ANALYSIS AND DESIGN OF DISTRIBUTED SYSTEM FOR MONITORING COMPUTER INFRASTRUCTURE MANAGEMENT BASED ON CLIENT/SERVER BY USING WINDOWS MANAGEMENT INSTRUMENTATION TECHNOLOGY

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***Abstract*-- This research aims to analyze and develop a system for monitoring computer infrastructure management in real time (real-time monitoring). The developed system was a distributed system that would help IT Administrators work at the Center for Computing and Information Technology Faculty of Engineering Universitas Indonesia (CCIT FTUI) to monitor the computer infrastructure in real-time. The Real-time referred to a system that was able to do direct monitoring to computer infrastructure, and quickly able to transmit the data status of the device. Limitations of the current monitoring process were that the IT Administrator checks directly into the computer lab room if there were problems related to a computer or cable that was not connected from the computer system based on a report from teachers or students. The developed monitoring system was a client/server based system that used network infrastructure so that the computer infrastructure could be optimally monitored. The modules used in this research are computer input and output modules, and installed applications or system services. This research is expected to be able to overcome the problems associated with computer infrastructure's performance, conduct supervision and centralized control in helping the problems that often occur during the learning process or examination.**

Keywords: **Monitoring; Computer Infrastructure Management; Distributed System; Computer Network; Real-time.**

I. INTRODUCTION

Computer infrastructure monitoring systems cannot be separated from the process of monitoring some hardware that is often lost or not automatically detected by a centralized system that has a significant impact, such as delayed learning process or exam for some students. Some hardware those may be missing or undetectable is a mouse, keyboard, graphics adapter, storage adapter, network adapter, services, and applications installed on the computer. This research is going to build a system that is able to conduct a comprehensive monitoring process on computer systems, especially computer infrastructure located in Computer Lab of Center for Computing and Information Technology Faculty of Engineering, Universitas Indonesia. The system development method used in this research is a prototyping [1] which consists of several stages, including identifying the requirements of system users, developing prototypes, determining whether prototypes can be used, and prototype implementations. The system development with a prototyping model is used because the problem is not properly structured and the data requirements are uncertain.

A. Prototyping Model

The prototyping model is a model used to identify detailed input, processing, or output requirements. In different cases, the developer might be not sure of the efficiency of the algorithm, adaptability to the system, or the interaction form between human and computer to be performed, so that the prototyping model (Pressman, 2001) can be applied.

There are two kinds of prototypes. Type I prototype is a model that will develop into an operational system. The Type II prototype is a discardable model that serves as a blueprint for the operational system. The approach to the Type I prototype is only possible if prototyping equipment enables prototypes to load all the essential elements of the new system while the Type II prototype approach is conducted if the prototype is only intended for the display as operating systems and is not intended to contain all the essential elements (McLeod, 2001).

B. Database Management System

DBMS (Database Management System) is a software that allows users to define, load, maintain, and manage access to databases (Connolly and Beg, 2010). DBMS is a software that interacts with users of application programs and databases.

C. Distributed System

The distributed system is a computer system that is geographically distributed, the system has databases, functions, and processes distributed. The common architecture for distributed systems is a local area network (LAN) client/server system [2]. The advantage of a distributed system is that when designed properly, it is able to integrate different applications running on different computer system into one system [3].

D. Real-time Application

Real-time application is an application that manages a hardware and software system that is limited by time span and has clear deadlines relative to the time of an event or operation such as manufacturing process control, or high-speed data

acquisition devices. The unique characteristic of real-time application is that it not only provides the correct response but also responds within a certain time frame. The real-time system is the set of all hardware system elements, operating systems, and applications required to meet the system requirements [4].

E. Windows Instrumentation Management

Windows Management Instrumentation (WMI) is an infrastructure for data management and operation on Windows operating systems. Writing programming using WMI support can automatically run administrative tasks on computers that are connected to the network. WMI implements the functionality described in WMI class function and class characteristic called WMI Provider and WMI Class [5].

F. Programming Language C#

C# is an object-oriented programming language that is modern, created and developed by Microsoft along with the .NET platform. There is various software developed with C# and .NET platform: office applications, web apps, websites, desktop apps, mobile apps, games and more. C# is a high-level language like Java and C ++ and, to some extent, other languages like Delphi, VB.NET and C. All C# programs are exploring. The C# language consists of a set of definitions in the class that include the functions and functions of a computer-run program [6].

