

Giddy Ion Reloaded: Desktop Manager, Optimizer with Multi Utility Tool

Jaymar C. Recolizado, Marifel Grace C. Kummer



Abstract: The performance of our computer is vital in fulfilling the task of the user. The paper presents a solution for maintaining the performance of the computer specifically computers with Windows operating systems. In this article, the fundamental difference and problem of the Windows operating system are defined which roots in the architectural design of using single configuration storage. The security hole of windows authentication, the exploitation of Microsoft EFS, and the acquisition of password hashes from Microsoft SAM are also discussed. Various existing utility software is evaluated to investigate if they meet the user define criteria. This paper also proposes a user-level implementation of the AES 256 encryption algorithm for securing user files and a Network Blocking algorithm based on ARP Spoofing techniques that provide a user-level network monitoring capability. The proposed application is called "Giddy-ION Reloaded" which consists of four main modules; machine information acquisition and monitoring, machine optimization, machine cleaning, and tools module that is divided into submodule; encryption and decryption, network monitoring, desktop management, network optimization/control, and task automation. The testing was conducted with the participants coming from a computer college, continuing education trainer/faculty, and various IT experts. The response from these groups was statistically treated and analyzed, where the Giddy ION rank top and shows promising results. The study is limited to windows machines with 64-bit support architecture. The developed application is ready for implementation and deployment as evidenced by its high overall performance rating as evaluated by the participants against the ISO 25010 standards.

Keywords: About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

The electronic computer is one of the most important developments of the twentieth century. Like the industrial revolution of the nineteenth century, the computer and the information and communication technology built upon it have drastically changed business, culture, government, and science, and have touched nearly every aspect of our lives. This is on the grounds that computers are a vital piece of people's everyday existence. Be it school, banks, shops, railroad stations, emergency clinic or one's own home, computers are available all over the place, making one's work

simpler and quicker for everybody. Computers are basic pieces of one's life and that people should know and understand the value and what it can do to human life. The literal meaning of computer is a gadget that can compute. Be that as it may, latest computers can complete much more than ascertain. [14] The computer is an electronic gadget that gets information, stores, or procedures the contribution according to client directions and gives yield in wanted configuration. In the cutting-edge universe of innovative progression, computer is the astounding blessing given by the science to everyone. It has changed the living style and standard of the general population. Nobody can envision the existence without computer as it has made heaps of works so natural inside less time [7]. Computer is assuming extraordinary job in the improvement of the creating nations. It is not simply a capacity or handling gadget however it resembles a heavenly attendant which can make anything conceivable. Numerous individuals use computers as the source of entertainment and communication. Furthermore, computers can get associated with one's companions, relatives, guardians, or others in a matter of moments using video visit or email. Utilizing web in the computer, they can look and recover huge data regarding any matter helpful for instruction or a task. It is protected and simple for the business exchanges purposes through banks of any record. By giving the office of information stockpiling it has diminished the paper works in the administrative and non-legislative workplaces or schools. [6] One can spare heaps of time and exertion by web-based shopping, paying bills, and so forth by being at home through the computer. School and other instructive foundations are utilizing computer and computer training for improving the aptitude level just as the ease of the understudies in their expert life. Learning computer has turned out to be fundamental in all the advanced occupations. In the higher education there are courses like network administration, hardware maintenance, software installation, etc. for the enhancement of skill. [10] Computers evolve from time to time. Computers are considered as the machines of present and future because of its superb accuracy, reliability, and timeliness in terms of transaction management, monitoring schemes, graphics design and development, data processing and storage, internet technology and a lot more. However, it has been observed that computer performance now a days seems to slow down even it has extremely high hardware specifications. This is because of the unwanted files, document and other embedded files and data in the system. Aside from that, another alternative is the use of free software tools that promise performance dividends. [11] These utilities purpose is to cure a multitude of PC ills, and make grand claims of improved performance, energy efficiency, faster boot times, and enhanced privacy.

