Characteristics of computer operating systems

SECURED OPERATING SYSTEM- IT2030

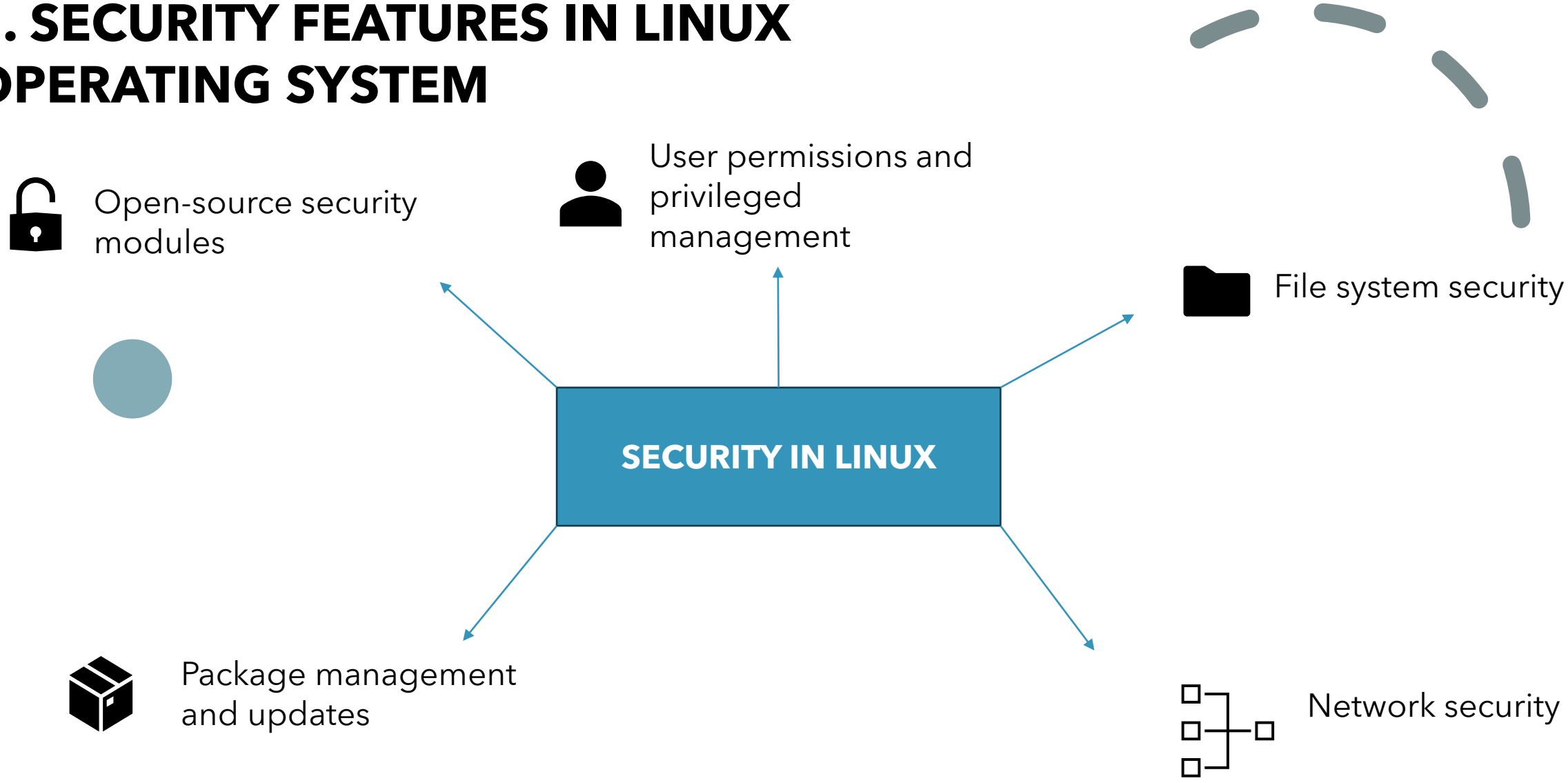
INTRODUCTION

- Section 1: Features of Linux operating system
- Section 2: Features of Windows operating system.
- Section 3: Features of Mac operating system.
- Section 4: Features of Android mobile operating system.
- Questions

SECTION 1-Linux operating system

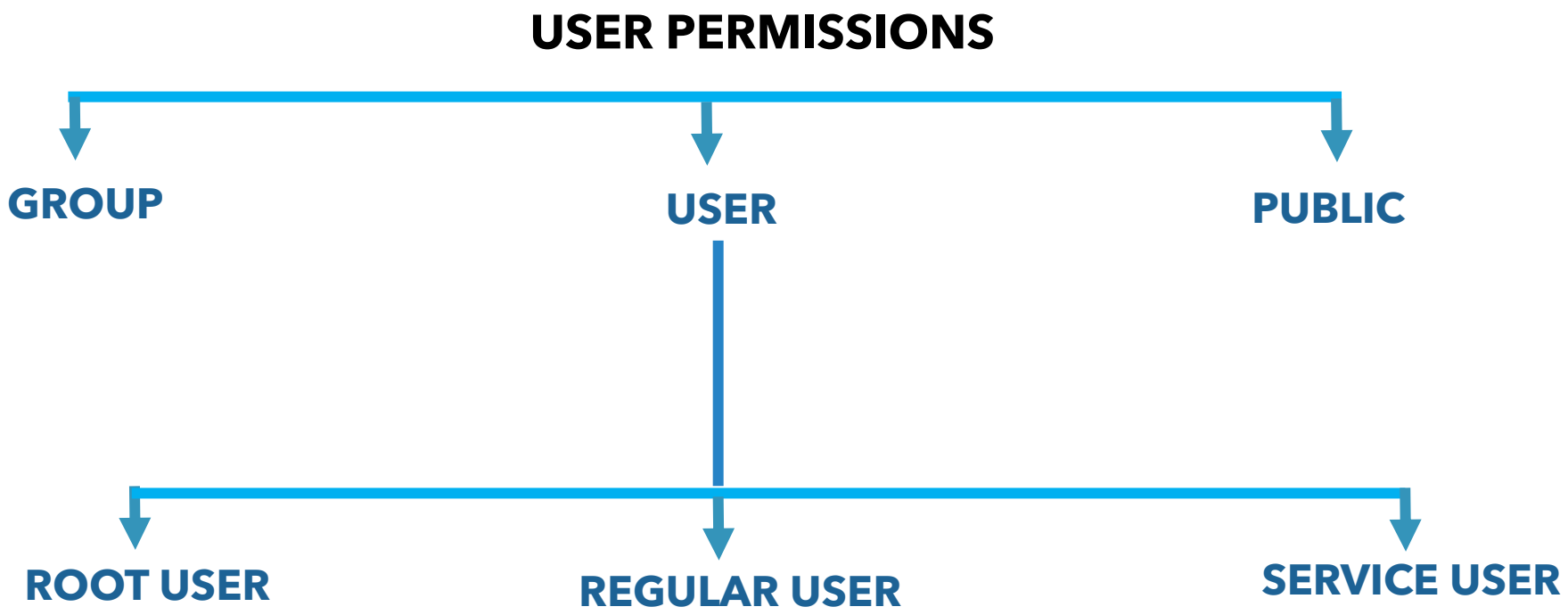
1. Security features in Linux operating system.
2. Provide a stable,portable,reliable,safe and well-behaved environment
3. Share resources among users,fairly,efficiently and safety
4. Manage memory,processor and file.

1. SECURITY FEATURES IN LINUX OPERATING SYSTEM



USER PERMISSION AND PRIVILLEGE MANAGEMENT

- Three types of users are defined.
- User accounts are further categorized into three types.