G. Local Area Network (LAN)

Local Area Network (LAN) is a network bounded by a relatively small area, generally restricted by an environmental area such as an office building, or a school, and usually not far from about 1 square kilometer. Some LAN configuration models, one computer then become a File Server. The server is used to store network activities devices, or as software that can be used by computers which are connected to the network. The computers that are connected to the network are commonly called workstations. Usually, a workstation capability is lower than a File Server and has other applications in the storage devices. Most of LAN use the media cable to connect one computer to another.

H. Network Topology

Network topology is a way to connect one computer with another computer to form a network. There is one central computer or hub, all computers in the network are directly connected to the central.

I. Client/Server Computing

Client/server computing is a system model that divides processing between clients and servers residing within the network, providing a specific function to a computer machine, so it's able to process an instruction or command [1].

J. Black Box Testing

Black-box testing is an approach to testing where test results are obtained from the program or component specifications. In this case, the black box testing is more focused on the functional requirements of the software and not from its implementation (Sommerville, 2001).

II. METHOD

The research method used in this research was the prototyping model development system. There are several stages in system development using this methodology [1], including Identification of Users' Requirements, Prototype Development, Prototype Validation, and Operating the Prototype

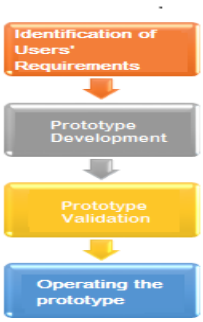


Figure 3.1. System Development Stages

A. *Identification of Requirements*

At this stage, developer and users met and objectively defined the whole of the software and identified all the requirements and outline of system coverage. Information requirements analysis was done by discussing with the users, which were the System Administrators in the Information Technology division so that at this stage would be obtained the expected results. At this stage, several steps can be done to identify and analyze Requirements are as follows [1]:

a. Problem Identification

The problem faced was how to develop a system for monitoring hardware and services system that were in the computer system in the Lab. Data collection was done by observing the operation of some installed devices in the computer system. It was conducted based on type, object, source, and preparation of data collection. Object and source of data consist of elements, characteristics, population, and sample. Preparation of data collection was done technically and nontechnically. The data could be obtained directly or indirectly. The data and information collection was conducted through the collecting process of information resources by the user of information.

b. Users Restriction Analysis

The process undertaken at this stage was to define user limits. Information obtained from discussion with IT Administrator, that system user consists of only one user, the IT Administrator. It was caused by the fact that the monitoring function may only be performed by a single user, the IT Administrator.

c. System Requirements Analysis

This stage was the process of determining some functions would be built, including the determining monitoring function of computer hardware.

d. User Requirements Analysis

The activity undertaken at this stage was determining the requirements of the system user. The requirements of users were obtained by determining the function of the system where the users could access information related to the computer infrastructure.

e. Information Requirements Analysis

This stage was the process of information requirements analysis needed by the system user. The information requirements referred to information needed to show the detailed data, notification system and the search system.

f. System Analysis

At this stage, an observation was done to collect system requirements. The system requirements specification that had been analyzed was a system that was able to know the detailed availability of computer devices, take over the computers even though they were in different places, and notify the computer Administrator if there were problems related to the computer infrastructure, especially the computer network.

B. Prototype Development

The prototype was developed through several stages as follow [7]:

a. Database Design

This stage was the stage of designing a specific database related to installing computer devices in the computer system. The design was done by using SQL Server 2014 database software.

b. System Interface Design

The system interface was designed by using Visual Studio 2015 to get a detailed design that described the overall system functionality.

c. Alternative System Configuration

This stage was the stage of determining the specification of the hardware and software requirements which were required to run a computer monitoring system. At this stage, some software was required to support the implementation of the design result. Software specification used in the prototype development of the system including SQL Serves 2014 as the database processor, C# as the programming language, and Visual Studio 2015 as the programming language editor.

C. Prototype Validation

The developed prototype was then explained its function to the users. The prototype testing would be done directly by the users by checking the functions of the system. If the developed prototype satisfied the users then proceeded to step 4, Operating the prototype. If the prototype failed to satisfy the users then the prototype would be revised by repeating step 1,2, and 3 (Figure 3.2) with additional input or suggestions for improving the prototype.

D. Operating the Prototype

The final stage of System Development by using Prototyping Model was operating stage. At this stage, the prototype would be explained how to use operational functions of each part in the system.

