



Bahirdar institute of technology

Department of software engineering

Operating system and system programming

Individual assignment

Name Bezwit Ayal

Id no 1601082

Section A

Submitted to Mr. Wendmu
Submission date 03/09/2017

Content table

Tizen OS -----	3
Introduction -----	3
History -----	3
objective of Tizen OS -----	4
Software and hardware requirements of Tizen OS -----	6
Installation process of Tizen OS-----	8
. Installation process -----	8
. Installation problems -----	12
. Advantages and disadvantages of Tizen os -----	15
. Conclusion-----	19
Recommendation-----	20
Virtualization of Tizen OS in modern operating system -----	21



Introduction

Tizen is an open source Linux based operating system. It is primarily developed by Samsung electronics and supported by Linux Foundation. A device powered by Tizen can provide seamless connectivity to Tizen developers and device users among various device types.

- Tizen is designed for diverse devices and is getting smarter and more connected.
- It supports both headed and headless products.
- It improves security measures that protect user information and reduce risks like loading untrusted software.
- It allows developers to create customised apps that use a wide range of device features.
- It is based on the Linux kernel and is designed to provide smooth and efficient user experiences.
- It is designed to power a wide variety of devices, from smartphones and tablets to smart TVs and wearables, as well as Internet of Things (IoT).
- It's developed by the Tizen Association, which includes major players like Samsung and Intel.
- The goal of Tizen is to create a versatile and adaptable platform that caters to the needs of both manufacturers and developers.
- At its core, Tizen aims to unify the experience across different types of devices, making it easier for users to navigate and enjoy their technology.
- It focuses on simplicity and user-friendliness.
- Tizen strives to provide a seamless experience, no matter what device you're using.

History of Tizen

The journey of Tizen OS began in 2005 when Nokia developed a platform based on Debian GNU/Linux, which included the Maemo operating system and its accompanying Software Development Kit (SDK). In February 2010, Nokia and Intel Corporation announced a significant collaboration, merging the Maemo platform with Intel's Moblin, a "mobile Linux" initiative. This partnership resulted in the creation of MeeGo.

However, in February 2011, Nokia shifted its focus by partnering with Microsoft to establish a global mobile ecosystem, opting to use the Windows Operating System for its devices. This decision left Intel without a major mobile hardware partner, ultimately leading to the

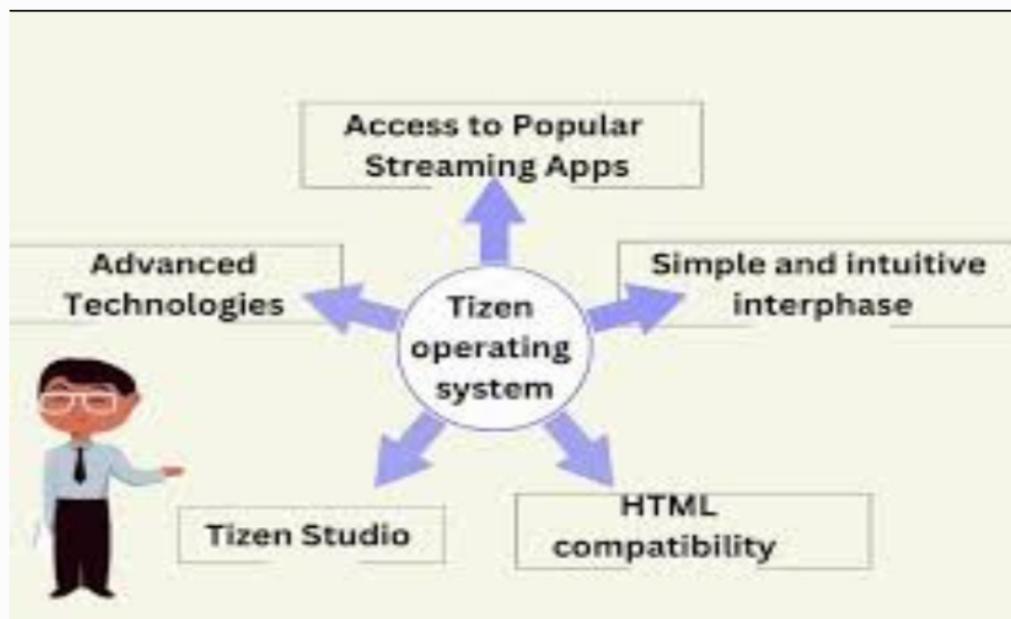
abandonment of MeeGo in favor of a new project: Tizen.

On February 25, 2013, Samsung made a pivotal announcement regarding its mobile strategy. The company decided to retire its Bada operating system (with "bada" meaning "ocean" in Korean) and merge its features and functionalities into Tizen.

Today, Tizen is hosted by the Linux Foundation, with its development being fully open and guided by a technical team comprised of experts from both Intel and Samsung. This collaborative effort aims to create a versatile and adaptable platform that serves a wide range of devices, from smartphones to IoT

Objective of Tizen OS

Tizen provides an application framework based on JavaScript. JavaScript is strong especially in IoT devices, since it has enormous developer community support and a fast development cycle.