FILE SYSTEM SECURITY

- Commands such as '**chown**' and '**chmod**' used to modify the privileges for files or directories.
- Two methods of changing privileges.

1. Absolute method
2. Symbolic method

Absolute method

- Octal values are given to specify the privileges.

```
0 indicates no permission.
1 indicates execute permission.
2 indicates write permission.
4 indicates read permission.
Chmod 774 file.txt
```

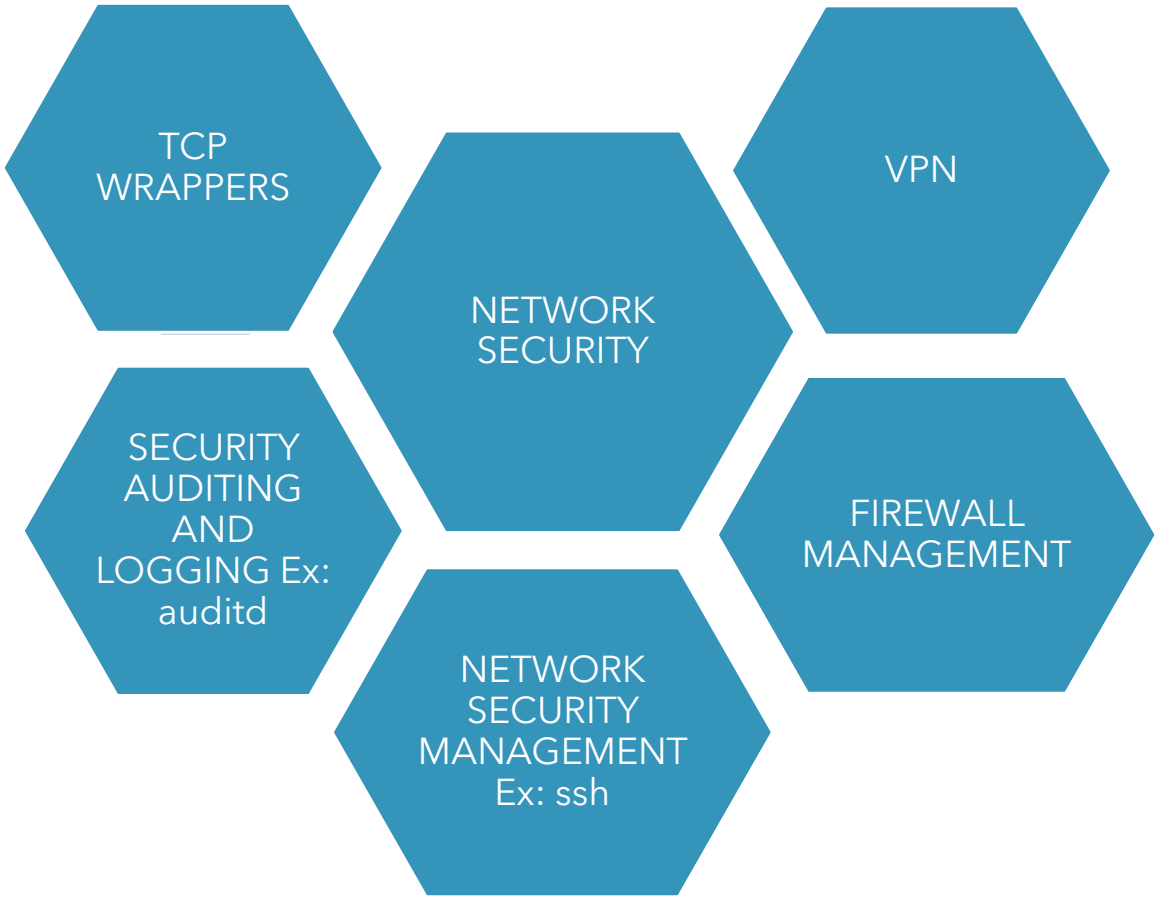
Symbolic method

- Privileges are specified by using characters r,w,e

```
chmod a+rw file.txt
```