III. RESULT AND DISCUSSION

A. Requirements Identification Results

1. Problem Identification Result

In improving the process of monitoring the computer infrastructure in the classroom, IT Administrator has not yet had the relevant system to perform real-time monitoring using computer network that has been built, it is necessary to build a system that is able to perform the process of computerized and network connected monitoring.

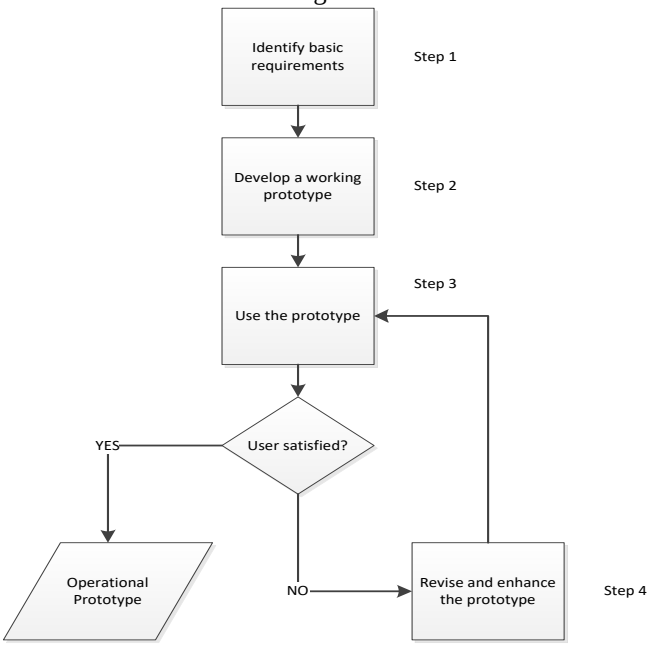


Figure 3.2. Prototyping Model

The process of monitoring the infrastructure currently being carried out was by direct inspection if there are reports from users, for example by calling the IT Administrator directly if there is a problem related to hardware or network so that from time aspect would charge the IT Administrator to conduct an infrastructure inspection.

Based on the above information, several problems that arise, including:

- There was no computerized monitoring process so the computer inspection process became ineffective.
- There was no computerized notification process in case of hardware and software related problems using the network.
- Unavailability of audit report process to some problems that arise related to process monitoring of computer infrastructure.

2. User Restrictions

The users of this system consisted of only one person, the Administrator, who had the authority to access all parts of the system, such as the process of monitoring computerized infrastructure.

3. System Requirements Analysis Results

The developed system would be named CCIT Surveillance System (CCSS) which would have several features, including:

- The function of computerized monitoring to the computer infrastructure.
- Tools to provide immediate notification if there were infrastructure related issues.

4. User Requirements Analysis Results

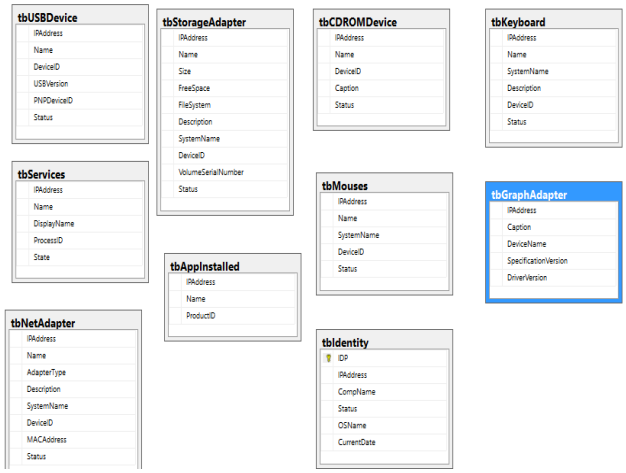
The needs of users which successfully identified were:

- Required a system that was accessible on both server and client sides in real-time.
- Required a system that was able to notify the Administrator directly if a problem had occurred related to the computer infrastructure.
- Required a system that was able to manage the monitoring results in the form of reports.

5. Information Requirements Analysis Results

Referring to the results of discussions with the IT Administrator, it found the needs for information required by the researcher, including:

- Displayed the details of data. The data displayed were the status of the mouse, keyboard, storage device data, computer addresses, services and applications installed on the computer.
- Notification information if there was a problem with the system.
- The system had a search function to display specific information, such as a computer address and a specific computer infrastructure.