Manuscript received on January 11, 2021.

Revised Manuscript received on January 15, 2021.

Manuscript published on January 30, 2021.

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Upon exposure to these said activities, computer performance and response rate decreases dramatically as a result of disc fragments temporary file junks, old pre-fetch files, internet history and stored cookies from browsing the internet, poor setup or settings especially in allocating proper VM (Virtual Memory) sizes for dynamic and static VM

(Virtual Memory allocation, Registry fragments, poor desktop and file management caused by overwhelming laziness of the user/s of the machine, broken shortcuts and file linkers and a lot more[10]. [3] The utility program performs an extremely specific task, usually related to managing system resources, several utilities for managing disk drives, printers, power management, network, and others. Other studies on different classification under the utility software had been conducted. Network monitoring can be achieved using various software's or a combination of plug-and-play hardware and software appliance solutions. Virtually any kind of network can be monitored. The authors added even the network is wireless or wired, a corporate Local Area Network (LAN), Virtual Private Network (VPN) or service provider Wide Area Network (WAN), a user can monitor devices on different operating systems with a multitude of functions, ranging from Android device and computers, to servers, routers, and switches. [13] There are techniques for building a better network monitoring system were devised and investigated. A new network monitoring tool was built from the ground using new technologies. Some of the new techniques devised were integrated into the new network monitoring tool to improve usability and usefulness of a network monitoring tool from the perspective of network users and systems administrators. Moreover, [13] the advent of interactive multimedia computing imposes strict new requirements on operating system performance. Next-generation operating systems must support the processing of real-time data types, such as digital audio and video, with low end-to-end latency and high throughput. The emerging model of computation is one in which real-time data enters the system via an input device, passes through several kernel and application processing steps, and is finally presented, in real-time, at an output device. In this environment, system performance is determined in large part by the throughput and total end-to-end latency of this pipeline.

To address all these problems, the development of new utility software should be created to improve and lead a better management of the windows device.

II. AIM OF THE PAPER

A. Statement of the Problem

This study aimed to design and develop software that optimizes and manages computer resources running under windows platform.

Specifically, it sought answers to the following:

1. What is the assessment of the participants on the available utility software in terms of:
 - a. Availability
 - b. Tools Offering
2. What algorithm can be used in the development of the proposed system?
3. What system can be developed to provide optimize windows machine, secure files and manage local network in the college?

4. What is the extent of compliance of the developed application in terms of the following ISO 25010 criteria:
 - a. Functional Suitability.
 - b. Performance Efficiency.
 - c. Usability.
 - d. Security.
 - e. Maintainability; and
 - f. Portability.
 - g. Compatibility.
 - h. Reliability.
5. What improvement can be done to enhance the developed system?

B. Framework of the Study

The conceptual framework [4] summarizes the theory of what the study proposes to achieve, and the processes undertaken to achieve its purpose.

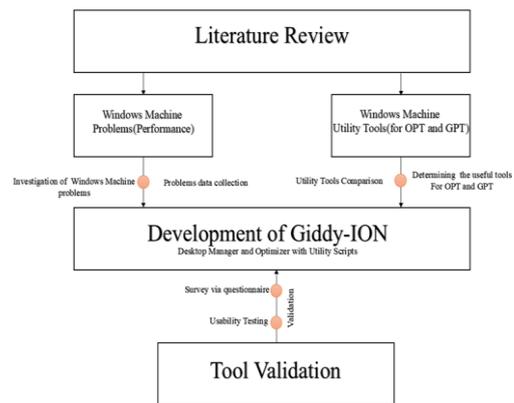


Figure 1: Conceptual Framework Diagram of Giddy-ION software

In order to develop the Giddy-ION utility software, there was Literature review about the existing architectural flaws of windows operating system, existing algorithm in network, cipher and file management that can be used to user level access for improving the windows operating system performance that was done followed by collection of windows machine problems analysis and windows machine utility collection with noted features and capabilities in parallel these three research activities are feeding the development of the said software/tool and finally, from down to up is the process of tool validation. The overall logic was presented from the above figure (as shown in Fig 1).