read,write and execution permissions are given to file.txt

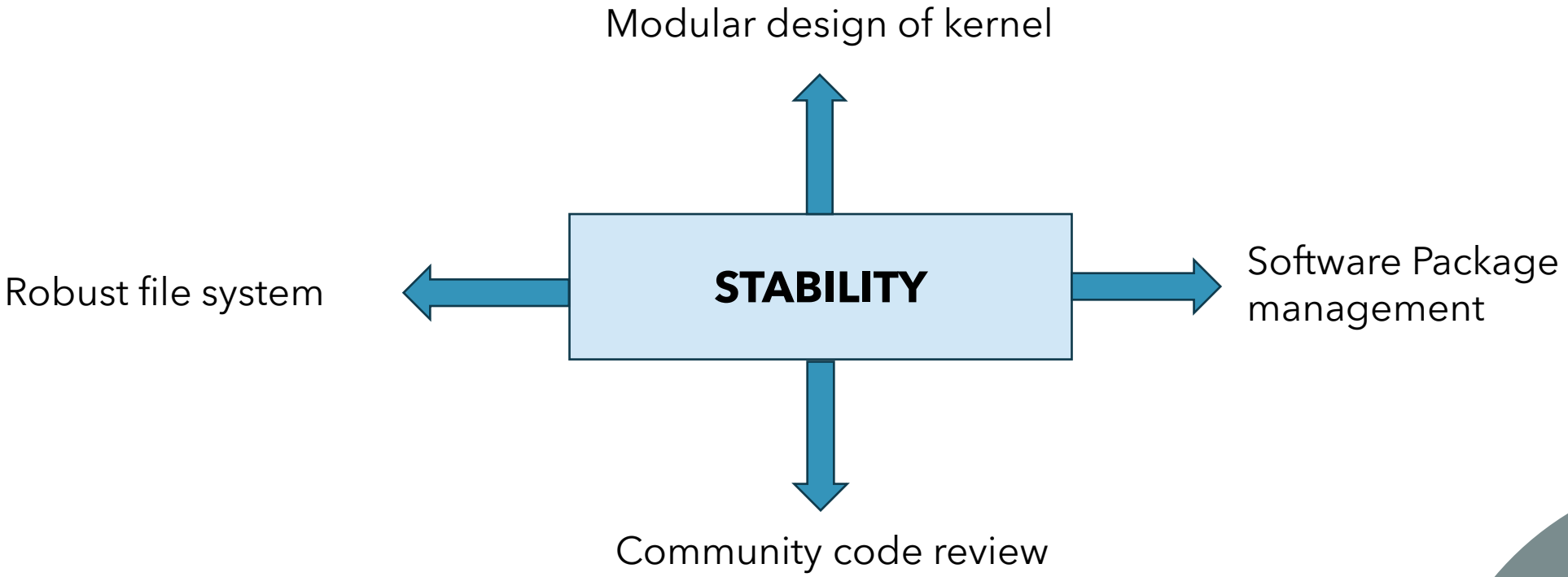
NETWORK SECURITY



2. PROVIDE A STABEL, PORTABLE, RELIABLE, SAFE, WELL-BEHAVED ENVIRONMENT

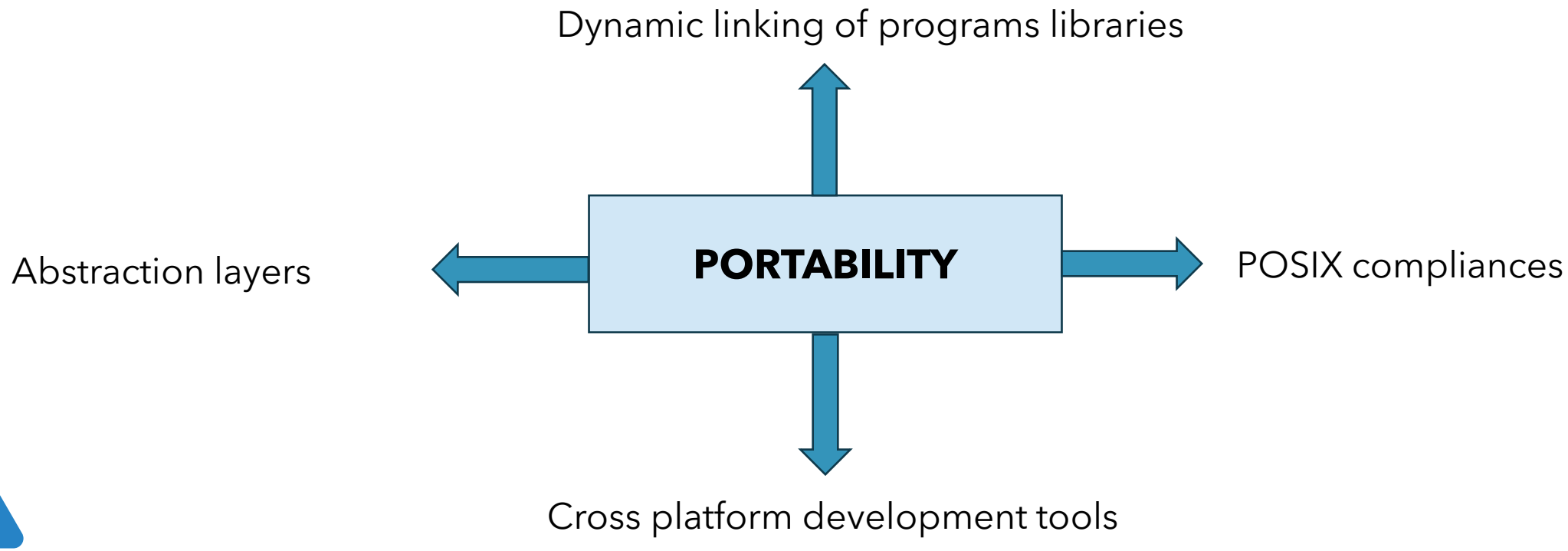
STABILITY

- Achieved by both kernel and software stability
- Software package management supports stability by reducing conflicts which leads to system unreliability.



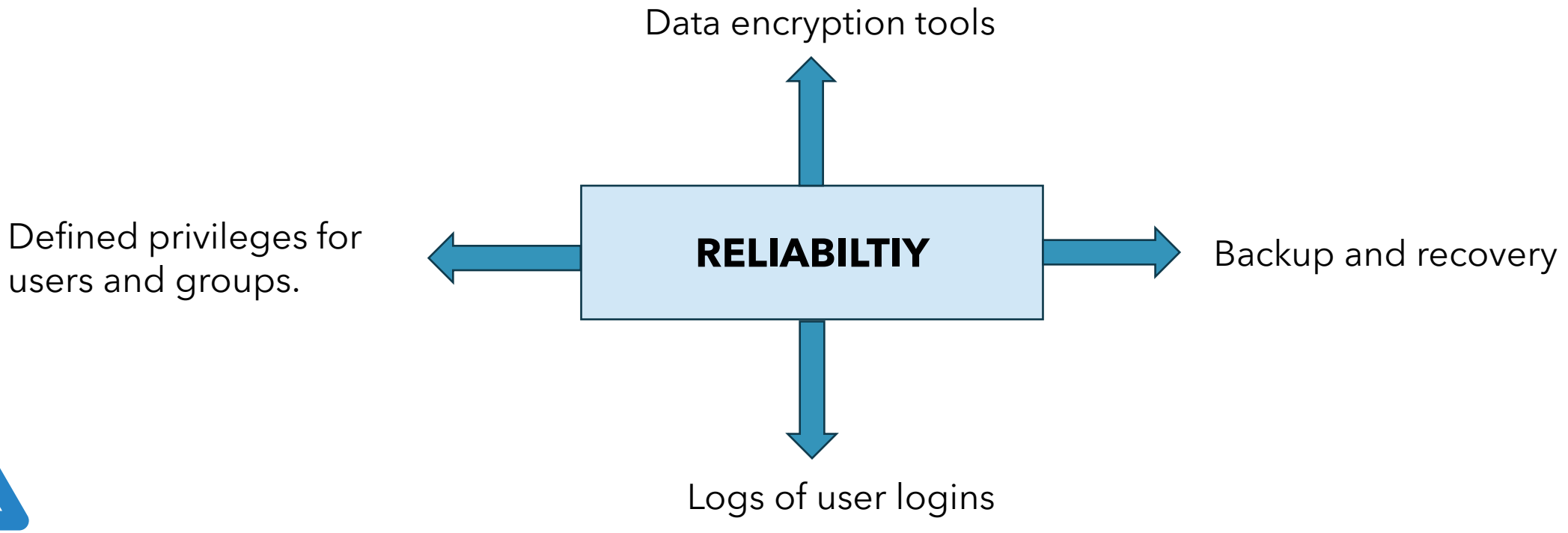
PORTABILITY

- Linux operates on various devices such as servers, personal computers, mobile devices and embedded system due to portability.
- For instance, system libraries in Linux can operates on other devices



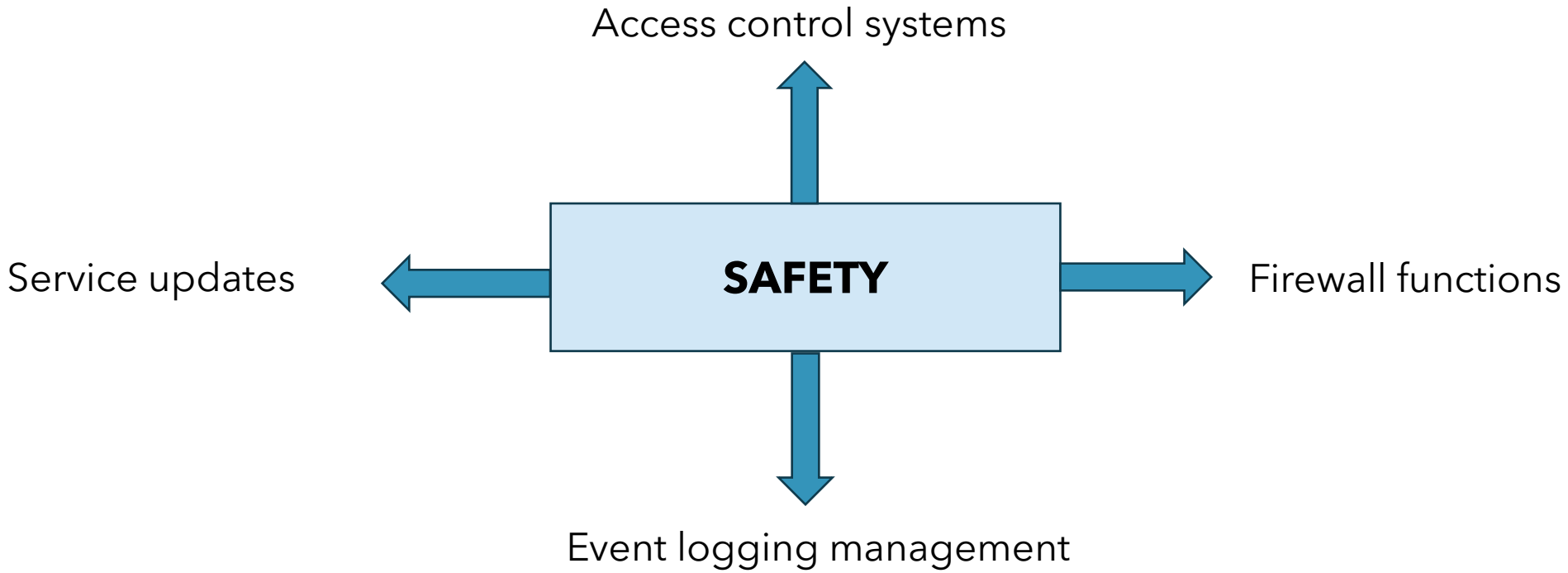
RELIABILITY

- Open source development of Linux offers more reliability than other operating systems.
- Following are the techniques used linux operating system to ensure reliability.