- Figure 4.1. Database Design

6. System Analysis Results

The developed system should have several facilities, including:

- Monitoring System

  In this section, the system was able to perform real-time monitoring of some components of the computer infrastructure. In this section, client-based applications would be installed on the computer and provide detailed information about the computer's infrastructure status. The data would be stored into the database provided and the server would display the data if needed.
- Remote Computer Monitoring System
- The system could perform remote computer monitoring using network devices.
- Notification System
- The system could notify directly to the Administrator if a problem with the computer infrastructure was detected.
- Reporting System
- The system could print computer infrastructure data in the form of reports for audit purposes.

B. Prototype Development Results

1. Detail of System Design

A system that was able to display some computer information, such as computer network, mouse, storage media, services, and computer graphics adapters. Administrators could view the status of each device listed in the system automatically. Any computer that installed the automation system could display detailed information on its computer information. The system was designed using a data flow diagram to view the data transmission of each process.

2. System Interface Design Results

The design of the developed system interface consisted of database design, menu interface, and submenu.

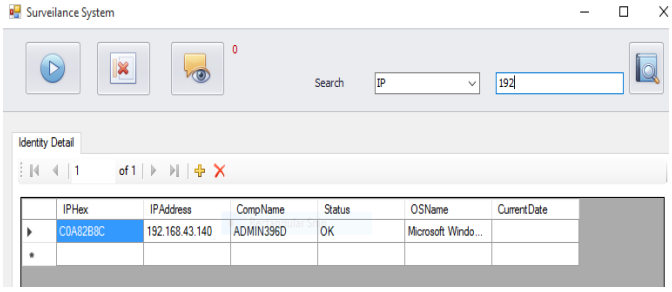


Figure 4.2. System Menu Design

Menu design was done to provide a clear picture of the information that would be displayed. Basically, the menu design consisted of several parts, including navigation menu, search and display data as shown in Figure 4.2.

The sub-menu interface design was used to display detailed information about the status of the scanned computer. The design of the interface can be seen in Figure 4.3.

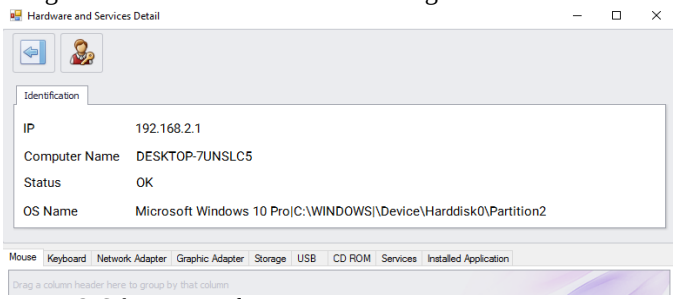


Figure 4.3. Sub-menu Interface Design

3. Alternative System Configuration

Hardware requirements for servers and clients were different in terms of performance. In order to the system developed could work optimally, the minimum hardware requirements that recommended for the server and client were as follows:

Server

- Processor Core i3 2.1 GHz. High-speed processors are needed for the system to work properly and the process can take place quickly.
- 4 GB memory is used to support the performance of the system to run properly, required large memory capacity.
- Minimum storage capacity 1 GB for system installation.
- Monitor resolution 1152 x 864. The display system will be better if using a high-resolution monitor.

Client

- Dual Core Processor 1.8 GHz.
- 2 GB of memory.
- Minimum 500 MB storage capacity for system installation.
- Monitor resolution 1152 x 864. System display will be better if using a high-resolution monitor.

C. Prototype Validation Results

At this stage, the test was held by using black box testing method, where each function was tested to get the expected results. The cases that have been tested can be seen in Table 4.1.

