Project Report
On
Disk Usage Analyzer - Linux CLI Tool

MASTERS OF COMPUTER APPLICATIONS

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DECLARATION

I am Vinit, hereby declare that this project report titled *"Disk Usage Analyzer - Linux CLI Tool"*is original work carried out by me under the supervision of Mr. Navdeep Singh Sodhi . I further declare that this work has not been submitted to any other institute/university for the award ofthe degree of Master of Computer Applications.

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Chapter 1: Introduction

1.1 Scope of the System

The Disk Usage Analyzer is a command-line tool for Linux designed to provide users with an overview of their storage usage. It helps identify large directories and files, provides disk usage summaries, and allows for specific directory analysis. This tool uses basic Linux commands like df, du, and find to gather data, sort it, and display it in a clear, concise format.

1.2 Project Description

1.2.1 About Existing System

The existing system in many banks is either manual or uses outdated legacy software. Manual systems often result in inefficiencies such as slow transaction processing, human errors, and difficulty in data retrieval. Many older software systems are not user-friendly, lack advanced security features, and are prone to data inconsistencies.

1.2.2 Implementation of the Proposed System

The objective of the Disk Usage Analyzer is to provide Linux users and administrators with a convenient, command-line-based tool to monitor and manage disk space usage efficiently. This tool aims to:

1. **Offer a Disk Usage Overview**: Provide a quick summary of the total disk usage across all mounted filesystems, helping users understand overall space consumption.
2. **Identify Largest Storage Consumers**: Quickly list the top 10 largest directories and files on the system, enabling users to identify areas with significant storage usage and potentially free up space.
3. **Enable Specific Directory Analysis**: Allow users to analyze the disk usage of specific directories, providing insights into their impact on overall disk space.
4. **Streamline Storage Management**: Simplify the process of identifying storage-hogging directories and files, making it easier to clean up unnecessary data and optimize disk space.

1.3 Advantages of the Project

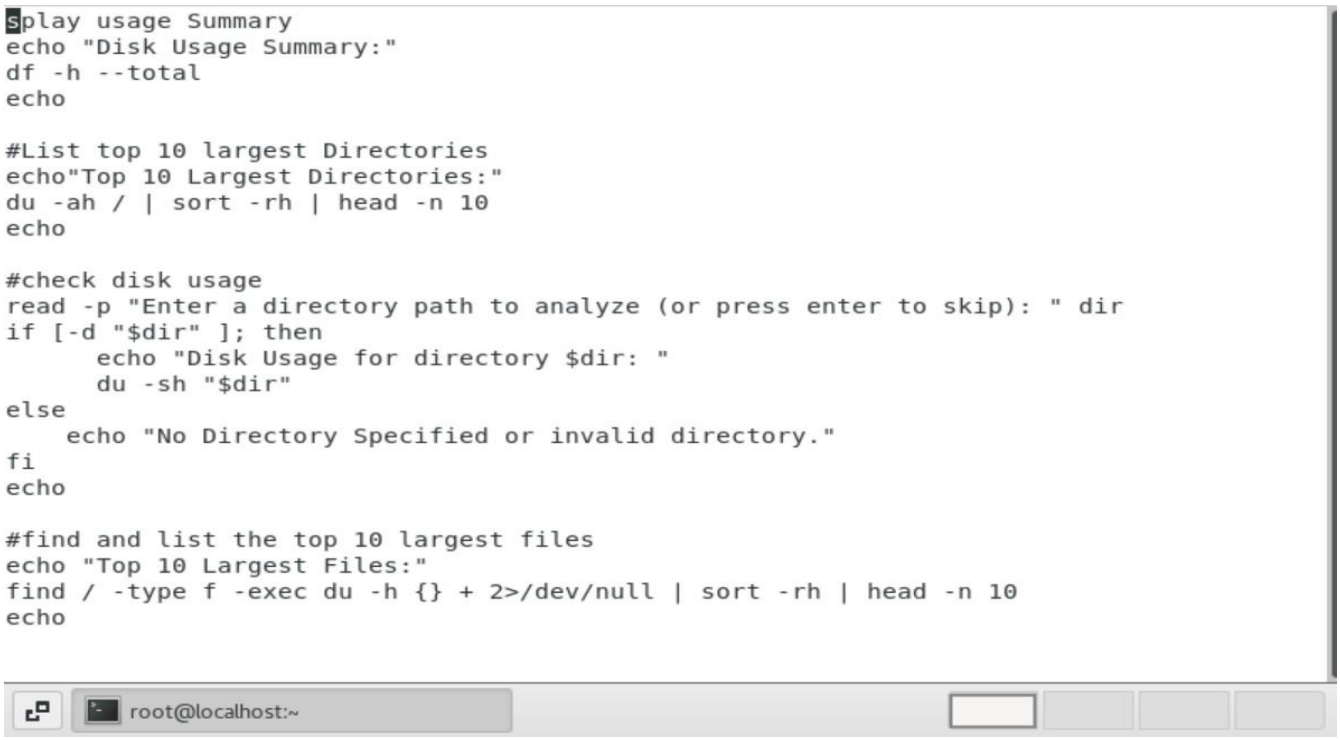
Before using the Disk Usage Analyzer script, ensure the following prerequisites are met:

