



Security of Hibernation on Linux

¹Supriya G. Bansode, ²Pooja V. Gaikwad, ³Suchita S. Mhaskar, ⁴Ashwini V. Wadkar, ⁵Prof. Snehal Nargundi_(Guide)
^{1, 2, 3, 4}Information Technology, Savitribai Phule Pune University, Pune, Maharashtra, India
⁵Assistant Professor RMD Sinhgad School of Engineering, Pune, Maharashtra, India

Abstract— *The proposed system is based on taking the snapshot images. When the system goes in to the hibernate state the system takes the snapshots of currently working session of a user. In this system we provide security by using the algorithms. We are going to add an authentication test before accessing the snapshot image. The system is so designed that it checks for the password before accessing the snapshot images. The concept of power management is highly implemented in these systems. Not only does the hibernated system load up faster, the user also gets back to his previous session without much effort.*

Keywords: Encryption, Snapshot Image, Boot, Freeze, System Image, Thaw, Boot Kernel, Target Kernel, Decryption.

I. INTRODUCTION

Hibernation (or suspend to disk) in computing is powering down a computer while keeping its state.[2] Upon hibernation, the computer saves the contents of its random access memory (RAM) to a hard disk or other non-volatile storage. The suspend option saves the state of the machine to a file system and move to standby mode.[3] Software hibernation or suspend-to-disk is a very productive operating system feature. It has many advantages over a restart system. Not only does the hibernated system increase faster, the user also gets back to his previous session with no effort. This is important because of the time the user saves by avoiding the need to set up a work session again. So, what is difference in hibernation? It is different because it saves the contents of the RAM (Random Access Memory) into some non-volatile storage medium before shutting down the system. Consequently, when the system initialize again, the operating system loads the suspended image from disk to get back to the previously stored session. Software suspend, as hibernation is popularly known in Linux systems, has evolved in kernels. It is regularly getting more and more strong and useful.

II. RELATED WORK

From the above Fig 1.1 we can see the three different types of power saving those are described here:-

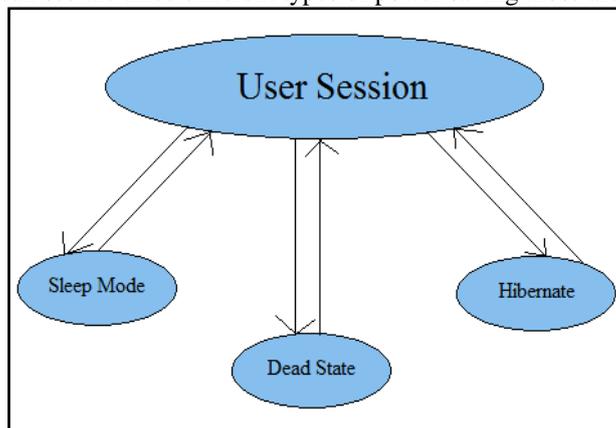


Fig 1.1 Existing System

1) Sleep state-

Sleep mode means CPU has no power. In this RAM maintains the power, and repair slowly. Power supply slowdowns. It is also known as “Save to RAM.” Windows enters this level when in sleep mode Sleep mode is a low power mode for electronic devices. These modes save significantly on electrical consumption compared to leaving a device totally on and, upon restart, allow the user to avoid having to reissue instructions or to wait for a machine to restart. Many devices communicate this power mode with a pulsed or red colored LED power light.

2) Dead state-

Suspend stops operation of all applications and puts the machine into a little power. Various devices can resume the machine, among releasing the power button. [5] Suspend saves the snapshot images of ready system state into ram and your hard-disk power will be off or it will be powered on, while when you press the power button it reloads the snapshots saved in ram within seconds based on the system capability.

3) Hibernate-

This level is also known as “Save to disk.”It saves all computer operational data on the hard disk before turning the computer off completely.[2] On switching the computer back on, the computer is restored to its state prior to hibernation, with all programs and files open, and unsaved data intact. In standby mode, computer's state is saved in RAM; in hibernation mode, computer's state is saved on the hard disk.[3]

4) Uses of Hibernation-

Hibernation saves electrical power. After hibernating, the hardware is powered down like a regular shutdown. Hibernation is a means of avoiding the burden of saving unsaved data before shutting down and restoring all running programs after powering back off. Hibernation is used in laptops,[2] which have restricted battery power available. Automatic System can signal for low battery backup. Most system also support for hibernation, for saving energy.[3]

III. MOTIVATION

In this paper we are providing more security on Linux when the system is hibernate. When the system is hibernating we capture the snapshot Images and store that image in swap device. In the TuxOnIce when we hibernate the system it does not ask for any password to save but in our Paper we provide the password. So when the system is hibernating system ask for password. Swsusp takes the snapshot images of the RAM. This snapshot or suspend image is copied and then saved in an atomic operation fashion to the partition. Upon restarting the system, if a Correct image signature is found on the swap, the image is loaded and the snapshot transferred in memory. This saved state retrieve to the user.