Table 4.1. Black Box Testing

Test Case	Input Value	Scenario	Expected Results	Test Result
Display of the Main Page	Correct	Users press the navigation *monitoring* button.	Displays the information about the identity of the computer	Success
		Users press the *Stop* button.	Stopping the process *monitoring* of infrastructure computer.	Success
		Users press the *information notification* button.	Get the Information	Success
		Users press the *Export* to *File* button.	Obtain the device information report.	Success
		The System displays computer information on *Datagrid*	Get computer device information on the *Datagrid*	Success
		Users press the data grid to display computer details when the data grid is pressed.	*Datagrid* displays detailed computer information	Success
Detailed Page View	Correct	Displays the information of IP data, status and computer name.	Data showing on the panel to display IP, status, and computer name.	Success
		Function button to the remote client computer.	The client computer can be remote	Success
		Function button to return to the main menu.	Users can return to the main menu.	Success
		Function to display mouse data.	Mouse data can be visible in the Datagrid	Success
		Function for displaying keyboard data.	The keyboard data can be visible on the Datagrid.	Success
		Function for displaying network device data.	Network device data can be visible on the Datagrid	Success
		Function to display monitor device data.	Monitor device data can be visible on the datagrid	Success
		Function to display storage media data.	Storage media data can be visible on the Datagrid	Success
		Function to display *universal serial bus* data.	USB data can be visible on the Datagrid	Success
		Function to display *CD-ROM* data.	The CD-ROM data can be visible on the Datagrid	Success
		Function to display computer service data.	The computer services data can be visible on the Datagrid	Success
		Function to display application data installed on the computer.	Application data can be visible on the Datagrid	Success
Remote Desktop Display Function	Correct	The function of the connection button to gain access to the client computer.	Users successfully to remote client computer	Success
		The function of the Disconnect button to stop connecting to the client computer.	Disconnect from client computer	Success

D. Prototype Implementation Result

Prototype implementation result is divided into two:

1. Operating System Functions On The Client

❖ Store Mouse Device Data

The data stored while running this function is the computer address, device name, user's computer name, device ID, and mouse device status (Figure 4.4).

IPAddress	Name	SystemName	DeviceID	Status
192.168.43.149	USB Input Device	ADMIN396D	USB\VID_203A&PID_F...	OK
192.168.43.149	USB Input Device	ADMIN396D	USB\VID_203A&PID_F...	OK
192.168.43.149	Parallels Mouse Synchronization Device	ADMIN396D	ACPI\PNP0F03\4&184...	OK

Figure 4.4. Mouse Device Data

❖ Store Keyboard Device Data

The next function is a function to store keyboard data installed on a computer system. Data is stored every second after the function is executed by the system (Figure 4.5).

IPAddress	Name	SystemName	Description	DeviceID	Status
192.168.43.149	Enhanced (101- or 102-key)	ADMIN396D	Standard PS/2 Keyboard	ACPI\PNP0303\4&1846B261&0	OK

Figure 4.5. Keyboard Data

❖ Store Network Device

The function that is run is used to store the data of computer network devices, such as hardware adapters. The data adapter is stored in the database once every second. The test results of the function can be seen in Figure 4.6.

IPAddress	Name	AdapterType	Description	SystemName	DeviceID	MACAddress	Status
192.168.43.149	Microsoft Kernel Debug Network Adapter	N/A	Microsoft Kernel Debug Network Adapter	ADMIN396D	0	N/A	N/A
192.168.43.149	Intel(R) 82574L Gigabit Network Connection	Ethernet 802.3	Intel(R) 82574L Gigabit Network Connection	ADMIN396D	1	00:1C:42:2B:30:89	Connected
192.168.43.149	Microsoft ISATAP Adapter	Tunnel	Microsoft ISATAP Adapter	ADMIN396D	2	N/A	N/A
192.168.43.149	Microsoft Teredo Tunneling Adapter	Tunnel	Microsoft Teredo Tunneling Adapter	ADMIN396D	3	N/A	N/A

Figure 4.6. Network Data

❖ Store Universal Serial Bus (USB) Data

USB data is required by the Administrator to check some of the connected devices to the computer system. The stored USB data includes computer address, device name, device ID, USB version and device status. The result of the function that runs on the client computer produces the data as shown in Figure 4.7.