- 1. Cross-Device Compatibility:** To enable a seamless user experience across various device categories by providing a unified platform that allows applications to run on multiple devices without extensive modification.
- 2. Developer Empowerment:** To facilitate application development through support for multiple programming languages and frameworks, particularly emphasizing web technologies like HTML5, thereby encouraging innovation and creativity in app design.
- 3. Modularity and Flexibility:** To offer a modular architecture that allows manufacturers to customize the operating system according to their specific requirements and use cases, enhancing adaptability in different markets.

- 4. Enhanced User Experience:** To deliver an intuitive and responsive user interface that meets the needs of diverse users while ensuring accessibility and ease of use.
- 5. Robust Security:** To prioritize security through features such as sandboxing, secure boot, and regular updates, ensuring the protection of user data and maintaining trust in the platform.
- 6. Ecosystem Growth:** To foster a vibrant ecosystem of applications and services that enrich the user experience, encouraging developers to create and distribute innovative solutions through the Tizen Store.
- 7. Support for Emerging Technologies:** To adapt to the evolving landscape of technology by integrating support for new standards and innovations in areas such as IoT, artificial intelligence, and connectivity.

8. Software Updates

For home appliance products, Tizen RT supports the proprietary software update mechanism developed by Samsung. As Tizen RT becomes an open source project, non-Samsung devices running Tizen RT require the software update service as well. To support non-Samsung devices, Tizen RT plans to support OMA lightweight M2M (LWM2M)-based FOTA in 2017. ARTIK Cloud already supports LWM2M.

9. Fault Tolerance

IoT platforms face a challenge in the large-scale device management of deployed IoT devices. System reliability has become a key success factor for IoT platforms. If a critical bug in device drivers or other system components occurs, the whole system inevitably crashes in the case of a traditional monolithic kernel. A clear solution is needed to overcome this challenge; however, typical Tizen RT target devices have only an MPU (memory protection unit). Without an MMU (memory management unit), protecting the system from faults is much more difficult. To provide MPU-based fault isolation, Tizen RT pursues 4 approaches:

- Per-thread memory protection
- Microkernel architecture
- Self-healing
- Live update

Assuming the completion of all these features, Tizen RT can be safely protected from any kind of faults. For example, even though a network component encounters a critical error,

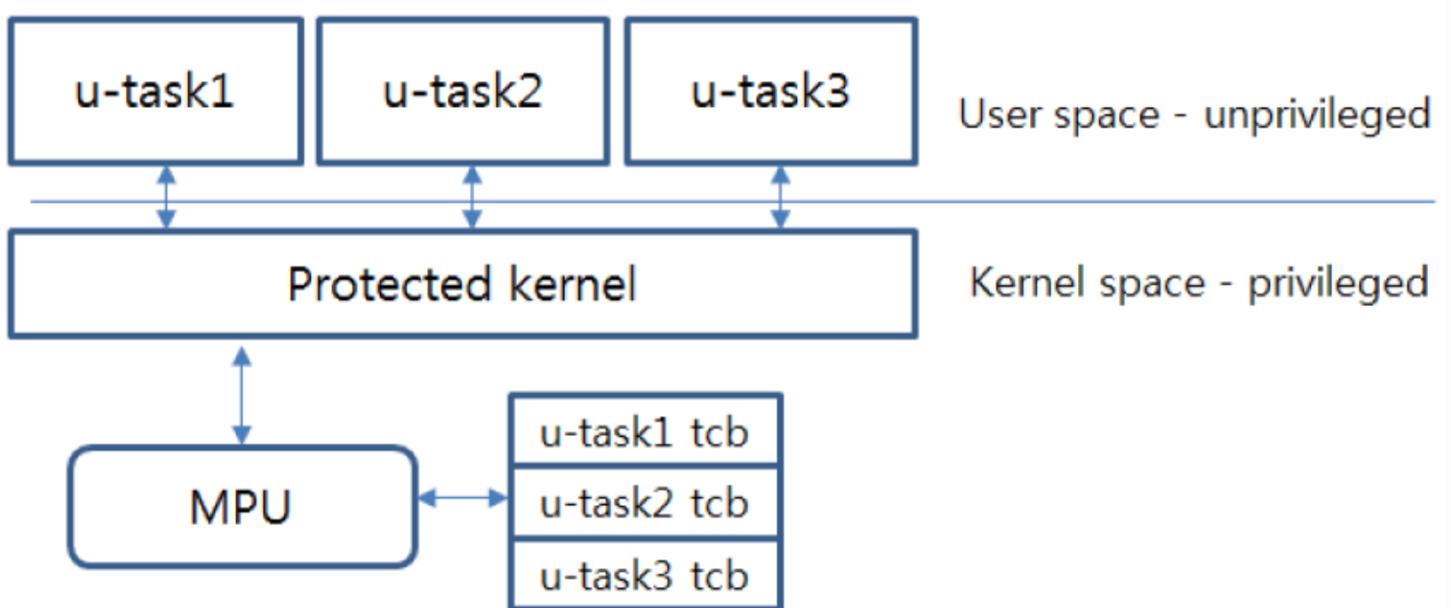
this fault can be identified by memory protection and isolated by the microkernel architecture. The network component can be restarted by self-healing without any effect on the entire system. If that component is not self-healed eventually, it can be updated by live update through software updating.