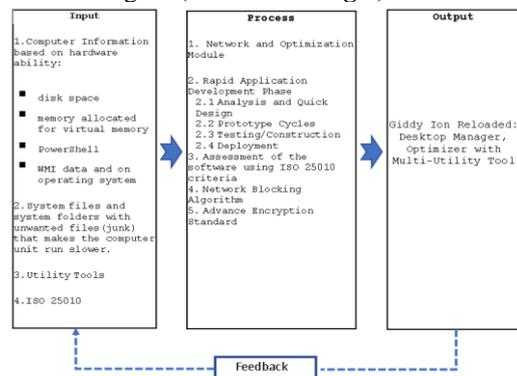


Figure 2: Paradigm of the Study



The conceptual paradigm of the study is divided into three parts: Computer Information based on hardware ability. System specification was gathered by using WQL and WMI commands for direct communication to the operating system for the retrieval of machine’s specification i.e. (disk space, memory allocated for virtual memory). Retrieval of junk files and folders is also included in this phase. A utility tool is added on this phase in preparation for the next phase for the total development and evaluation of the effectiveness of the software following the ISO 25010 standards [5].

Different processes to be undertaken like analysis and data gathering were conducted to be able to gather useful and relevant data for this study. In the course of system development, the RAD phases will be applied in order to collect user responses and move forward with the development accordingly. Additional modules, security and network-based algorithm are also inserted during the development. The whole phase of RAD is applied for the creation of prototype to address the demands and requirement of the participants. The output is a .NET based software called the Giddy-ION Desktop Manager, Optimizer with Multi-Utility Tool which is written in native Microsoft ware object oriented language which is c# and accompanied by the native scripts (VBscript, Batch, powershell, WMI, WQL). By using the system, the stake holders of AMA Computer College Tuguegarao is now able to optimize their windows machine,secure their private files and manage their network in a very simple manner.

III. METHODOLOGIES

A. Research Design

This study designed and developed a utility software with multi utility tool for the AMA Computer College Tuguegarao. It uses a descriptive research method particularly interviews and questionnaire in order to gather data relevant to the conduct of the study and developmental research for the development of the system. The Rapid Application Development was also utilized in the system development. It raises the quality of finished systems while reducing the time it takes to build them. It relies on incremental development wherein each goal is built into shippable product and are adjusted based on stakeholder and customer feedbacks. This way the stakeholders are more involve and get what they want at the end of the development.

B. Research Method

A structured questionnaire was developed by the researcher. A covering letter with a description of the purpose and the importance of the research study was attached to the questionnaire. Participants were assured of their anonymity and freedom to decide whether to participate in the study or not. Clear instructions were given to the participants regarding completion of specific items throughout the questionnaire. The questionnaire was designed in such a format that the data could be easily entered into the computer. Item numbers that could be used in a data set was incorporated into the questionnaire. Questions requiring both open-ended and closed-ended responses were included.

A separate questionnaire based on ISO/IEC 25010 characteristics and sub-characteristics was considered in order to determine the overall performance of the system.

Participants in the questionnaire were IT experts for they are knowledgeable on the technical side of the study. The researcher guaranteed that the involvement of the participants in this study is voluntary and that they are further assured that data and information gathered will be treated with utmost confidentiality.

C. Data Analysis

The data collected were tabulated, analyzed, interpreted, and summarized using both descriptive and inferential statistics. It was based on the given problem statement and analyzed using the Statistical Package for Social Science for Windows (SPSS for Windows).Weighted Mean was used to analyze the average rating of the IT experts with respect to the compliance of the application that was developed in this study with respect to the ISO standard. To determine the participants response on the extent of compliance of the developed application in terms of the ISO 25010 criteria, a Likert-range conversion was used as presented in Table 1.