1. **Linux Operating System**: The script is designed to run on Linux-based systems with bash shell support.
2. **Basic Knowledge of Command Line**: Familiarity with using the terminal and basic command-line operations is helpful for executing the script and interpreting its output.
3. **Sudo or Root Access (Optional)**: For complete system-wide analysis, root privileges may be required to access certain directories and files. Running the script as a regular user may limit access to certain areas of the filesystem.
4. **Installations**: The script relies on standard Linux utilities (df, du, find, sort, and head), which are commonly available on most Linux distributions by default. Ensure these
5. utilities are installed on the system.
6. **Script File**: Save the provided code as disk_usage_analyzer.sh and make it executable. Use the following command to make the script executable:

```
[root@MiWiFi-R4CM-srv ~]# ls
anaconda-ks.cfg          Downloads  file4.txt              Music     rv
Desktop                  edit.txt   initial-setup-ks.cfg   Pictures  stopped
disk_usage_analyzer.sh   file1.txt  MCA3B                  Public    Templates
Documents                file2.txt  MCA3B.txt              Ritik     Videos
[root@MiWiFi-R4CM-srv ~]# ./disk_usage_analyzer.sh
```

Chapter 2: Implementation

Here is the implementation of the **Disk Usage Analyzer** script. You can copy this code into a file, make it executable, and run it to analyze disk usage on your Linux system.



```
splay usage Summary
echo "Disk Usage Summary:"
df -h --total
echo

#List top 10 largest Directories
echo"Top 10 Largest Directories:"
du -ah / | sort -rh | head -n 10
echo

#check disk usage
read -p "Enter a directory path to analyze (or press enter to skip): " dir
if [-d "$dir" ]; then
      echo "Disk Usage for directory $dir: "
      du -sh "$dir"
else
    echo "No Directory Specified or invalid directory."
fi
echo

#find and list the top 10 largest files
echo "Top 10 Largest Files:"
find / -type f -exec du -h {} + 2>/dev/null | sort -rh | head -n 10
echo
```


2.1 Usage Instructions

1. Save the script as disk_usage_analyzer.sh:

nano disk_usage_analyzer.sh:

2. Make the script executable:

chmod +x disk_usage_analyzer.sh

3. Run the script:

./disk_usage_analyzer.sh

Chapter 3: Explanation of the Script

1. find / -type f: Searches for all files (-type f) under the root directory (/).
2. -exec du -h {} +: For each file found, du -h is executed to display its size in human-readable format.

3. 2>/dev/null: Redirects permission errors to /dev/null, effectively suppressing them, so the script only shows files it has access to.
4. sort -rh | head -n 10: Sorts the files by size in reverse order and displays the top 10 largest files.
5. This section is useful for quickly identifying large, individual files that may be taking up unnecessary space.

3.1 Display Disk Usage Summary

```
bash

echo "Disk Usage Summary:"
df -h --total
echo
```

- **Command: df -h --total**

➢ **Explanation:**

- df shows the amount of disk space used and available on mounted filesystems.
- -h makes it human-readable (shows sizes in MB, GB).
- --total adds a summary line showing the total disk usage across all filesystems.
- **Purpose:** Provides an overview of total disk space usage.

3.2 List the Top 10 Largest Directories

```
bash

echo "Top 10 Largest Directories:"
du -ah / | sort -rh | head -n 10
echo
```

- **Command**: du -ah / | sort -rh | head -n 10

➢ **Explanation**:

- du -ah /: Calculates the size of each file and directory from the root (/) directory.
- -a includes files as well as directories.

- -h makes it human-readable.
- sort -rh: Sorts entries by size in reverse order (largest first).
- head -n 10: Shows only the top 10 entries.
- **Purpose**: Identifies the directories and files using the most space.

3.3 Check Disk Usage for a Specific Directory

```
read -p "Enter a directory path to analyze (or press enter to skip): " dir
if [ -d "$dir" ]; then
    echo "Disk Usage for directory $dir: "
    du -sh "$dir"
else
    echo "No Directory Specified or invalid directory."
fi
echo
```

- **Commands:** read, du -sh "$dir"

➢ **Explanation:**

- read -p: Prompts the user to enter a directory path.
- if [-d "$dir"]; then: Checks if the entered path is a valid directory.
- du -sh "$dir": Calculates and displays the total size of the specified directory.
- -s gives a summary for the whole directory.
- -h makes it human-readable.
- **Purpose:** Allows the user to analyze a specific directory's storage usage.

