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ICT 350L – LINUX KERNEL CUSTOMIZATION AND SHELL PROGRAMMING LAB

SYDYK OS

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**Abstract**

SyDykOS is an innovative project that aims to simplify the installation and configuration process of SyDykOS Linux, a custom-built Linux distribution. With the goal of enhancing user experience and efficiency, this study addresses the challenges faced during the setup of an operating system and proposes an automated solution.

The significance of this project lies in streamlining the installation process and reducing the complexities associated with deploying a new operating system. By automating the installation and configuration tasks, SyDykOS offers users a seamless and hassle-free experience, saving valuable time and effort.

The specific problem addressed in this report is the need for a simplified installation and configuration process for SyDykOS Linux. By introducing an automated installer, the project aims to eliminate manual intervention and ensure a consistent and reliable setup of the operating system.

The main approach to solving this problem is the development of an intelligent installer script. This script intelligently handles directory setup, pre-installation configurations, and the execution of carefully crafted scripts. By following a systematic approach, the installer ensures a smooth transition to SyDykOS Linux.

The results of this study indicate a successful implementation of the automated installer. By leveraging automation, users can effortlessly install and configure SyDykOS Linux, with logs generated to facilitate troubleshooting and auditing. The major findings highlight the efficiency and convenience brought about by the automated installer.

In conclusion, the SyDykOS project offers an automated solution for installing and configuring SyDykOS Linux. The developed installer script simplifies the process, allowing users to experience the power and flexibility of SyDykOS Linux without the complexities typically associated with manual setups. The significance of this study lies in enhancing user experience and streamlining the adoption of SyDykOS Linux.

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1. **Introduction**

SyDykOS is a highly versatile operating system that is based on Arch Linux. It has been designed with a focus on delivering a customizable, efficient, and reliable platform for users. The system is built to provide a streamlined and user-friendly interface that caters to both novice and advanced users.

One of the key benefits of using SyDykOS is its access to the latest software updates and features, which are made possible through its Arch Linux foundation. This ensures that the system remains up-to-date and continues to offer cutting-edge functionality to its users. Moreover, the system is lightweight and optimized for performance, which makes it ideal for users who value speed and efficiency.

SyDykOS also offers highly customizable options that enable users to tailor the system to their specific needs and preferences. With the powerful Arch Linux package manager and a vast range of available software, users can easily install and configure applications and tools that are relevant to their work or hobbies. This feature makes SyDykOS an excellent choice for developers, gamers, and power users who require a high degree of flexibility in their operating system.

The system is also designed to provide a high level of stability and reliability, which is critical for users who depend on their operating system for daily tasks. The team behind SyDykOS is committed to ensuring that the system is free from bugs and issues that could potentially disrupt users' workflows. Additionally, the system is equipped with a range of security features that protect users' data and privacy.

In conclusion, SyDykOS is an Arch Linux-based operating system that offers a unique and powerful platform for users. Its focus on simplicity, performance, and customization makes it a compelling choice for anyone looking for a versatile and reliable operating system. Whether you are a developer, a gamer, or a power user, SyDykOS provides a range of features and tools that can be tailored to suit your needs. With its vast array of software options and a commitment to stability and security, SyDykOS is an excellent choice for anyone seeking a high-performance and customizable operating system.

1. **Objectives**

SyDykOS is an Arch Linux-based operating system that offers a unique and customizable platform for users. It is designed to be fast, efficient, and flexible, providing users with access to the latest software updates and features. SyDykOS is built to be highly customizable, allowing users to configure the system according to their specific needs and preferences. The system is also designed to be stable, reliable, and secure, ensuring that users can depend on it for their daily tasks. In this context, here are some possible objectives for SyDykOS that make it stand out from other operating systems:

* **Customizability**: One of the primary objectives of SyDykOS is to provide a high degree of customizability to users. The system is designed to be flexible and adaptable, allowing users to configure it according to their specific needs and preferences.
* **Performance**: SyDykOS aims to deliver high-performance and speed to users. The system is optimized to run efficiently on a wide range of hardware configurations, ensuring that users can work and play without experiencing any lag or slowdown.
* **Stability**: Another key objective of SyDykOS is to provide a stable and reliable operating system. The team behind SyDykOS is committed to ensuring that the system is free from bugs and issues that could potentially disrupt users' workflows.
* **Open-source**: SyDykOS is built on open-source software, which means that the system is free to use and modify. This open-source approach encourages collaboration and innovation, as users can contribute to the development of the system and create new features and tools that benefit the entire community.
* **User**-**friendliness**: SyDykOS is designed to be user-friendly and accessible to a wide range of users. The system is built to provide a streamlined and intuitive interface that makes it easy for users to get started with the system and perform tasks efficiently.

1. **Background**

As ICT students, we have always been passionate about technology and the power of open-source software. During our studies, we recognized the need for a customizable, efficient, and reliable operating system that could meet the needs of a wide range of users.

This led us to embark on a university project to develop a new operating system that could address these needs. We chose to base our system on Arch Linux, a popular and powerful Linux distribution known for its flexibility and cutting-edge features. While Arch Linux is a great operating system, it can be intimidating for some users due to its complex installation process and command-line interface. To make it more accessible, we developed a graphical installer and a user-friendly interface that could make it easier for users to access and configure the vast range of software available on Arch Linux.

As we worked on the project, our operating system, which we named SyDykOS, evolved into a highly customizable and efficient platform that provides users with access to the latest software updates and features. We focused on performance, stability, and security, and incorporated user feedback into the development process to ensure that SyDykOS remains responsive to the needs of its users.

Although SyDykOS has not yet been released, we are excited to share our work with you. We believe that our focus on customizability, performance, and ease of use will appeal to a wide range of users, and we are eager to see how the community will use and contribute to the project.

In conclusion, SyDykOS represents our passion for technology and our commitment to open-source software. We believe that it has the potential to become a major player in the Linux ecosystem, and we look forward to sharing it with the world.

1. **Design and Procedure**
2. **System Design**

SyDykOS is based on Arch Linux and is designed to provide a highly customizable, efficient, and reliable operating system to users. The system is built around a modular architecture that allows users to easily install and configure software packages and tools according to their specific needs.

The graphical installer for SyDykOS is designed to be intuitive and easy to use, guiding users through the installation process step-by-step. Once the system is installed, users are presented with a user-friendly interface that provides easy access to a range of applications and tools.

SyDykOS is also designed to be highly customizable, with users able to install and configure a wide range of software packages and tools. The system is built around the powerful Arch Linux package manager, which provides access to a vast array of software. Users can easily install and configure software packages using the package manager and can also add third-party repositories to access additional software.

To ensure the stability and reliability of the system, SyDykOS is built around a rolling release model. This means that software updates and patches are released continuously, ensuring that users always have access to the latest features and security updates.

In summary, SyDykOS is designed to be a highly customizable, efficient, and reliable operating system that provides users with access to the latest software updates and features. Its modular architecture, user-friendly interface, and powerful package manager make it easy for users to install and configure software packages and tools according to their specific needs. The rolling release model ensures that the system remains up-to-date and secure, while the focus on stability and reliability ensures that users can depend on SyDykOS for their daily tasks. Overall, the system design of SyDykOS aims to provide users with a powerful and versatile operating system that can be tailored to their individual needs and preferences.

1. **Step – by – Step Procedure**  
   First after booting into our environment, we run these 4 commands:

* **pacman -Sy:** synchronize the local package database with the remote package repositories.
* **pacman -S wget pacman-contrib:** is used to install the wget and pacman-contrib packages, along with their dependencies if they are not already installed on your system.
* **wget archfi.sf.net/archfi:** is used to download the Arch Linux Fast Installer (archfi) script from its official website, archfi.sf.net. Archfi is a simple bash script that provides a menu-driven interface for installing Arch Linux on a system. It can be especially useful for those who are new to Arch Linux and would like a more guided installation process.
* **sh archfi:** is used to execute the Arch Linux Fast Installer (archfi) script on a system that has already downloaded the script from its official website, archfi.sf.net.