IPAddress	Name	DeviceID	USBVersion	PNPDeviceID	Status
192.168.43.149	USB Root Hub	USB\ROOT_HUB20\4&1387C2E6&0	N/A	USB\ROOT_HUB20\4&1387C2E6&0	OK
192.168.43.149	USB Root Hub (xHCI)	USB\ROOT_HUB30\4&39A6351E&0&0	N/A	USB\ROOT_HUB30\4&39A6351E&0&0	OK
192.168.43.149	USB Root Hub	USB\ROOT_HUB\4&2FB9F663&0	N/A	USB\ROOT_HUB\4&2FB9F663&0	OK
192.168.43.149	USB Composite Device	USB\VID_203A&PID_FFF9\0XFA20000005AC8509	N/A	USB\VID_203A&PID_FFF9\0XFA20000005AC8509	OK
192.168.43.149	USB Printing Support	USB\VID_203A&PID_FFFA\TAG21D87ACA0	N/A	USB\VID_203A&PID_FFFA\TAG21D87ACA0	OK
192.168.43.149	USB Printing Support	USB\VID_203A&PID_FFFA\TAG2982A5F8C	N/A	USB\VID_203A&PID_FFFA\TAG2982A5F8C	OK
192.168.43.149	USB Composite Device	USB\VID_203A&PID_FFFC\PW3.0	N/A	USB\VID_203A&PID_FFFC\PW3.0	OK

Figure 4.7. USB Data

❖ Store Services Data

Network administrators need to check the services of the software running on the computer system. Monitoring covers computer address data, service names, on-going software names, process IDs, and system service statuses. The executed function manages to get data every second to enter data related to the computer system service (Figure 4.8).

IPAddress	Name	DisplayName	ProcessID	State
192.168.43.149	lfsvc	Geolocation Service	904	Running
192.168.43.149	LicenseManager	Windows License Manager Service	396	Running
192.168.43.149	lltdsvc	Link-Layer Topology Discovery Mapper	0	Stopped
192.168.43.149	LSM	LSM	656	Running
192.168.43.149	MpsSvc	Windows Firewall	1428	Running
192.168.43.149	MSDTC	Distributed Transaction Coordinator	3216	Running
192.168.43.149	MSOLAP$DBSERVER	SQL Server Analysis Services (DBSERVER)	1820	Running
192.168.43.149	MSSQL$DBSERVER	SQL Server (DBSERVER)	7608	Running
192.168.43.149	MSSQLFDLauncher$DBSERVER	SQL Full-text Filter Daemon Launcher (DBSERVER)	7464	Running
192.168.43.149	NcbService	Network Connection Broker	952	Running
192.168.43.149	NlaSvc	Network Location Awareness	912	Running
192.168.43.149	Parallels Coherence Service	Parallels Coherence Service	1804	Running
192.168.43.149	Parallels Tools Service	Parallels Tools Service	1928	Running
192.168.43.149	PrlVssProvider	PrlVssProvider	2068	Running
192.168.43.149	ReportServer$DBSERVER	SQL Server Reporting Services (DBSERVER)	2680	Running
192.168.43.149	RpcEptMapper	RPC Endpoint Mapper	708	Running
192.168.43.149	SamSs	Security Accounts Manager	572	Running
192.168.43.149	Spooler	Print Spooler	1340	Running
192.168.43.149	sppsvc	Software Protection	6460	Running
192.168.43.149	SQLBrowser	SQL Server Browser	2180	Running
192.168.43.149	SQLWriter	SQL Server VSS Writer	2172	Running
192.168.43.149	SSDPSRV	SSDP Discovery	1004	Running
192.168.43.149	StateRepository	State Repository Service	2392	Running
192.168.43.149	stisvc	Windows Image Acquisition (WIA)	2232	Running
192.168.43.149	VSStandardCollectorService140	Visual Studio Standard Collector Service	812	Running

Figure 4.8. Services Data

2. Operating System Functions On The Server

The function of the operating system on the server computer is used for the monitoring process of every computer

device installed in the computer system, the computer device consists of the mouse device, keyboard, universal serial bus, system services, graphics, computer network, CDROM, and installed applications. There are several functions associated with the operating system on the server computer, including:

❖ Computer Identity Monitoring Function

The function that is run is used for monitoring the process of general information on computer identity. The identity of the computer successfully displayed is the computer's address data, computer name, status, and name of the operating system used (Figure 4.9).

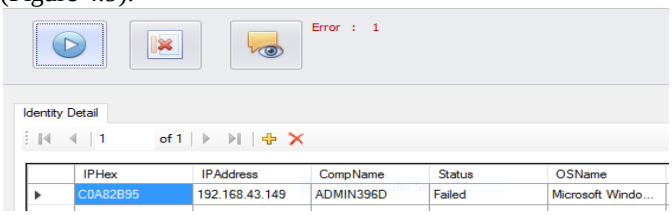


Figure 4.9. Computer Monitoring Result

The monitoring result in Figure 5.8 explains that there is one computer network device that is not connected to the server, this can be caused by the cable device that is not connected to the computer. The system error indicator is indicated by displaying an error message, i.e Error: 1 which means there is 1 computer not connected to the computer system.