SAFETY

- Various tools and techniques in Linux operating system to ensure safety of the devices.



3. SHARE RESOURCES AMONG USERS FAIRLY, EFFICIENTLY AND SAFELY

USER AND GROUP MANAGEMENT

SHARING RESOURCES

SAFETY

USER AND GROUP MANAGEMENT

- Users are grouped in Linux, each assigned defined permissions, facilitating efficient user management.
- Administrators possess the ability to enforce access controls and allocate resources based on user groups.
- Fine-grained control is provided, allowing administrators to set constraints on various resources such as CPU time, file size, and memory usage for specific users or groups.

SHARING RESOURCES

Various methods and techniques used to ensure proper management of computer resources

Following are the some of the techniques.

MANAGING DISK I/O REQUESTS

- Algorithm called CFQ used to manage disk I/O
- CFQ – Complete fair queuing.

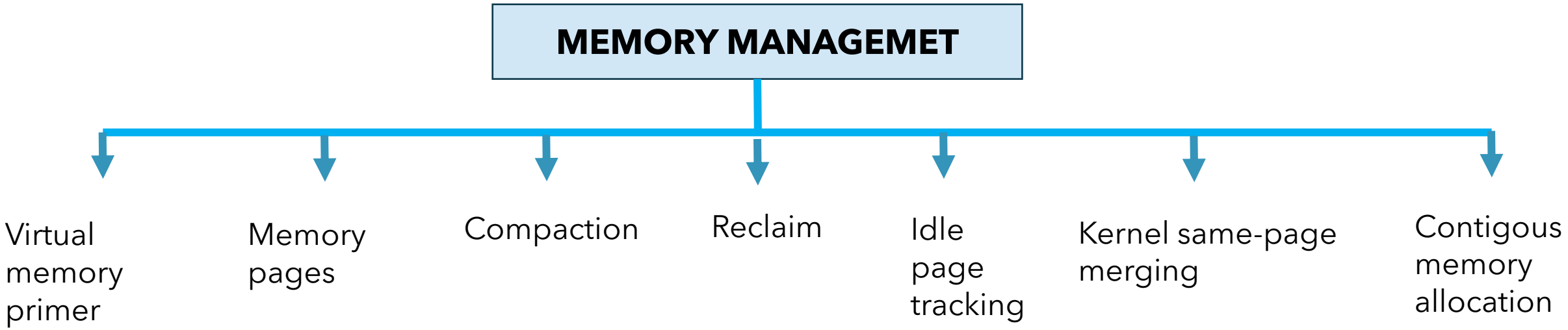
CPU SHEDULING

- Algorithm called CFs used to manage CPU scheduling.
- CFS – Complete fair scheduling.

SAFETY

- User permissions form a fundamental part of Linux security, controlling access to resources based on user roles.
- SELinux and AppArmor add an additional layer of security by enforcing access policies, preventing unauthorized actions and breaches.

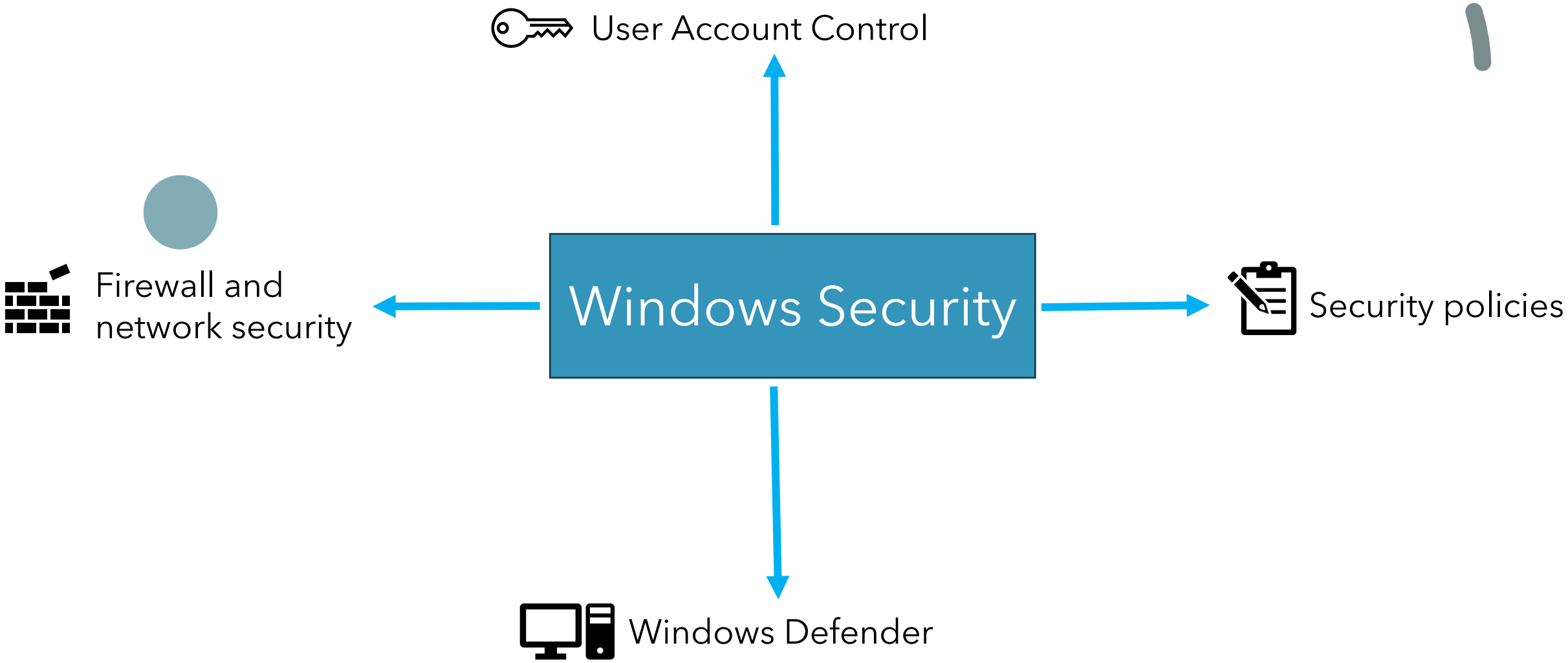
4. MANAGE MEMORY, PROCESSOR ANF FILE IN LINUX OPERATING SYSTEM



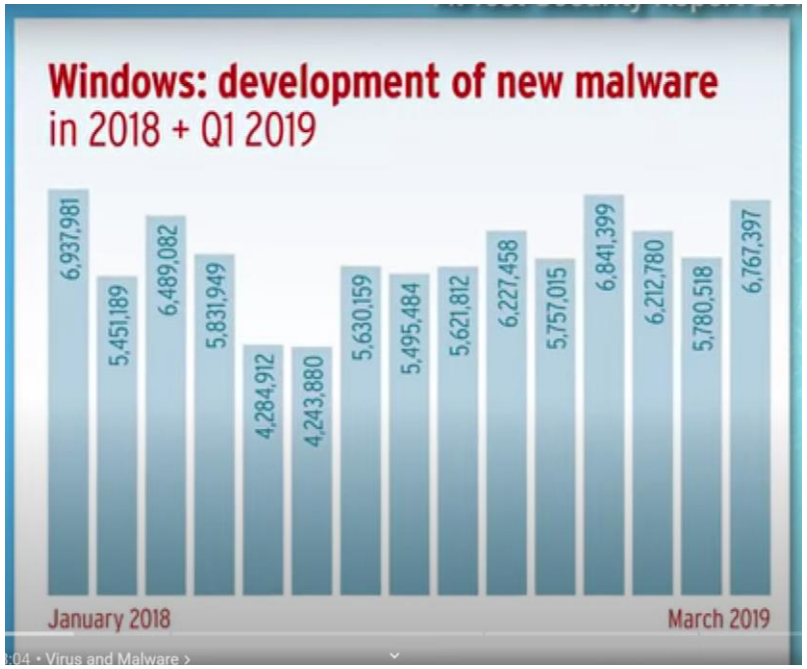
SECTION 2- Windows operating system

1. Level of security windows provides.
2. Manage memory, processor, file.
3. Support many devices simultaneously.
4. Hide implementation details.