10. Memory Protection

Tizen RT supports not only flat build, but also memory-protected build. The former can help to reduce the memory usage at the expense of memory vulnerability. The latter can be achieved at the cost of about 20~30% increase of memory usage. Which mode is more suitable for low-end IoT devices depends on the trade-off analysis, considering software requirements and hardware limitations.

User/kernel space separation has already been achieved. The entire memory map is divided into user and kernel spaces. The kernel space is exclusively accessed by the kernel only. Any user tasks which illegally attempt to access this memory region raise an exception. In this mode, the kernel executes with privileged permissions while user threads execute with unprivileged, restricted permissions, as shown in the following figure. Per-thread memory protection is expected to be implemented in the first half of 2017.

Figure: User and kernel separation



The user thread is executed in the unprivileged mode with restricted permissions. When multiple threads are running, the scheduler preempts the currently-running task and brings the new ready-to-run thread for execution. The stack/data region of thread A is protected from being written by thread B even after thread A is preempted by thread B. This per-thread protection can be realized by the MPU which stores and restores the MPU context of every thread at every context switch.

Software and hardware requirements of Tizen OS

The software and hardware requirements for Tizen OS can vary based on the specific version of Tizen and the type of device it is intended for (e.g., smartphones, smart TVs, wearables, IoT devices). Below are general guidelines for both software and hardware requirements:

Software Requirements

1. Development Environment:

- **Tizen Studio:** The official IDE for Tizen application development, which includes tools for building, debugging, and testing applications.
- **Web Development Tools:** Support for web technologies like HTML5, CSS, and JavaScript.
- **Native Development Tools:** C/C++ development tools for native applications.

2. Supported APIs:

- Tizen provides various APIs for accessing device features, including multimedia, sensors, networking, and more. Developers need to be familiar with these APIs based on the type of application they are building.

3. Frameworks:

- Support for various frameworks such as .NET, W3C APIs, and others depending on the target application type.

Hardware Requirements

1. Processor:

- ARM-based processors (e.g., Cortex-A series) are commonly used in Tizen devices.
- x86 architecture is also supported in some cases, particularly for smart TVs and other devices.

2. Memory:

- Minimum RAM: Typically 512 MB or higher, depending on the device type.
- Recommended RAM: 1 GB or more for better performance, especially for smartphones and complex applications.

3. Storage:

- Minimum storage: At least 1 GB of internal storage is recommended for basic functionality.
- Additional storage may be required for applications, media files, and system updates.

4. Display:

- Support for various display resolutions depending on the device category (e.g., HD for TVs, standard resolutions for wearables).

5. Connectivity:

- Support for Wi-Fi, Bluetooth, and possibly cellular connectivity (for smartphones).
- Ethernet support may be required for certain devices.

6. Sensors and Interfaces (depending on the device):

- Touchscreen capabilities for smartphones and wearables.
- Various sensors such as accelerometers, gyroscopes, heart rate monitors (for wearables), etc.

7. Graphics:

- GPU support may be required for rendering graphics-intensive applications, especially in smart TVs and gaming devices.

Note

The specific requirements can vary significantly based on the intended use case of the Tizen OS device. Therefore, it's essential to refer to the official Tizen documentation for the particular version and device category you are interested in to obtain precise specifications.

Installation process of Tizen OS

Installation process

The installation process for Tizen OS primarily involves installing Tizen Studio, the dedicated development environment, and then installing the necessary tools and SDKs within it. You can also install Tizen SDK through Visual Studio. For Samsung TVs, you may

need to install third-party apps using USB or by enabling developer mode and allowing installation from unknown sources.

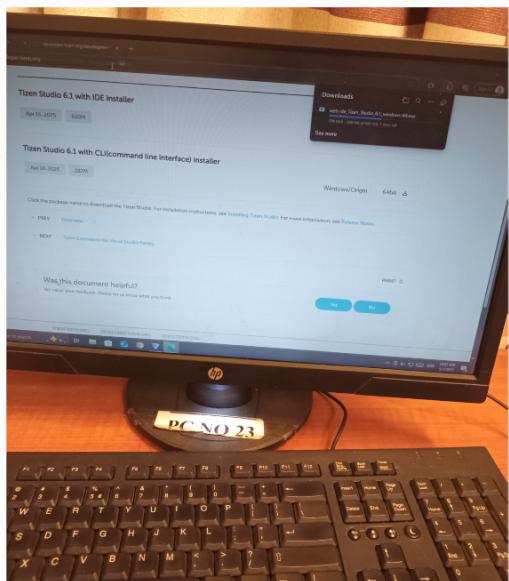
The installer has been renewed to provide a better user experience and show the unique Tizen philosophy. Using the new installer, you can now install the basic platform and the useful tools with a few clicks.