❖ Mouse Device Monitoring Function

The computer monitoring functionality is used to facilitate IT Administrators to get detailed information related to the mouse device. The information displayed consists of computer address, device name, user's computer name, device ID, and mouse device status (Figure 4.10).

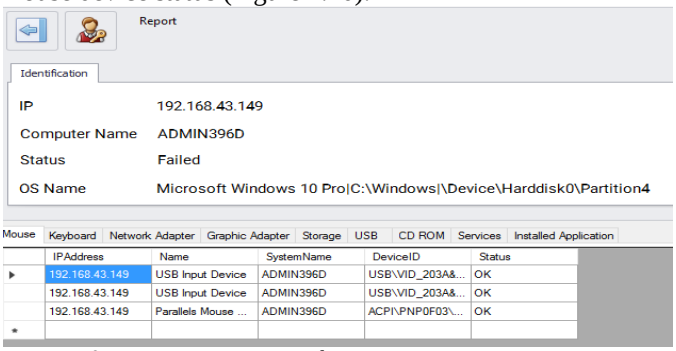


Figure 4.10. Mouse Monitoring Result

❖ Keyboard Monitoring

Keyboard device information needs to be displayed for general device information details. The information displayed consists of the computer address, device name, computer name, device status, and device ID as seen in Figure 4.11.

Figure 4.11. Keyboard Monitoring Result

❖ Network Monitoring

The monitoring function of the network device is used to display information consisting of a computer network device, the name of the network device, the device type, the device description, the computer system name, the device ID, the physical address of the computer, and the status of the network device (Figure 4.12).

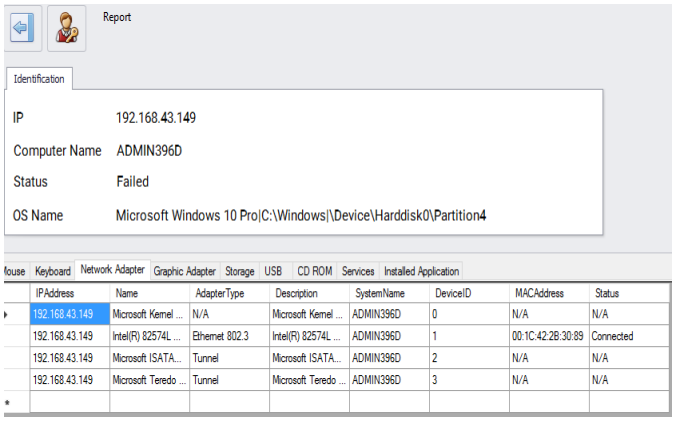


Figure 4.12. Network Monitoring Result

❖ USB Monitoring

The USB device monitoring function is used to display the computer's address data, device name, device ID, USB version and device status (Figure 4.13).

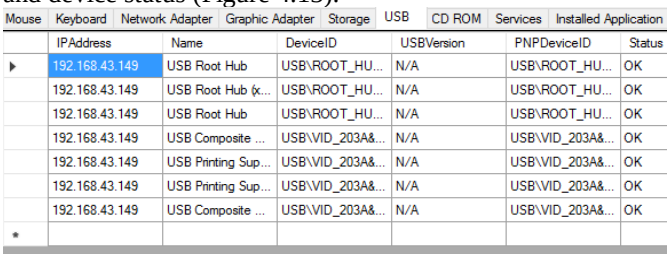


Figure 4.13. USB Monitoring Result

❖ Services Monitoring

Computer services is a service that runs in the background system when the operating system is run for the first time and provide specific functions. The information displayed consists of computer address, service name, current software name, process ID, and system service status (Figure 4.14).