1. Level of security windows provides.

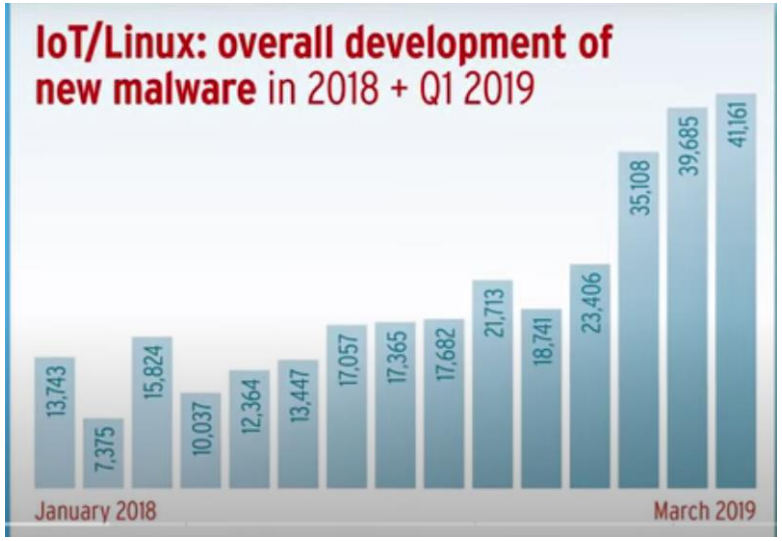


Is windows the least secure operating system?