Table 1: Likert-Range Conversion Table ISO 25010 Product Standard

Scale	Rating	Qualitative Rating
5	4.20-5.00	Very Great Extent
4	3.40-4.19	Great Extent
3	2.60-3.39	Moderate Extent
2	1.80-2.54	Little Extent
1	1.00-1.79	Very Little Extent

IV. RESULTS AND DISCUSSION

Based on the conducted interviews, observations and responses of IT experts using the ISO/IEC 25010, the following results were obtained:

1. Assessment of the participants on the available utility software.

Table 2 presents the overall mean assessment of the IT experts, CONEC Trainers and student participants regarding the evaluation of the existing utility software and the developed software in terms of the given criteria.

Table 2: Overall Mean Distribution on the assessment of the participants regarding the evaluation of the existing utility software and the developed software in terms of the given criteria

Software Name	Overall Mean	Qualitative Description
Windows Tweaker 4	2.99	Moderate Extent
Taskbar Tweaker	2.85	Moderate Extent
Winaero	3.43	Great Extent
Giddy-ION	4.63	Very Great Extent

The developed software Giddy-ION is the highest with overall mean of 4.63 with descriptive interpretation of “very great extent” followed by Winaero with overall mean of 3.43 and a descriptive interpretation of “great extent”, and Taskbar Tweaker got the least overall mean of 2.85 with a descriptive interpretation of “moderate extent”. This implies that the developed software which is Giddy-ION meet the standard requirement of the participants with respect to the given criteria such as availability and tools offering.



2. Algorithms used in the development of the proposed system.

The researcher compared algorithms and adopted the results of previous research specifically entitled A Comparison of Cryptographic Algorithms: DES, 3DES, AES, RSA, and Blowfish for Guessing Attacks Prevention [2] and [8] Evaluation of Network Blocking Algorithm Based on ARP Spoofing and Its Application; in the development of the software.

The researcher implemented the AES-256 with the key size of 256 and 128 block size in C# .NET in reference with the library using System.Security.Cryptography for the encryption module of the system. The key size refers to the number of bits in the key with AES, the key size relates to the strength of the key / algorithm. The block size is simply the number of bits or bytes that can be transformed by the block cipher. It is the input and output size of the keyed block cipher. The researcher utilized the [8] Network Blocking Algorithm and Architecture see Fig 7 that is based on ARP Spoofing. It is utilized in the developed software to avoid unauthorized user to abuse the network configuration resources like IP address, MAC address, and host name the TCP/IP network environment. Moreover, it utilized Address Resolution Protocol (ARP) spoofing techniques which is used to prohibit unauthorized network access and resource modifications. The architecture for the network resource and security management is a manager-to-probe or a manager-to-agent model. A node on the entire network is designated as a manager system and at least a probe or an agent system had installed on each network management domain. The manager issues a message of the protocol data unit to a probe. The probe interprets the protocol data unit message. The probe monitors all the packets on its management domain by using the packet capture library, for example, pcap library in Linux and picks up only the ARP request or reply packets. If the ARP packets are in violation of the management policy, the probe issues a network block. In the developed system the probe is manually triggered by the user. For the application of Network blocking algorithm, the researcher added [8] WinPCap(Windows Packet Capture) as a substitute of Pcap driver for linux for link-layer network access in Windows environments, allowing applications to capture and transmit network packets bypassing the protocol stack, and including kernel-level packet filtering, a network statistics engine and support for remote packet capture. WinPCap consists of a driver that extends the operating system to provide low-level network access and a library that is used to easily access low-level network layers. WinPCap serves as packet capture and filtering engine for the system.

3. Giddy-ION Desktop Manager, Optimizer with Multi Utility Tool

This developed software provides optimization of the windows operating system for better performance and for the removal of unwanted system files, tweaking and provides additional security layer using Encryption algorithm for the securing of important and private files. Also, it provides a user level control of network via implementing ARP spoofer /tester-based algorithm which is used to cut connection of unwanted machines inside a Local Area Network. It also shows important network information such as internet protocol address, media access control address, and hostname on the transmission control protocol/internet protocol network environment.