You can use either the GUI or the CLI version of the installer.

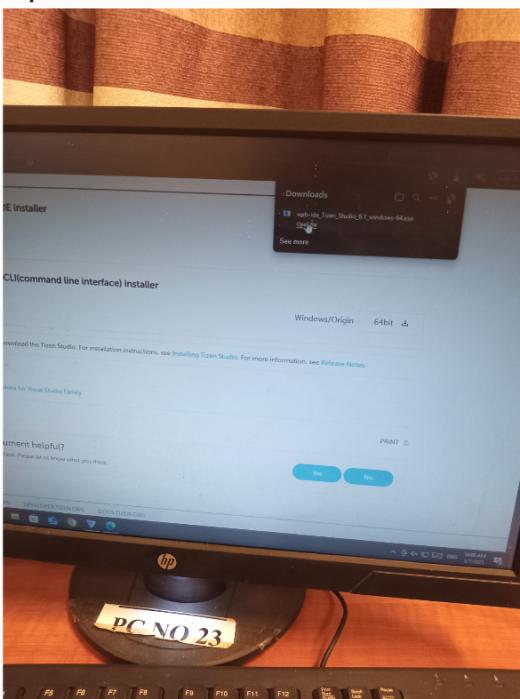
Using the GUI Installer

To install Tizen Studio:

- Search Tizen Studio installer
- Down load 64 bit
- Wait for file downloading ends

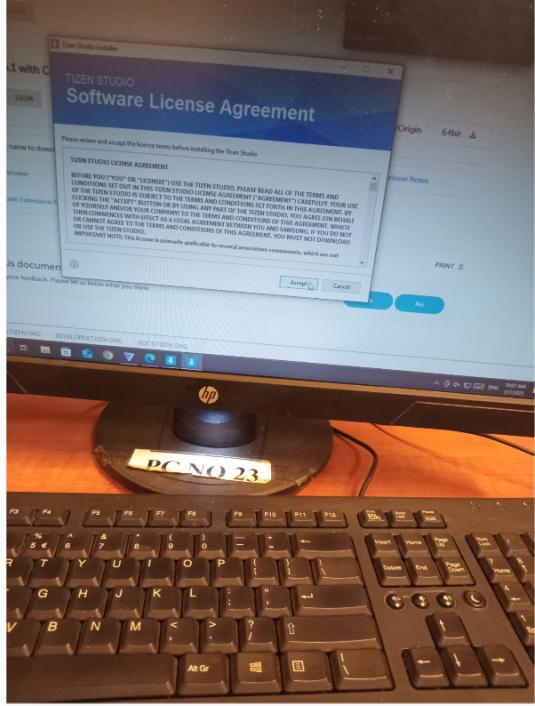


- Open the file

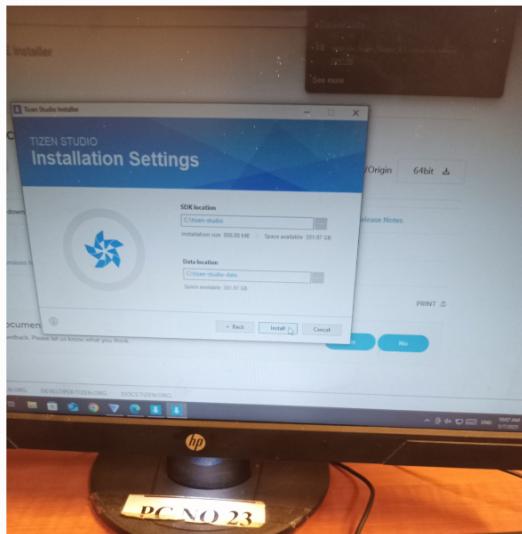


- Accept the software license.

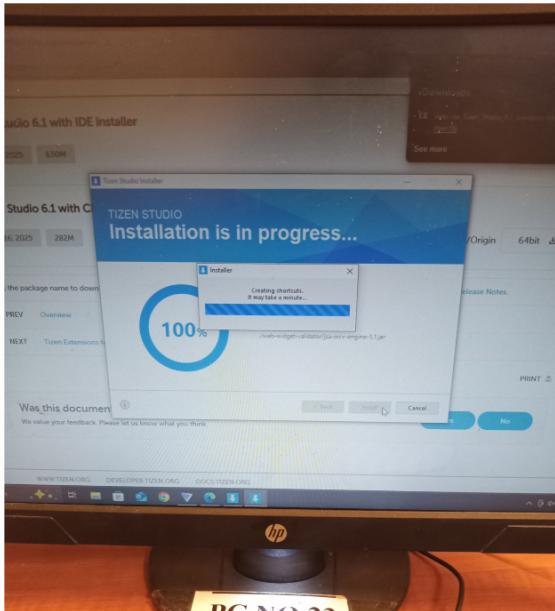
- The license contains important legal notices for using Tizen Studio. Read it fully, and click **Accept** only if you agree with the license statement