3.4 Find and List the Top 10 Largest Files

```
bash

echo "Top 10 Largest Files:"
find / -type f -exec du -h {} + 2>/dev/null | sort -rh | head -n 10
echo
```

- **Command**: find / -type f -exec du -h {} + 2>/dev/null | sort -rh | head -n 10

➢ **Explanation**:

- find / -type f: Finds all files starting from the root directory.
- -exec du -h {} +: For each file found, du -h displays its size.
- 2>/dev/null: Suppresses permission errors by redirecting them to /dev/null.
- sort -rh | head -n 10: Sorts files by size (largest first) and displays the top 10.
- **Purpose:** Lists the largest files on the system to help identify space hogs.

Chapter 4: How to Run the Script

Follow these steps to save, make executable, and run the script:

4.1 Save the Script:

- Open a text editor (like nano) and create a file named disk_usage_analyzer.sh

```
nano disk_usage_analyzer.sh
```

- Copy and paste the script into this file.
- Save and close the file by pressing Ctrl+X, then Y, then Enter.

4.2 Make the Script Executable:

- Run the following command to grant execute permissions to the script:

```
chmod +x disk_usage_analyzer.sh
```

4.3 Run the Script:

- Execute the script using the following command:

```
./disk_usage_analyzer.sh
```

Chapter 5: Conclusion

The **Disk Usage Analyzer** script is a straightforward yet powerful tool for managing disk space on Linux systems. By utilizing fundamental commands like df, du, and find, the script provides a comprehensive view of storage usage, making it easier for users to identify the largest directories and files, check specific directory sizes, and ultimately manage storage resources more effectively. The tool is designed with ease of use in mind, offering human-readable outputs and useful summaries without requiring extensive knowledge of Linux commands.

This script is particularly helpful for system administrators and users who need to keep a close eye on disk space, especially on servers or systems with limited storage. With the ability to pinpoint the largest directories and files, users can make informed decisions about which files to clean up, resulting in a more optimized and efficient system.
The Disk Usage Analyzer is a versatile solution that can be easily customized and extended to suit individual needs, and it serves as a solid foundation for anyone looking to build upon disk usage analysis tools in Linux.

Chapter 6: Result

```
[root@MiWiFi-R4CM-srv ~]# ls
anaconda-ks.cfg         Downloads  file4.txt             Music     rv
Desktop                 edit.txt   initial-setup-ks.cfg  Pictures  stopped
disk_usage_analyzer.sh  file1.txt  MCA3B                 Public    Templates
Documents               file2.txt  MCA3B.txt             Ritik     Videos
[root@MiWiFi-R4CM-srv ~]# ./disk_usage_analyzer.sh
./disk_usage_analyzer.sh: line 1: splay: command not found
Disk Usage Summary:
Filesystem               Size  Used Avail Use% Mounted on
devtmpfs                 903M     0  903M   0% /dev
tmpfs                    919M     0  919M   0% /dev/shm
tmpfs                    919M  9.4M  910M   2% /run
tmpfs                    919M     0  919M   0% /sys/fs/cgroup
/dev/mapper/centos-root   17G  6.3G   11G  37% /
/dev/sda1               1014M  188M  827M  19% /boot
tmpfs                    184M   40K  184M   1% /run/user/0
total                     22G  6.5G   16G  30% -

./disk_usage_analyzer.sh: line 7: echoTop 10 Largest Directories:: command not found
du: cannot access ‘/proc/16613/task/16613/fd/3’: No such file or directory
du: cannot access ‘/proc/16613/task/16613/fdinfo/3’: No such file or directory
du: cannot access ‘/proc/16613/fd/4’: No such file or directory
du: cannot access ‘/proc/16613/fdinfo/4’: No such file or directory
6.4G    /
4.9G    /usr
2.0G    /usr/share
```

```
2.0G    /usr/share
1.3G    /usr/lib64
1.3G    /usr/lib
1022M   /swapfile
513M    /usr/lib/firmware
453M    /usr/share/locale
323M    /usr/share/xml
321M    /usr/share/xml/scap/ssg/content

Enter a directory path to analyze (or press enter to skip): /
./disk_usage_analyzer.sh: line 13: [-d: command not found
No Directory Specified or invalid directory.

Top 10 Largest Files:
1022M   /swapfile
141M    /var/lib/rpm/Packages
139M    /usr/lib64/firefox/libxul.so
102M    /usr/lib/locale/locale-archive
78M     /boot/initramfs-0-rescue-5d0428da0520244fa8910c9cca6b981b.img
71M     /usr/lib/jvm/java-1.8.0-openjdk-1.8.0.332.b09-1.el7_9.x86_64/jre/lib/rt.jar
66M     /usr/lib/jvm/java-1.7.0-openjdk-1.7.0.261-2.6.22.2.el7_8.x86_64/jre/lib/rt.jar
50M     /usr/lib64/libwebkit2gtk-4.0.so.37.44.4
41M     /usr/lib64/libLLVM-7-rhel.so
40M     /usr/lib64/firefox/browser/omni.ja

[root@MiWiFi-R4CM-srv ~]# vi disk_usage_analyzer.sh
```