IV. CONTENT USED

4.1 Kernel

When the system is start and kernel finds the snapshot image. System ask to the user to enter password and the password is satisfy then it Will allow for next procedure otherwise it will continue with the normal kernel. In Linux, swsusp or suspend is the part of kernel that deals With the hibernation mechanism. However, it is not entirely an autonomous subsystem as it shares some code with the other parts of the Kernel. On resume, while booting the system checks for a swsusp signature and loads the kernel image stored on swap partition to restore the Previous suspended session.[8]

4.2 BIOS

When we start the system BIOS finds the kernel and then kernel searches the snapshot image stored on disk the fundamental purposes of the BIOS are to initialize and test the system hardware devices, and to load a boot loader or an operating system from a mass memory device. BIOS provide a consistent way for application programs and operating systems to interact with the all input and output devices.[7]Variations In the system hardware are hidden by the BIOS from programs that use BIOS services instead of directly accessing the hardware.

4.3 ACPI

ACPI (Advanced Configuration and Power Interface) is an open industry specification establishing industry standard interfaces for OS directed configuration and power management on laptops, desktops, and servers.[6] ACPI is the current standard for power management, removes APM and providing the backbone for sleep and hibernation on modern computers. Sleep mode corresponds to Advanced Configuration and Power Interface mode S3. When a non-ACPI device is plugged in, Windows will sometimes harm stand-by functionality for the whole operating system. Without ACPI functionality, as seen on older hardware, sleep mode is usually restricted to off the system and the hard drive is divided.[7]

V. ARCHITECTURE

In the Fig.4.1 shows proposed system. In the first step of architecture user hibernate the system. After hibernating user provides the appropriate password. Then all running processes are dead or sleep and all user sessions are logged off.[4] After hibernating the system create snapshot images of working processes and then that snapshots are stored to RAM. Images moved to swap device. Then the system powered off.

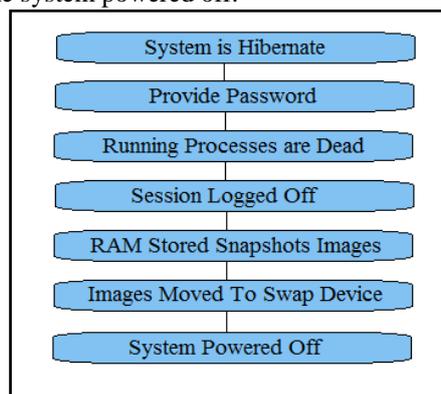


Figure 4.1 Proposed System Model

In the proposed system there are two modules

1. Shutdown
2. Resume

1. Shutdown:

In these module we provided an entirely new mechanism for traditional shutdown and boot to improve the boot time and provide user session more quickly. Generally when we shut down all the user space application are closed initially and then the kernel threads and services are closed. Finally all the device prepare themselves for a complete shutdown. When shutdown arises system saves all user processes and freezed all kernel services. Then kernel creates the bitmap images of currently working processes and it will store to swap partition. It will save all kernel threads and system will powered off. Shutting down the user session followed by hibernation of the kernel session. Compared to a full hibernation, which includes a lot of memory pages in use by the user application, the proposed hibernation data is much smaller, which in turn will take substantially less time to write to the disk. It also gives a fresh user session quickly as compared to that of the traditional.

2. Resume:

In these module we resume the machine the saved data is loaded back to RAM and the machine can continue its work. It has two real benefits. First we save ourselves the time machine goes down and later boots up, energy costs are real high when running from batteries. The other gain is that we don't have to interrupt our programs so processes that are calculating something for a long time shouldn't need to be written interruptible. You must explicitly specify the swap partition to resume from with "resume=" kernel option. If signature is found it loads and restores saved state. If the option "noresume" is specified as a boot parameter, it skips the resumming. If the option "hibernate=nocompress" is specified as a boot parameter, it saves hibernation image without compression.

VI. CONCLUSION

The completion of this project we are providing the kernel level security on Linux. It basically on hibernate system. The security is in terms of providing the password when the system is resumed. Basic aim of this project is providing security to the hibernated snapshot images in terms of password and encryption. In our future work we will consider this recommendation scheme and we will use it on different Operating system.

ACKNOWLEDGEMENT

We are happy to present this project on "Security of Hibernation on Linux". In this project there are various models so that it can be understood easily. Successful completion of any task is incomplete without writing the names of people. We take this opportunity to thank our Dr. C.B Bangal (RMDSSOE), Prof. Dhara T. Kurian (Head of Dept.), Information Technology for their valuable guidance and for providing all the necessary facilities, which were indispensable in the completion of this project report.

Supriya Bansode (B81028502)
Pooja Gaikwad (B81028510)
Suchita Mhaskar (B81028530)
Ashwini Wadkar (B81028554)

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