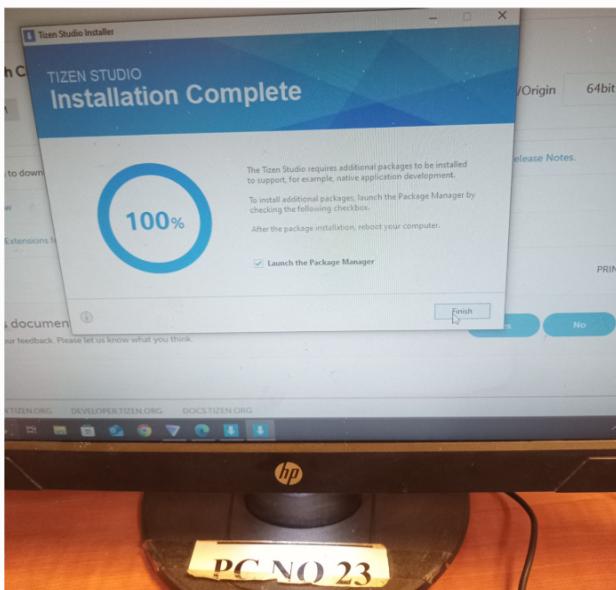
- And then click Install



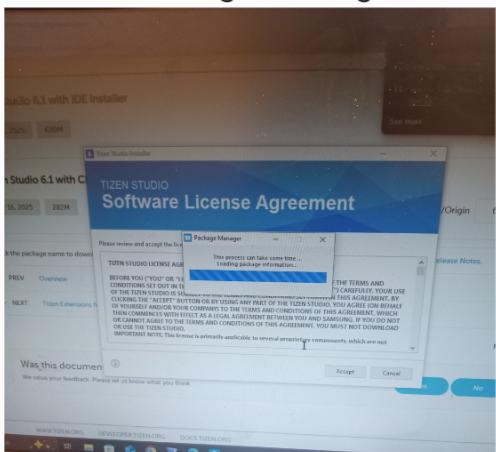
- Wait until installation is done



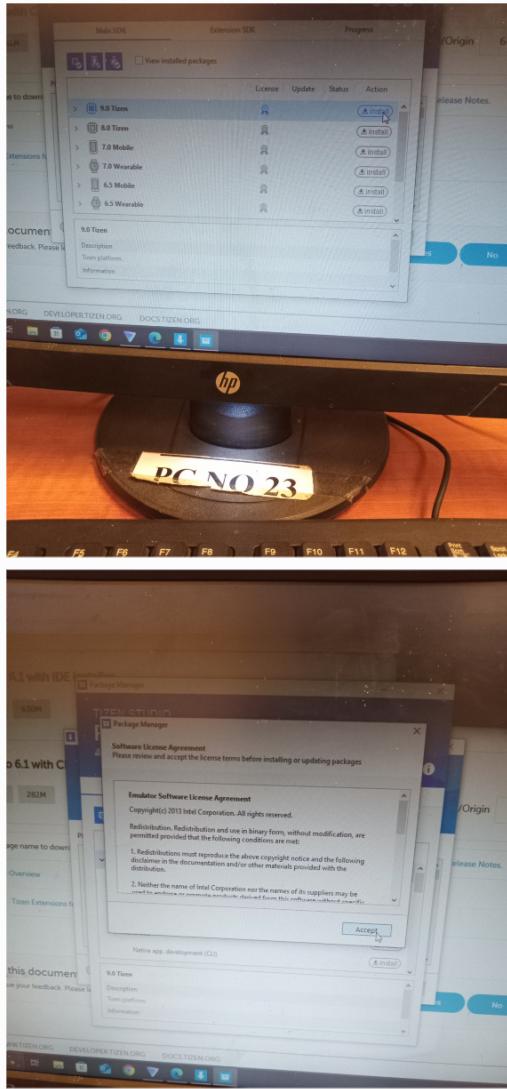
- Click **Finish** and close the installer:



- Package Manager is launched automatically



- Click **Install** on latest version (9.0) and accept the Package Manager license agreement



- Wait for your installation is finished

The problem

Internet connection limitation

waiting until installation process ends

It takes more time

Supported file system

1. ext4 (Fourth Extended File System)

- **Overview:** ext4 is a journaling file system that is widely used in Linux-based operating systems, including Tizen. It is an evolution of the earlier ext3 file system, providing improvements in performance, reliability, and scalability.

- **Features:**

- **Journaling:** This feature helps protect data integrity by keeping a log of changes that will be made. In case of a crash or power failure, the system can recover more gracefully.
- **Support for Large Files:** ext4 supports files larger than 2 TB and volumes up to 1 EB (exabyte), making it suitable for modern applications with large data requirements.
- **Performance Improvements:** It includes features like delayed allocation and multiblock allocation, which enhance performance, especially with large files.
- **Backward Compatibility:** ext4 is backward compatible with ext3 and ext2, allowing for easier upgrades.

Why it supports??

Performance and Reliability: ext4 is a journaling file system, which means it provides better data integrity and recovery options. This is crucial for devices where reliability is paramount, such as smart TVs and home appliances. The performance enhancements over previous versions (like ext3) make it suitable for handling large applications and multimedia content.