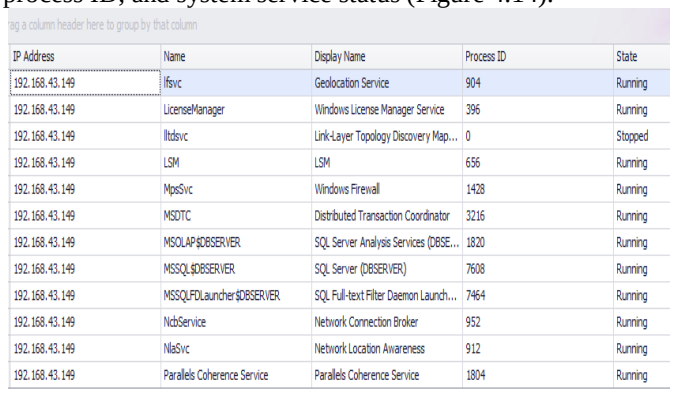


Figure 4.14. Services Monitoring System

E. Performance Measurement Results

The performance measurement of computer infrastructure monitoring process was done on one server computer and a client computer. The parameters used for this performance measurement were the use of a computer processor and memory. On the client side, with the process name RealTimeMonitoring.vshost.exe, processor performance measurement obtained data that the monitoring system used 0.61% processor of the total 100% (Figure 4.15).

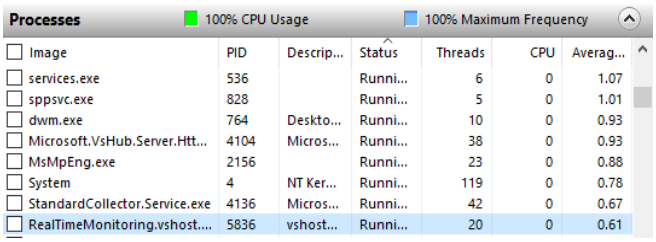


Figure 4.15. Processor Performance Measurement from Client Side

The client-side monitoring system used 38.284 KB (0.0365 GB) of memory from a total of 4 GB of memory used (Figure 4.16). From the performance measurement results concluded that the monitoring system on the client side did not burden the performance of the processor and did not require excessive computer memory usage.

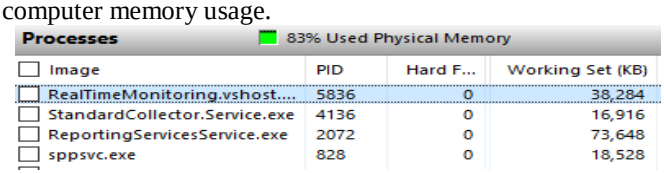


Figure 4.16 Memory Performance Measurement from Client Side

On the server side, with the process name ServerManager.vshost.exe, performance measurement of the processor found that the monitoring system used 1.01% processor consumption of the total 100% (Figure 4.17).

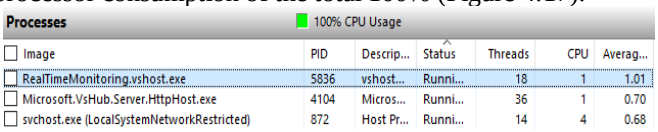


Figure 4.17. Processor Performance Measurement from Server Side

The measurement of the computer's memory performance on the monitoring system from the server side showed that the system used 58.620 KB (0.056 GB) from a total of 4 GB used (Figure 4.18). The system usage did not burden the computer's performance significantly in terms of memory and processor.

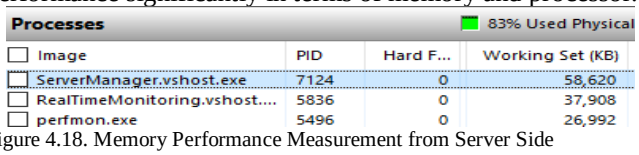


Figure 4.18. Memory Performance Measurement from Server Side

IV. CONCLUSION

ICT has been widely used in rural areas. ICTs are used by individual and household communities, although they are mostly used only for social media and entertainment. In addition to individuals, in some regions, ICTs are also used to support journalism through village portals and community radio. ICT has also been used by farmers and fishermen. in addition, local governments have also used ICTs to promote their regions.

Most of ICT for development models in Indonesia, especially in rural area are the telecenter. The kind of telecenters has held in Indonesia such as PLIK, MPLIK, Information Village and DBT. Most of literatures states that this telecenter program was less successful.

Some ICT problems for development, especially in rural areas are revealed in the literature, such as problem of ICT programs for development (limited infrastructure, management and communication), territories problems (location, culture), e-literacy problems, and public awareness issues.

The challenge of ICT for development especially in rural areas is a literacy problems. ICT literacy itself, public awareness, cultural issues and the problem of unsuccessful various ICT programs for development, one of the reasons is illiteracy. In addition, Indonesia's territorial issues are quite difficult challenges, so an ICT model for development is really planned and mature. In addition, the important thing is that this work must be carried out together.

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