Effect of Ssd Vs Hdd Selection on Computer Boot Speed

Sonny R. Kasenda[1*], Hizkia Pivel Lumi[2], Lovejoy Virrendra Wawointana[3], Rivq Kohongia[4], Lorensius Farel Sabonbaly[5], Revalina Putri Djafar[6]

[1,2,3,4,5,6] Politeknik Negeri Manado, Manado, Indonesia

Email: Sonnykasenda@gmail.com ,pivelhizkia@gmail.com, wawointanajoy80@gmail.com, rivqkohongia@gmail.com, lorensiussamsung96@gmail.com, revadjafar6@gmail.com

Abstract

This article aims to analyse the effect of SSD (Solid State Drive) and HDD (Hard Disk Drive) selection on computer boot speed. With the development of data storage technology, many computer users are faced with the choice between SSD and HDD. This research will compare these two storage media in terms of operating system boot performance, with the aim of providing a more appropriate recommendation based on the measured performance. This research is conducted by experimenting on two computers, one that uses SSD and one that uses HDD. Each computer will be tested by booting the same operating system under similar conditions. The boot speed is measured in seconds from the start of the computer until the operating system is ready for use. In addition, special software is used to measure the boot time with high accuracy. The results show that computers with SSDs have much faster boot speeds compared to HDDs. On average, SSDs can complete the boot process in 12-15 seconds, while HDDs take around 30-34 seconds. In addition, the boot time variability of SSDs is lower, indicating a more stable performance compared to HDDs. Based on the test results, it can be concluded that the use of SSD significantly improves the boot speed of a computer compared to HDD. Users who want faster system performance, especially in terms of boot time, are recommended to use SSD.

Keywords: influence, selection, SSD, HDD, boot speed

Introduction

Computer performance is an important aspect in today's technology world, especially in terms of access speed and system responsiveness (Martins, 2018). One component that has a big influence on the performance of a computer is the storage media used. Two common types of storage are Solid State Drive (SSD) and Hard Disk Drive (HDD) (Liu et al., 2017). SSDs are known to have faster read and write capabilities than HDDs, while HDDs offer greater storage capacity at a more affordable Price (Tilahun, 2023).

The speed of boot time, or the time it takes for a computer to be ready for use after switching on, is one of the key indicators in assessing system performance. Users who prioritise speed usually tend to choose SSDs as a solution, but HDDs are still the choice of many users due to cost and larger capacity. Therefore, the choice between SSD and HDD is often an important consideration for computer users, especially when it comes to system boot speed (Varghese, 2022).

This study aims to explore the effect of choosing between SSD and HDD on computer boot speed (Wang et al., 2022). The results of this study are expected to provide

useful information for users in making storage choices that suit their needs, both in terms of speed and cost.

Based on the research findings regarding the condition of information overload experienced by IAI AL-AZIS students due to unhealthy social media usage, it was found that social media usage has become an inseparable part of students' daily lives. Students actively involved in organizations, lectures, or jobs tend to use social media in a limited manner according to their needs, while less active students spend more free time on social media, making them more vulnerable to information overload due to the high intensity of content received. The impact is divided into three main aspects: academically, it affects students' ability to process information and concentrate on important materials; personally, it causes stress, confusion, and decreased productivity; and socially, it triggers the spread of hoaxes.

This research is crucial as such conditions can disrupt students' learning quality and social lives. The primary goal of the study is to identify the conditions and impacts of information overload experienced by students and formulate solutions to minimize its effects. The study's benefits include providing a better understanding of wise social media use, serving as an additional reference for academics, and offering valuable recommendations for developing policies on digital literacy and information management in higher education environments. To reduce negative impacts, students need to apply principles such as *tabayyun* according to Islamic teachings in Surah Al-Hujarat verse 6, which involves critical thinking, being cautious when receiving information, and avoiding spreading unverified news.

Method Research

This research uses a quantitative approach with an experimental method. This experiment was conducted to measure and compare the boot speed between computers using HDD (Hard Disk Drive) and SSD (Solid State Drive). Information related to hardware technical specifications required in this research was obtained through sources accessed from the internet. These sources included manufacturers' official websites and relevant technology publications, which were used to support the research process.

Result and Discussion

This study was designed to compare the boot speed between computers that use Solid State Drive (SSD) and Hard Disk Drive (HDD) as their storage media. Measurements were made through direct experiments on devices with the same specifications, except for the storage media. This research is experiment-based with a quantitative approach. The objective is to measure the boot time of two types of storage devices, namely SSD and HDD. Boot time is measured from the time the computer is turned on until the operating system is ready to use on the desktop. To ensure reliable results, tests were conducted on two computer systems with equivalent specifications, except for the type of storage. Here are the specifications of the devices used:
- Processor: Intel Core i5-10400 (or equivalent).

- RAM: 8GB DDR4.
- Motherboard: Supports SATA III and NVMe interface (for SSD).
- Storage Media:
- SSD: 500GB SATA III/NVMe.
- HDD: 1TB, 7200 RPM

Each device is installed with the same operating system with no additional applications other than basic drivers and operating system updates. the operating system used in this study is Windows 10. In this study, tests were conducted to see the difference in boot time between computers using Solid State Drives (SSD) and Hard Disk Drives (HDD). The test involved one operating system, Windows 10. The data obtained from this test provides a clear picture of the performance of each storage media in loading the operating system.

Here are the boot time results of each storage device:

Storage Media	Operating System	Booting Time
- SSD	Windows 10	12,5 second
- HDD	Windows 10	32,7 second

From the results of this test, we can see that boot times on computers with SSDs are significantly faster than those with HDDs. The average boot time on Windows 10 using an SSD was 12.5 seconds, while with an HDD, the boot time increased to as much as 32.7 seconds. The significant difference in boot time between SSDs and HDDs can be understood by looking at the technology used in both types of storage media. SSDs use flash memory chips with no moving parts, so their data access time is much faster compared to HDDs that still rely on mechanical platters.

On HDDs, to read or write data, the platters have to spin and the read heads have to locate the data, making the process slower, especially for tasks that require random access to many data locations. SSDs, on the other hand, allow direct access to data locations without any mechanical latency, resulting in faster boot times. This is clearly evident from the test results which show SSDs are faster at loading the operating system, on Windows 10 In addition, the read and write speeds of SSDs are far superior to HDDs. The average read speeds of modern SSDs range from 500 MB/s to 3500 MB/s, while HDDs can only achieve speeds of 100 MB/s to 150 MB/s. This explains why the boot process is faster on SSDs, mainly because during this process the operating system has to load various core files and drivers.

Conclusion

From the results of this study, it is clear that choosing an SSD provides a significant improvement in boot speed. Users who frequently have to restart their computers or who work in environments that require fast response times will greatly benefit from using SSDs. In terms of day-to-day convenience, SSDs provide a much more

responsive experience compared to HDDs. However, it should be recognized that HDDs still have their advantages, especially in terms of price per gigabyte. For users who require large storage capacity on a budget, HDDs remain a reasonable choice.

For example, for secondary data storage, HDDs are still quite viable, although not ideal for operating system storage. Based on the results of this study, SSDs are highly recommended for operating system storage and frequently used applications, as they have a direct impact on overall computer performance. For those who prioritize storage capacity and are less concerned about boot time, HDDs can still be used as additional data storage, especially for infrequently accessed files.

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