- **Support for Large Files:** With the increasing size of media files (like 4K videos), ext4's ability to handle very large files makes it an ideal choice for modern applications that require substantial storage.
- **Scalability:** ext4 can support large volumes, which is essential for devices that may require extensive storage solutions without compromising performance.
- **Backward Compatibility:** By supporting ext3 and ext2, Tizen can easily upgrade existing systems without losing data or requiring complex migration processes.

2. FAT (File Allocation Table)

- **Overview:** FAT is one of the oldest file systems still in use today and is known for its simplicity and wide compatibility.
- **Features:**
 - **Compatibility:** FAT is supported by virtually all operating systems, making it ideal for removable media like USB flash drives and SD cards.
 - **Simplicity:** The structure of FAT is straightforward, which makes it easy to implement and manage.
 - **Limitations:** FAT32 (the most common version) has a maximum file size limit of 4 GB and

volume size limit of 8 TB.

Why it supports??

- **Simplicity and Compatibility:** FAT's straightforward design allows for easy implementation across a wide range of devices. Its compatibility with nearly all operating systems makes it an excellent choice for removable media such as USB drives and SD cards, which are often used in Tizen-powered devices.
- **Legacy Support:** Many older devices and systems still rely on FAT, so supporting this file system ensures that Tizen can interact with a broader array of hardware and software environments, facilitating easier data transfer and sharing.

3. exFAT (Extended File Allocation Table)

- **Overview:** exFAT is an extension of the FAT file system designed to address the limitations of FAT32, particularly for flash drives and SD cards used in modern devices.
- **Features:**
 - **Support for Large Files:** exFAT can handle files larger than 4 GB, making it suitable for high-definition video files and large applications.
 - **Optimized for Flash Memory:** It is designed specifically for flash storage, reducing wear and improving performance on such devices.
 - **Compatibility:** Like FAT, exFAT is widely supported across different operating systems, including Windows and macOS, making it a good choice for external storage.

Use Cases in Tizen

- **Smart TVs:** Tizen OS is commonly used in smart TVs where ext4 is often utilized for the internal storage due to its performance and reliability.
- **Wearables:** Devices like smartwatches may use FAT or exFAT for external storage options to ensure compatibility with other devices.
- **IoT Devices:** In IoT applications, the choice of file system may depend on the specific requirements of the device, including storage capacity and data access patterns.

Why it supports??

- **Handling Large Files:** exFAT addresses the limitations of FAT32 by supporting files larger than 4 GB. This is increasingly important in today's digital landscape, where high-definition video and large applications are common.

- **Optimized for Flash Storage:** Given that many Tizen devices use flash memory (e.g., smartphones, smart TVs, wearables), exFAT is designed to work efficiently with such storage types, enhancing performance and longevity.
- **Cross-Platform Compatibility:** Like FAT, exFAT is widely recognized across different operating systems, making it suitable for external storage scenarios where users may need to move files between Tizen devices and other platforms like Windows or macOS

The combination of these file systems in Tizen OS allows it to cater to a wide range of devices and applications. The choice between ext4, FAT, and exFAT typically depends on factors such as performance needs, storage capacity, and compatibility requirements with other devices.

The selection of these file systems reflects Tizen OS's focus on flexibility, performance, reliability, and compatibility across various device types. By incorporating ext4 for internal storage needs and FAT/exFAT for external storage solutions, Tizen can effectively meet the demands of modern applications while ensuring ease of use for consumers. This multi-faceted approach allows Tizen to serve a diverse ecosystem of devices—from smart TVs to wearables—while maintaining robust performance and user-friendly features.

advantage and disadvantage of Tizen OS

Advantages

Tizen OS offers several advantages that make it a compelling choice for various devices, including smart TVs, wearables, smartphones, and IoT devices. Here are some of the key advantages of Tizen OS:

1. Open Source Platform

Tizen is an open-source platform, allowing developers to customize the user interface and tailor the operating system to specific device requirements.

- Tizen is an open-source operating system, which means developers can access and modify the source code. This fosters innovation and allows for customization to meet specific needs.

2. Cross-Device Compatibility

- Tizen supports a wide range of devices, including smart TVs, wearables, smartphones, and home appliances. This allows for a unified ecosystem where applications can be developed and run across multiple device types.

3. Rich Development Environment

- Tizen Studio provides a robust set of tools for developers, including a comprehensive IDE, emulators, and debugging tools. It supports multiple programming languages such as HTML5, CSS, and JavaScript, making it accessible to web developers.

4. Performance and Efficiency

- Tizen is designed to be lightweight and efficient, which helps in optimizing performance on devices with limited resources. This results in faster boot times and improved responsiveness.

5. User-Friendly Interface

Tizen is known for its intuitive and streamlined interface, making it easy to navigate and access various features and apps.

- Tizen OS features a clean and intuitive user interface that enhances the user experience. Its design is adaptable to various screen sizes and resolutions, providing a consistent experience across devices.