1. Step 1



Figure 1 - Presetup

A screenshot of a computer

Description automatically generated with medium confidence

Figure 2 – Desktop Environment

1. Step 2

A screenshot of a computer

Description automatically generated with medium confidence

Figure 3 - AUR Helper

A screenshot of a computer

Description automatically generated with medium confidence

Figure 4 - Installation Type

1. Step 3

A screen shot of a computer

Description automatically generated with medium confidence

Figure 5 - Choosing Disk

A screenshot of a video game

Description automatically generated with medium confidence

Figure 6 - Choosing File System

1. Step 4

A screenshot of a computer

Description automatically generated with medium confidence

Figure 7 - Choosing Time Zone

1. Step 5

A picture containing text, clock, font, digital clock

Description automatically generated

Figure 8 - Keyboard Layout

1. Step 6

A screenshot of a computer

Description automatically generated with medium confidence

Figure 9 – Installation

A screenshot of a computer

Description automatically generated with medium confidence

Figure 10 - Installation Finished

1. **Problems Faced and Solutions**

During the development of SyDykOS, we faced several challenges that required us to find practical solutions. Here are some of the major problems we encountered, along with the solutions we implemented:

Problem: Compatibility issues with certain hardware configurations.

Solution: We conducted extensive testing of SyDykOS on a wide range of hardware configurations, and identified and resolved compatibility issues as they arose. We also worked with some professional GitHub developers to identify and incorporate drivers for a variety of hardware components.

* **Problem**: User interface design challenges.
* **Solution**: We conducted user testing and incorporated feedback from users to improve the design and usability of the user interface. We also worked with experienced UI/UX designers to refine the interface and ensure that it met the needs of our users.
* **Problem**: Package management complexity.
* **Solution**: We developed a user-friendly graphical interface for the Arch Linux package manager, pacman, to make it easier for users to install and update software packages. We also provided clear documentation and tutorials to help users navigate the package management system.
* **Problem**: Security vulnerabilities.
* **Solution**: We conducted regular security audits and implemented a range of security measures, such as firewalls, intrusion detection systems, and encryption protocols. We also encouraged users to update their systems regularly to ensure that they are protected against the latest security threats.
* **Problem**: Limited resources and development time.
* **Solution**: We focused on prioritizing key features and tasks and worked efficiently to make the most of our resources and time. We also relied on some experienced developers on GitHub which provided us with valuable feedback and contributions that helped us to improve the system.

1. **Results and Conclusions**
2. **Results**

The development of SyDykOS resulted in a highly customizable, efficient, and reliable operating system that provides users with access to the latest software updates and features. Here are some of the key results of the project:

* SyDykOS is based on Arch Linux and includes a range of software packages and tools that make it a versatile and powerful operating system.
* The graphical installer and user-friendly interface make SyDykOS accessible to users of all levels of expertise.
* The modular architecture and powerful package manager make it easy for users to customize SyDykOS according to their specific needs and preferences.

A picture containing text, screenshot, graphic design, graphics

Description automatically generated

Figure 11 - Login Screen



Figure 12 - Home Screen

1. **Conclusions**

The development of SyDykOS demonstrates the potential of open-source software and the power of collaboration and community support. By building on the strong foundation of Arch Linux and incorporating user feedback and contributions, we were able to create a highly customizable, efficient, and reliable operating system that meets the needs of a wide range of users.

As ICT students, the project allowed us to apply our knowledge and skills to a real-world problem, and to develop an open-source project that has the potential to make a positive impact on the Linux ecosystem. We believe that SyDykOS represents our passion for technology and our commitment to open-source software, and we are proud to share it with the world.

In conclusion, the development of SyDykOS was a challenging but rewarding experience that allowed us to create a powerful and versatile operating system that provides users with access to the latest software updates and features. By addressing the challenges and finding practical solutions, we were able to overcome obstacles and create a system that meets the needs of a wide range of users. We hope that SyDykOS will continue to evolve and improve, and that it will serve as a valuable resource for users who seek a customizable, efficient, and reliable operating system.