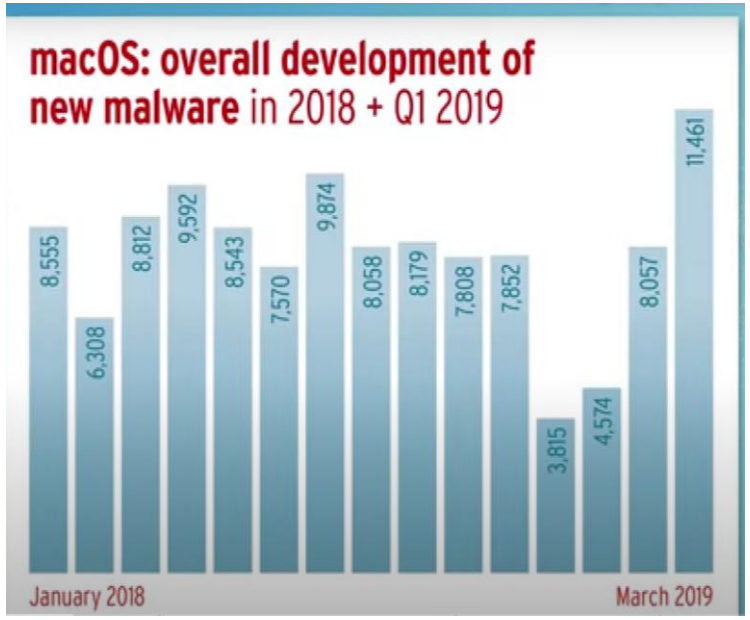


4Million to 7 Million

Malware detected in a month

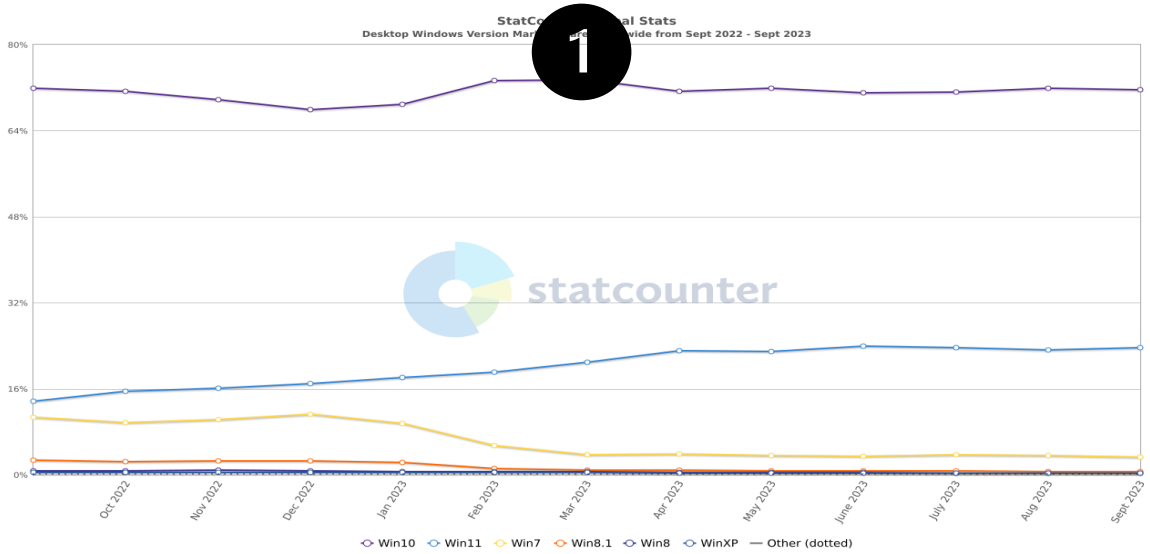


10 thousand to 40 thousand



3 thousand to 11 thousand

Reason



According to this data windows OS various version usage till 2023 sept

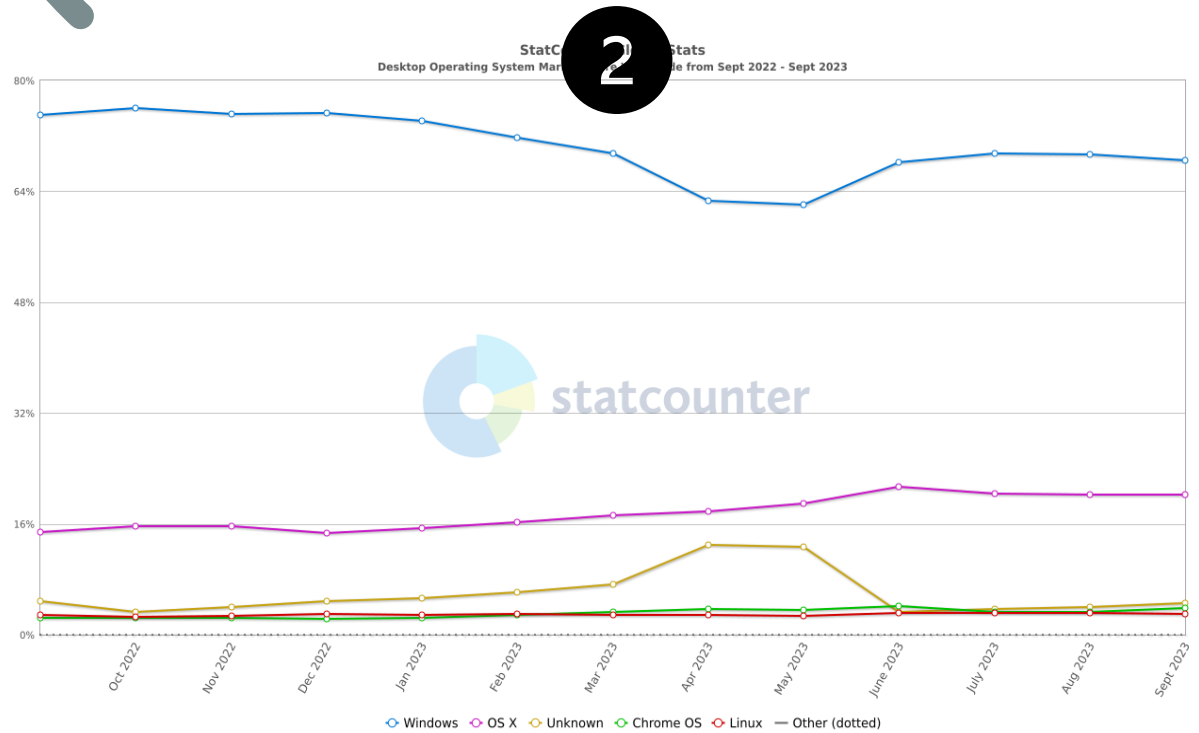
- Windows 10 – 70%
- Windows 11- 19%
- Windows xp- 0.5%
- Windows 7 – 10%

According to this data Operating system market share details.

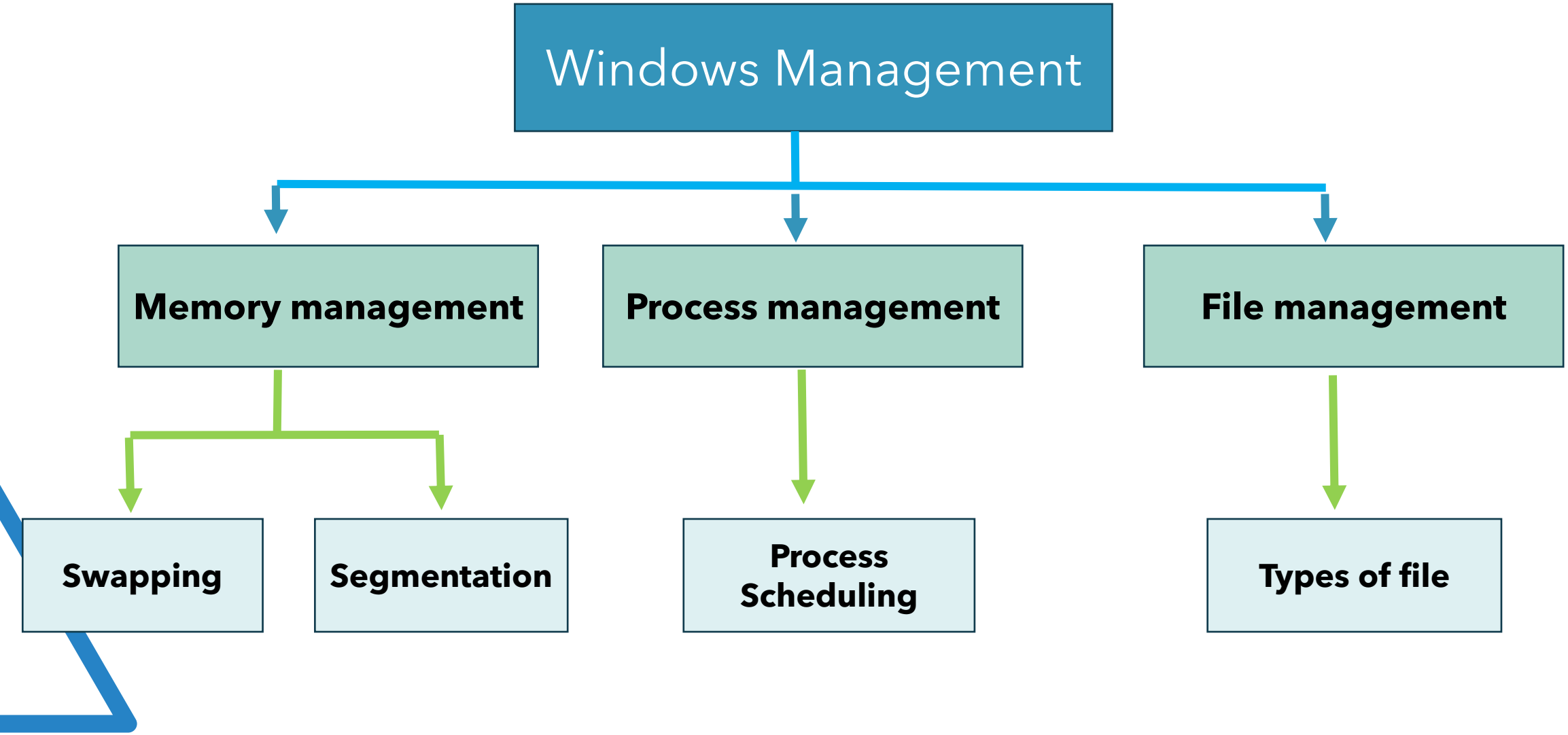
Windows – 76%

MacOS- 19%

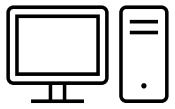
Linux-1.6%



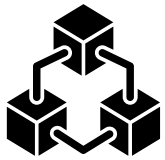
2. Manage memory, process, and files.



3. Support many devices simultaneously.

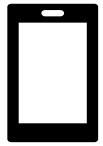


Personal computers-windows 10/11



Servers-windows server 2019

Input Devices-windows vista/XP/7/10/11

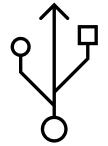


Mobile devices-windows mobile

Printers and scanners-windows 8.1/7/10

Devices and versions

Advantages



Universal plug and play-UPnP

Unified user experience

Cross platform compatibility

Enhanced productivity

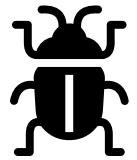
4. Hide the implementation details

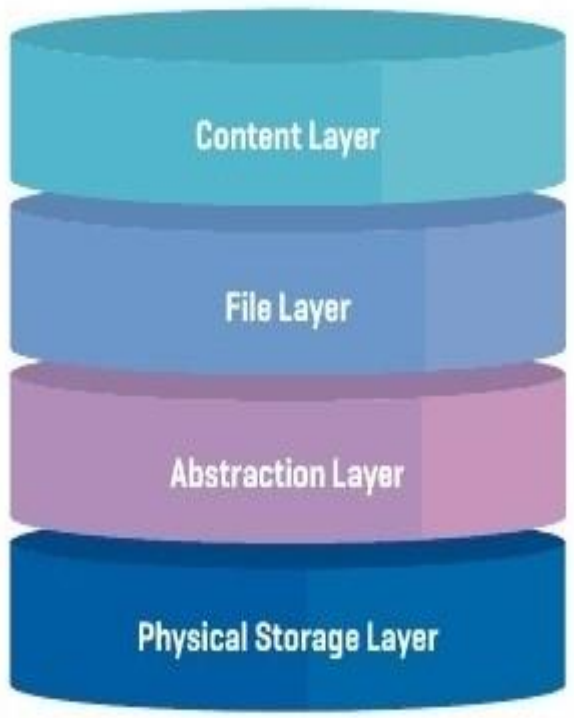
Why?