6. Strong Support for Multimedia

- Tizen has robust support for multimedia applications, including video playback, streaming services, and gaming. This makes it particularly appealing for smart TVs and media devices.

7. Security Features

- Tizen incorporates advanced security features, such as a secure boot process and application sandboxing, which help protect user data and ensure the integrity of the operating system.

8. Integration with IoT

- Tizen is well-suited for IoT applications, allowing seamless integration with various smart home devices and sensors. This makes it an excellent choice for smart appliances and connected environments.

9. Strong Backing from Industry Leaders

- Tizen is backed by prominent companies like Samsung, which helps ensure ongoing development, support, and a strong ecosystem of applications and services.

10. Support for Multiple Connectivity Options

- Tizen supports various connectivity options such as Wi-Fi, Bluetooth, NFC, and more, enabling devices to connect easily to networks and other devices.

11. Regular Updates and Community Support

- Being an open-source platform with a vibrant developer community means that Tizen benefits from regular updates and improvements based on user feedback and contributions.

12. Customization for Manufacturers

- Device manufacturers can customize Tizen OS to suit their branding and specific use cases, allowing for differentiation in a competitive market.

Lightweight and efficient:

Tizen is designed to be lightweight, consuming less battery and resources compared to other operating systems like Android.

Focus on core tasks:

On mobile devices, Tizen prioritizes a simplified experience, focusing on essential tasks like messaging, navigation, music, and fitness tracking.

Samsung ecosystem integration:

Tizen seamlessly integrates with other Samsung devices and services, offering a cohesive user experience within the Samsung ecosystem.

Supports popular streaming services:

Tizen supports major streaming platforms like Netflix, Amazon Prime Video, and Hulu.

Seamless smartphone casting:

Tizen offers seamless smartphone casting capabilities, allowing users to easily cast content from their mobile devices to the smart TV.

Disadvantages

While Tizen OS has several advantages, it also comes with its own set of disadvantages. Here are some of the key drawbacks:

1. Limited App Ecosystem

While Tizen has its own app store, the selection of apps and games is smaller compared to the Google Play Store on Android TV.

- Compared to more established operating systems like Android and iOS, Tizen has a

smaller app ecosystem. This can limit the availability of popular applications and services, which may deter users.

2. Fragmentation Issues

- The wide range of devices that support Tizen can lead to fragmentation. Different versions of the OS may be used across devices, making it challenging for developers to create applications that work seamlessly on all devices.

3. Less Developer Interest

- Due to its smaller market share and user base, Tizen may attract less interest from developers compared to more popular platforms. This can result in fewer resources dedicated to creating and maintaining applications.

4. Compatibility Challenges

- Some applications or features available on other operating systems may not be compatible with Tizen. This can limit user experience and functionality for those transitioning from other platforms.

5. Limited Market Penetration

- Tizen OS is primarily used in Samsung devices and some IoT products. This limited market penetration can restrict its growth and visibility compared to more widely adopted operating systems.

6. User Interface Limitations

- While Tizen has a user-friendly interface, some users may find it less intuitive or visually appealing compared to competitors like Android TV or Apple TV, which could affect user satisfaction.

7. Performance Variability

- The performance of Tizen OS can vary significantly depending on the hardware it runs on. Devices with lower specifications may experience sluggishness or lag, impacting the overall user experience.

8. Dependence on Samsung

- Since Samsung is the primary supporter and developer of Tizen, the platform's future is closely tied to the company's strategy. Any changes in Samsung's direction could impact the development and support for Tizen.

9. Security Concerns

- Although Tizen has security features, its open-source nature can also pose risks if vulnerabilities are discovered and not addressed promptly. Additionally, the smaller community may lead to slower responses to security threats.

10. Learning Curve for Developers

- While Tizen Studio is a robust development environment, developers unfamiliar with the platform may face a learning curve, particularly if they are more accustomed to mainstream operating systems.

11. Limited Global Support

- Support for Tizen varies by region, and users in certain areas may find it difficult to get help or resources related to the OS.

12. Market Perception

- Tizen may not have the same brand recognition or positive perception as more established operating systems, which can affect user trust and willingness to adopt devices running Tizen.

Less flexibility and customization options:

Tizen may not offer the same level of flexibility and customization options as Android or other competing operating systems.

Documentation and support limitations:

Some users have reported that the documentation for Tizen can be lacking in certain areas, and customer support may not be as readily available.

Potential for slower performance on older devices:

Some older devices running Tizen may experience performance issues compared to newer devices or those running other operating systems.

Not as widely adopted as other OS:

Tizen is not as widely adopted as other operating systems like Android or iOS, which may lead to a smaller developer community and fewer third-party apps

Conclusion

In conclusion, while Tizen OS offers several advantages, such as a lightweight design, flexibility for various devices, and strong integration with Samsung products, it also faces notable challenges that can impact its adoption and usability. The limited app ecosystem,

fragmentation issues, and reduced developer interest hinder its competitiveness against more established platforms like Android and iOS. Additionally, concerns regarding compatibility, performance variability, and market penetration further complicate its position in the tech landscape.