4. Giddy-ION Extent of Compliance with respect to ISO/IEC 25010 Criteria.

Table 3: Summary of the extent of compliance of the developed software in terms of ISO 25010 criteria

ISO 25010 Software Quality Standards	Overall Mean	Interpretation
Functionality Suitability	4.72	Very Great Extent
Performance Efficiency	4.19	Great Extent
Compatibility	4.30	Very Great Extent
Usability	4.20	Very Great Extent
Reliability	4.26	Very Great Extent
Security	4.12	Great Extent
Maintainability	4.15	Great Extent
Portability	4.20	Very Great Extent
Grand Mean	4.26	Very Great Extent

With a category grand mean of 4.26 which is described as “very great extent”, the evaluation of the developed Giddy-ION Desktop Manager, Optimizer With Multi Utility Tool is compliant with the ISO 25010 Software Quality Standards in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability and portability as assessed by the IT experts. This means that both the target users and experts found the system to be usable, perform its perceived functions and met their needs towards the optimization and improvement of their windows operating system experience. Further, the results agree with the study [1] that systems should not only conform to but extends beyond standards of the ISO 25010.

5. Enhancement for the developed software.

Based on the feedback of the participants the following recommendations were suggested for the enhancement of the application.

- 1.Update the GUI of the software and make a simple manual for the normal users.
- 2.Change the based framework from .Net Framework to .Net core for newer GUI support and machine learning ability to train the software to identify the signature of junk files for automation and for the identification of optimization based on the machine’s specification.
- 3.Additional tools shall be open for integration based on the liking of the user like the software store of Microsoft and Linux PPA.
- 4.Expand from windows platform into another OS platform i.e. (Android, apple OS, Linux).
- 5.Log file report for abnormal windows behavior or activity.
- 6.Software lock mechanism for the software itself to prevent unwanted usage.

V. CONCLUSION

The developed application is ready for implementation and deployment as evidenced by its high overall performance rating as evaluated by the participants against the ISO 25010. Based on the overall rating and descriptive evaluation of “Very Great Extent” there is an extremely high acceptance of the application by the experts and participants regarding the given evaluation criteria. The windows operating system machines are used widely for everyday work. Upon exposure to activities, the windows machine performance significantly drops overtime because of accumulation of unwanted files, poor windows maintenance from the user.



This study developed a software that address this issue and provide additional tools and additional functionality for the improvement of the windows user experience specially in maintaining a high-performance machine specifically during this period where industry and other work depends on computers because of the ongoing covid pandemic. The software also provides an additional layer of protection on the user files with the inclusion of Advance Encryption Standard (AES) and a user level network information tools in providing useful features for optimizing and maximizing local network performance. The software is comparable with the existing premium software without the need to pay for access and plan-based purchase. The software provides a wide variety of tools to cater the needs of the user. The software provide transparency since the source is open for everyone to download to undergo thorough inspection. Due to the nature of open-source software, it provides a high level of customization and rapid feature development specially for developers worldwide. Currently, this study is limited to windows operating system and support for Mac OS and Linux based operating system is still on the process of evaluation for future study and expansion.

ACKNOWLEDGMENT

The researcher would like to express his sincerest gratitude to the following persons whose endless assistance and encouragement have contributed to the realization of this study. To Dr. Marifel Grace C. Kummer, for the invaluable support guidance and constructive suggestions that enhanced the study. She was always there to give her heartfelt encouragement and not only she did as my adviser, but she served as a good mentor as well as a good friend to the researcher. Without her guidance, this study would not have been possible. To Dr. Jesus B. Pizarro, his data consultant for his expertise in analyzing the data needed in this study and untiringly giving answers to queries pertinent to the number of informants and participants in this study. To the informants, participants, and IT experts for providing the necessary data for this study and the development of the application.

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