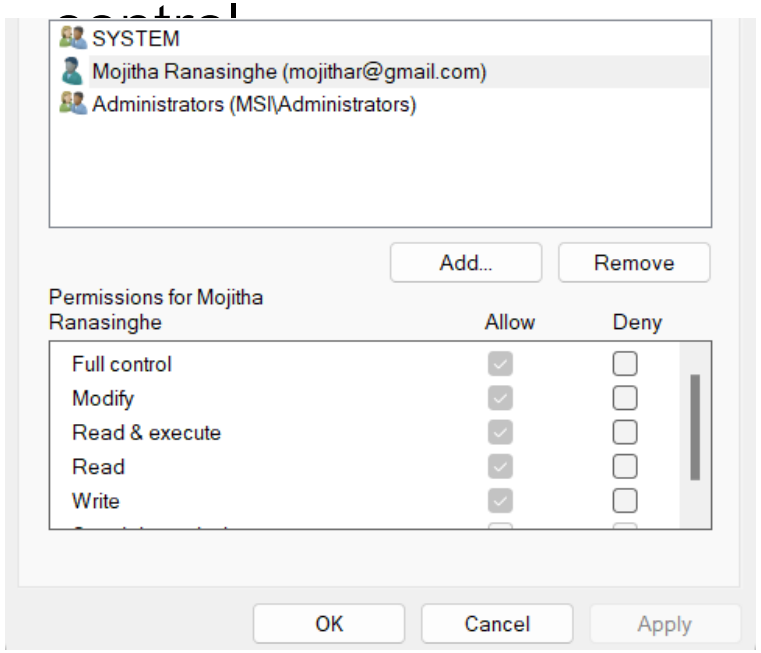
- Prevent unauthorized access and attacks.
- Keep user experience and stability.

How?

