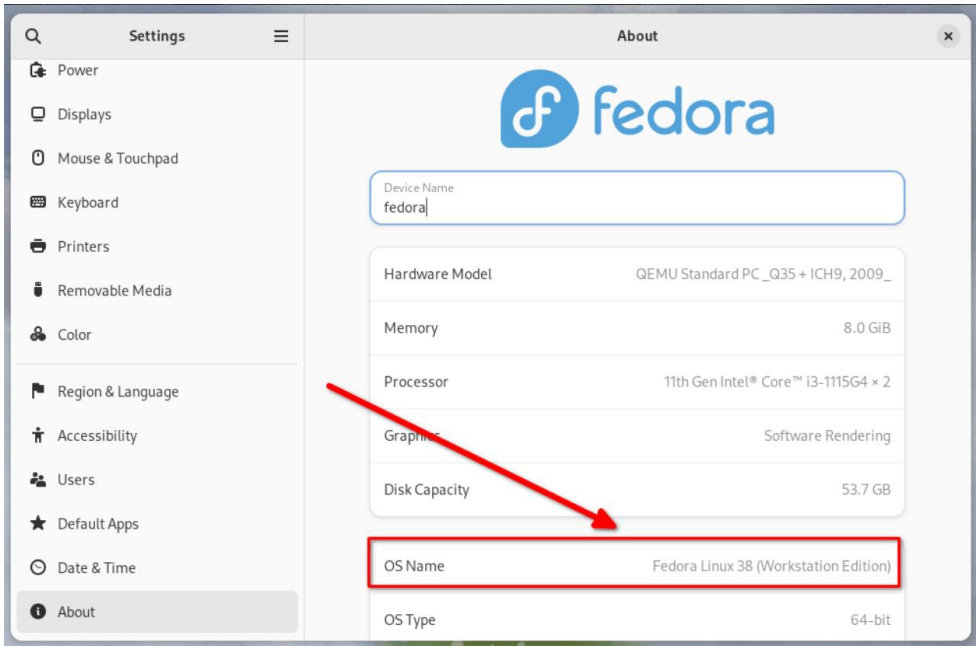
This how Fedora 38 Workstation GNOME desktop looks like.



To view the installed version, go to the **Settings.**



Click the **About** section.



CONCLUSION

The successful installation of Fedora Linux marks a significant milestone in understanding modern operating systems and their configurations. This project provided a comprehensive exploration of the installation process, highlighting the importance of each step from preparation to execution and post-installation setup. Through this experience, several key insights emerged:

1. **User-Friendliness**: Fedora's graphical installer simplifies the setup process, making it accessible even for those new to Linux. The clear options for language selection, disk partitioning, and user setup contribute to a smooth installation experience.

2. **Robust Features**: Fedora is equipped with cutting-edge technologies such as SELinux for enhanced security, and the DNF package manager for efficient software management. These features not only improve the overall performance but also ensure a secure operating environment.

3. **Community and Support**: The Fedora community plays a crucial role in maintaining and developing the distribution. Access to forums, documentation, and tutorials enriches the user experience, making it easier to troubleshoot and find solutions to potential challenges.

4. **Post-Installation Configurations**: Learning to navigate the system post-installation was essential. Updating the system, installing additional software, and configuring network settings demonstrated the flexibility and power of Linux environments.

5. **Real-World Applications**: The knowledge gained through this project is directly applicable to real-world scenarios, whether in personal projects, academic pursuits, or professional environments. Understanding how to install and manage a Linux distribution like Fedora prepares individuals for various roles in IT and software development.

In conclusion, this project not only solidified technical skills related to Linux installations but also fostered a deeper appreciation for open-source software. Fedora stands out as a dynamic and versatile operating system suitable for various use cases, from development to everyday computing. The journey of exploring Fedora will undoubtedly serve as a strong foundation for future explorations in the vast Linux ecosystem.

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