For consumers and developers alike, understanding these disadvantages is essential when considering Tizen OS for their devices or applications. As the technology landscape continues to evolve, Tizen's future will largely depend on how effectively it can address these challenges, expand its ecosystem, and enhance user experience while remaining aligned with Samsung's strategic vision. Ultimately, while Tizen has potential, it must overcome significant hurdles to realize widespread acceptance and success in a crowded market.

Recommendation

Tizen OS is an open-source operating system based on the Linux kernel, primarily designed for a variety of devices, including smart TVs, wearables, and IoT devices. Here are some key points and recommendations regarding Tizen OS:

Key Features of Tizen OS:

1. **Cross-Device Compatibility:** Tizen is designed to work across various devices, making it versatile for developers targeting multiple platforms.
2. **Lightweight and Efficient:** Tizen is optimized for performance, making it suitable for devices with limited resources, such as smartwatches and low-end TVs.
3. **HTML5 Support:** Tizen supports HTML5, allowing developers to create web applications that can run seamlessly on Tizen devices.
4. **Strong Security:** The OS has built-in security features, which are crucial for IoT devices that may be vulnerable to attacks.
5. **Developer Tools:** Tizen provides a comprehensive set of development tools, including the Tizen Studio IDE, which supports a range of programming languages and frameworks.

Recommendations for Using Tizen OS:

1. For Developers:

- **Explore Tizen Studio:** Familiarize yourself with Tizen Studio for application development. It offers emulators, debugging tools, and a wide range of samples.
- **Utilize the Tizen Web APIs:** Make use of the extensive APIs provided by Tizen for

accessing device capabilities like sensors, notifications, and multimedia.

- **Join the Community:** Engage with the Tizen developer community through forums and events to share knowledge and get support.

2. For Consumers:

- **Smart TVs:** If you're considering a smart TV, look for models that run Tizen OS, as they often offer a user-friendly interface and access to popular streaming services.

- **Wearables:** Explore smartwatches running Tizen OS, such as those from Samsung's Galaxy Watch series, which provide a good balance of functionality and battery life.

3. For Businesses:

- **IoT Solutions:** Consider using Tizen for IoT applications due to its lightweight nature and security features. It can be particularly effective in smart home or industrial applications.

- **Custom Applications:** If you are developing custom applications for specific devices (like kiosks or digital signage), Tizen's flexibility allows for tailored solutions.

Tizen OS is a robust platform suitable for various applications, especially in the smart device ecosystem. Whether you are a developer looking to create new applications or a consumer interested in smart technology, Tizen offers numerous advantages worth exploring.

Virtualization in modern OS

What is Virtualization?

Think of virtualization like having a magic box that allows you to create multiple smaller boxes inside it. Each of these smaller boxes can run its own operating system and applications, just like having different computers, but they all share the same physical hardware. This technology helps us make the most out of our computers without needing a bunch of separate machines.

Why Use Virtualization?

Better Use of Resources: Imagine you have a big pizza (your physical computer) and you want to share it with friends (the virtual machines). Instead of everyone getting their own pizza (separate computers), you cut it into slices (virtual machines) so everyone can enjoy it without wasting food.

Safety and Isolation: Each virtual machine is like a separate room in a house. If one room gets messy (like an application crashes), it doesn't spill over into the other rooms. This

keeps everything running smoothly and securely.

Easily Expandable: If you suddenly need more space for guests (more applications or users), you can easily build another room without needing to buy a new house. Similarly, you can create new virtual machines quickly as your needs grow.

Cost Savings: By using virtualization, you're not buying multiple houses (computers) but rather making better use of your existing one. This saves money on hardware, electricity, and maintenance.

Safe Testing Environment: If you want to try out a new recipe (application), you can do it in one of those smaller boxes without messing up your main kitchen (main system). This way, you can experiment without any risk.

Easy Recovery: If something goes wrong, like a storm damaging your house, having those smaller boxes means you can quickly move them to a safe place or restore them easily without losing everything.

How Does It Work?

The Hypervisor: Think of this as the magic that makes everything possible. It sits between your physical hardware (the big pizza) and the virtual machines (the slices). It decides how much of the pizza each slice gets and makes sure they all get what they need.

Virtual Machines: These are your smaller boxes or slices of pizza, each with its own setup. They can run different operating systems and applications, just like how you might have different flavors of pizza.

Guest Operating Systems: Each virtual machine can have its own flavor—Windows, Linux, etc.—allowing you to use whatever suits your needs best.

Resource Management: The hypervisor is like a good host at a party, making sure everyone has enough to eat and drink. It allocates resources like CPU and memory to each virtual machine based on what they need at any given time.

Management Tools: These are like the party planners who help you keep track of everything—ensuring that all your virtual machines are running smoothly and that you can easily set up or shut down as needed.

Virtualization is like having a smart way to make the most out of your computing resources. It allows you to run multiple systems on one machine, providing flexibility, safety, and efficiency. Whether for business or personal use, virtualization helps us do more with less, making our digital lives easier and more productive!