- Use abstract layer.
- Give user's to privileges and access control



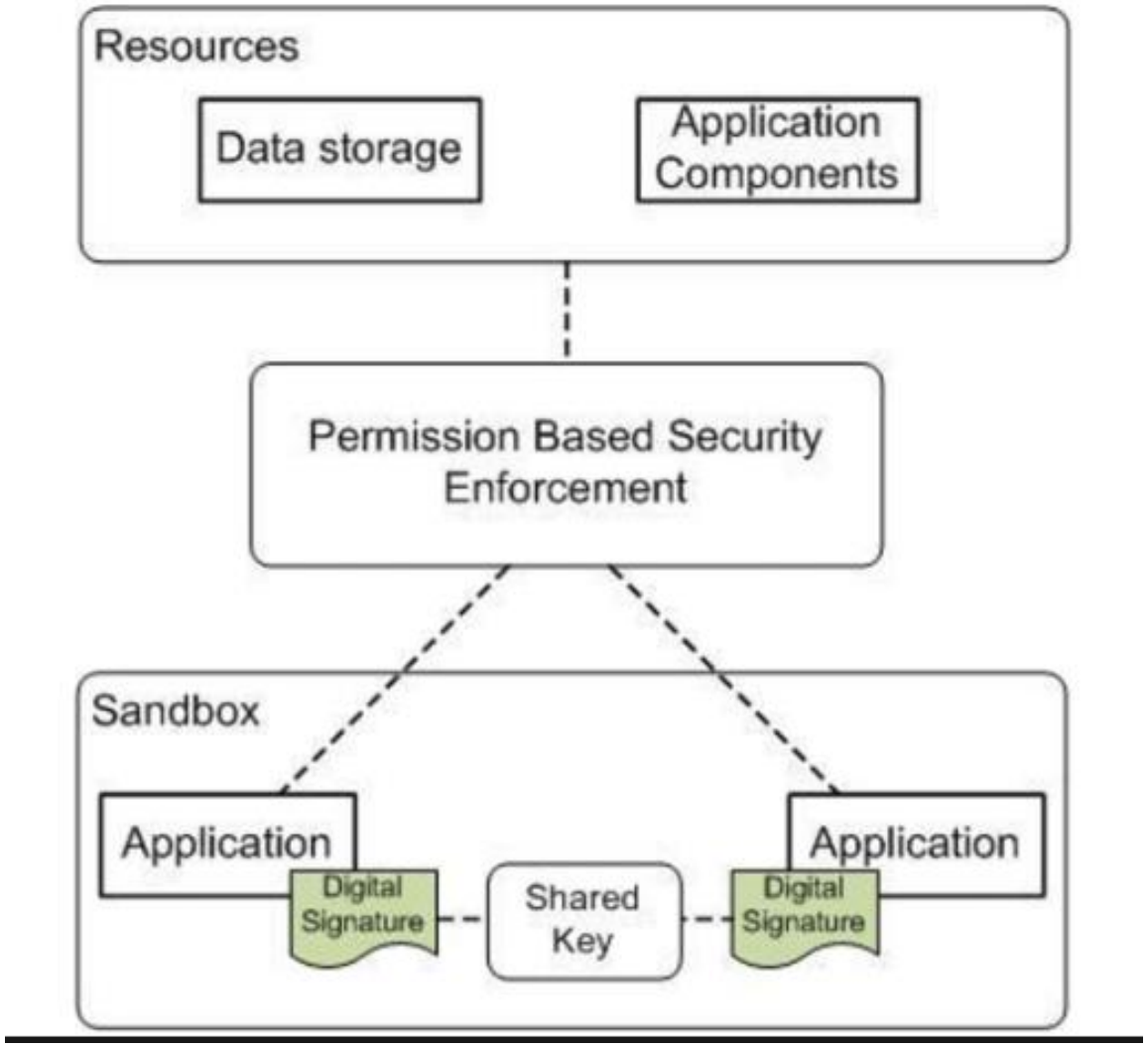




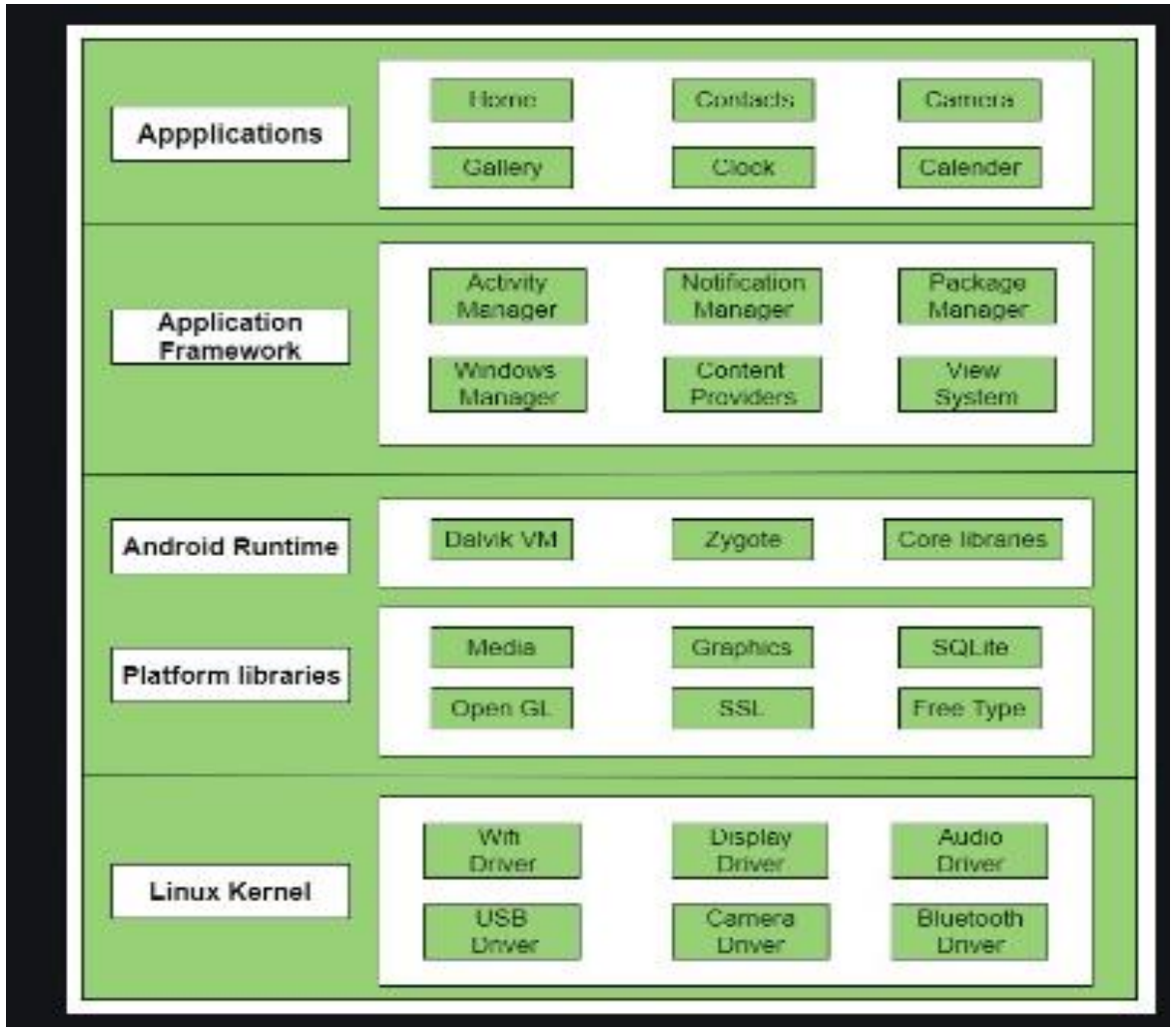
SECTION 4- Android mobile operating system

1.The level of security it provides.
2. Hide the implementation details.
3. Manage memory, processor, file etc
4. Resolve conflict in resource demand.

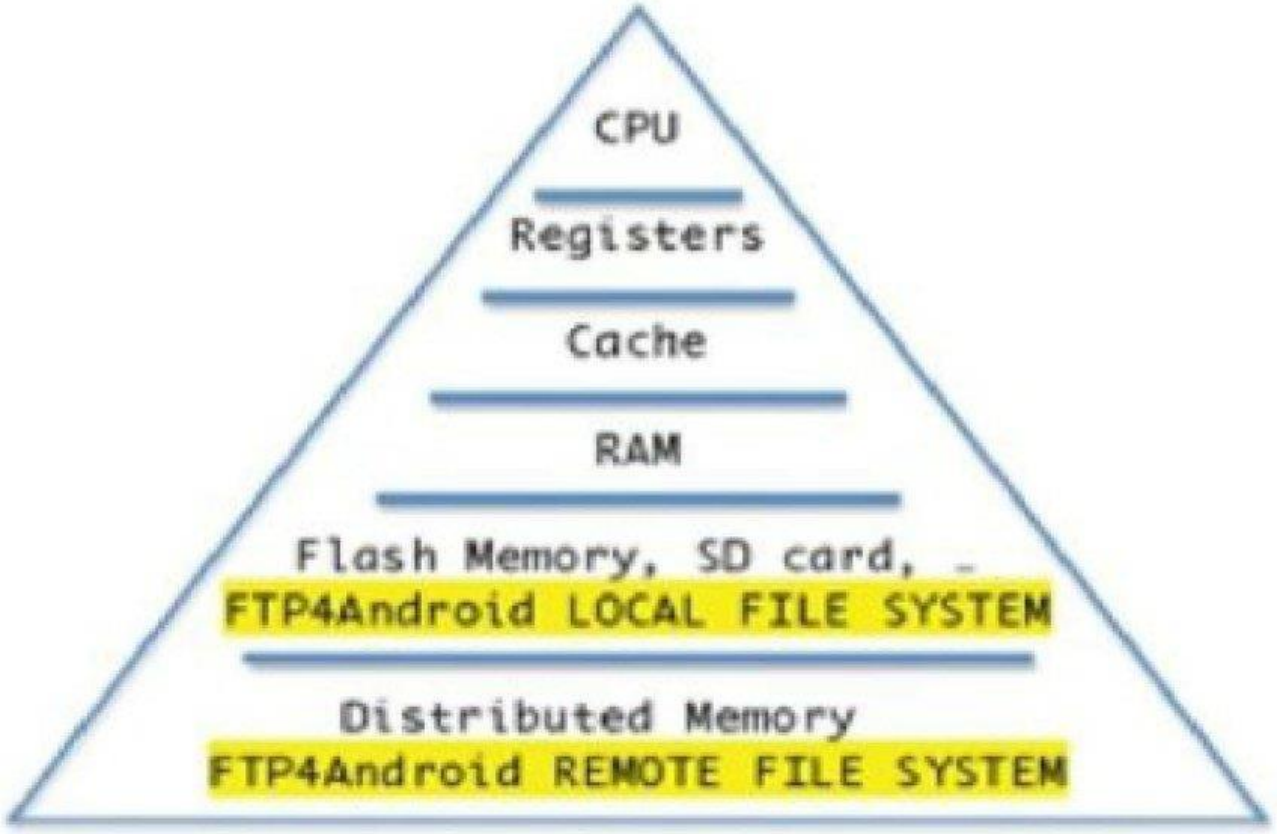
1. The level of security it provides



2.Hide the implementation details.



3.Manage memory, processor, file etc.



4.Resolve conflict in resource demand.

SECTION 3- MAC operating system

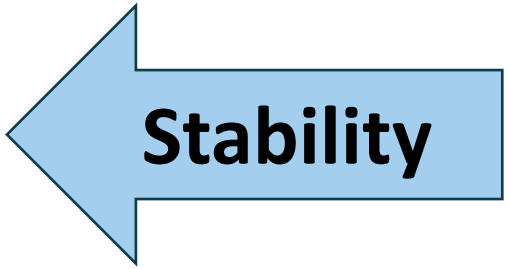
1. Support many devices simultaneously.
2. Provide a stable, portable, reliable, safe, and well-behaved environment.
3. Management of memory, and process.
4. The level of the security macOS provides.

Support many devices simultaneously

- The iPhone can wirelessly connect to a Mac as a web camera.
- All photos and files can be accessed from any device.
- The user can copy a file on one device and paste it on another device.
- Allows a Mac keyboard and trackpad/mouse to operate a nearby iPad.
- If we receive a call on our iPhone, we can answer the call from our Mac.
- The computer can be unlocked using the Apple Watch.

Provide a stable, portable, reliable, safe, and well-behaved environment

- Software update
- System monitoring



- Install anti-virus and anti-malware
  - Gatekeeper
  - XProtect
  - FileVault

Portability

Cloud services like iCloud, Dropbox, or Google Drive

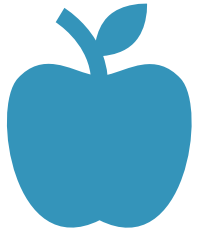
Airdrop allows us to share files

Siri allows us to perform tasks hands-free using their voice

Reliability

Choose reliable hardware and peripherals

Test and troubleshoot hardware components



Apple ID use to access all Apple services

Well behaved environment

- clean up function
- Spotlight Search
- The Dock
- Focus Mode
- Split View

The level of the security macOS provides

THE APPLE M1 CHIP

THE FIND MY APP

ACTIVATION LOCK

Conclusion

ANY QUESTIONS?