

Performance Analysis of Different Operating System for Desktop Virtualization in Vmware Using Rdp Protocol

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Abstract- This work deals with performance analysis of Windows Operating System using VMware. The communication protocol RDP is implemented on different Windows Operating System and are compared based on various parameters. The first part consists of the technical background of RDP implementation. The second part is based on the methodologies designed for the comparison of the operating systems. The features of RDP Protocol are taken into consideration to design the methodologies and determining the results. Based on the user requirement, the methodologies are divided into low and high user requirement. A number of applications are used to analyze the performance of the operating systems in RDP Protocol. The tests vary from server loading performance to monitoring and mapping of data transmission time, bandwidth and response time of the different Windows Operating System. Windows X is used as the host for the other operating system and characteristics of RDP Protocol are analyzed for other Windows Operating System.

Keywords- RDP protocol, Windows Operating System, virtualization, memory consumed bandwidth.

I. INTRODUCTION

Desktop Virtualization is the creation of a virtual version of the desktop including virtual hardware platform, storage and computer networks [1]. VMware is virtualization provider based software which is a subsidiary of Dell Technologies. VMware supports a number of protocols with RDP and PCoIP the main virtual desktop protocols. RDP Protocol is a proprietary protocol developed by Microsoft and is an integrated part of Windows server and desktop. RDP is a vital protocol for desktop virtualization solution and its prime function was remote connection function initially [2].

THEORETICAL BACKGROUND

1. VIRTUALIZATION

Virtualization is the creation of virtual resources rather than actual versions like the server, desktop, Operating System or network. The main goal behind virtualization is the management of workload just by transforming the traditional methods.

2. VIRTUAL DESKTOP

Virtual Desktop is a virtual operating system that does not directly run on the hardware of the actual system from which it is accessed by the user [3].

3. REMOTE DESKTOP PROTOCOL

Microsoft Remote Desktop Protocol is a Microsoft protocol designed to provide remote display and facilitate application data transfer security between devices, users and virtual network. It enables to connect one operating system to other operating system or more precisely connect two systems [4].

This paper analyses the performance of Windows 7(Pro) and Windows 8(Pro) on VMware with the most common being Windows 10(Pro) using RDP Protocol. All the professional version of Windows contains Remote Desktop by default.

Thus, a number of tests are conducted to determine which operating system performs better in VMware when RDP Protocol is implemented. VMware is a good platform to run a number of operating system simultaneously. The test methodologies are designed keeping in mind a number of factors thus making the experiment a different one.

Section I introduces the basic concepts that have been used in the project. Section II describes all the related work that have been used as references for the project. Section III contains the test methodologies designed for the experiments. It also describes the parameters that are taken into concern. Section IV describes the results that are obtained from the tests conducted. A number of factors like

Bandwidth, System Response Time, Memory Consumption are measured using the tests. Section V shares the conclusion of the tests conducted during the experiments.

II. RELATED WORKS

A number of tests have been previously performed to compare the virtualization protocols RDP and PCoIP. From thin client to VMware, there are a number of sources of creating virtual desktops. The two protocols have been compared using a number of applications that we run of the system.

The author Louis Casanova, Marcel, Edy Kristianto [1] has compared RDP and PCoIP Protocol in VMware Environment for Desktop Virtualization.

The author Jiri Kouril, Petra Lambertova [2] has presented the performance analysis along with the comparison of the various applications in the RDP protocol.

The author S.Saggar [3] Controlling Remote Desktop functions is explained clearly.

The author Anderson, CH. K.L. Griffin [4] has expressed various Windows Server 2008 Terminal Services.

The author R.Miseviciene, D.Ambraziene, N.Pazareckas, R.Zakarevicius, R.Plestys [5] tells us about virtual desktop infrastructure.

The author Stanek, W. R.Mistrovstvi [6] explains about Microsoft Windows Server 2008.

III. METHODOLOGIES

Two test sequences are prepared to analyze the performance of Windows 7 and Windows 8. A number of applications are installed and run according to the sequence so as to analyze them in both Windows 7 and Windows 8.1.

The two test sequences use applications like Microsoft Office 2007, VLC Media Player, Google Chrome and Whatsapp. We have analyzed the bandwidth (CPU Utilization), Memory Consumption, Data Sent and Received (in bytes) and Average Response Time.

Test Sequences:

Two test sequences, one for low user requirements and other for high user requirement have been created [1].

The first test sequence for low user requirement is-

- 1) Open 3 tabs for Google Chrome.
- 2) Minimize the browser.
- 3) Open Word
- 4) Type some data.
- 5) Open PowerPoint
- 6) Run PowerPoint

The second test sequence for high user requirement is-

- 1) Open 3 tabs for Google Chrome.
- 2) Minimize the browser.

- 3) Open Word.
- 4) Type some data.
- 5) Open Whatsapp and send a message to anyone
- 6) Open VLC Media player
- 7) Play audio/video.
- 8) Open PowerPoint
- 9) Run PowerPoint.

A number of parameters need to take care of while implementing the RDP Protocol. Remote Desktop Connection has a number of parameters that can be altered while implementing the RDP Protocol. Table 1 shows the parameters and how three presets are created using these parameters [2].

The following parameters are used -

- Desktop Background- Whether to set a background for the remote desktop or not.
- Font Smoothing- Anti-aliasing techniques are used to draw the curves and diagonals of font characters to make them more realistic.
- Desktop Compilation- The specific compiler used for processing.
- Show window content while dragging- This parameter enables the window content while dragging the screen.
- Menu and Window Animation- Displays the menu and some of the animations.
- Visual Styles- It includes the theme and background changes.
- Bitmap Caching- The images and other bitmap resources are locally stored on the client computer so that they can be reused later.
- Transmission line speed- The different speed of the transmission lines is used.

Note- ‘x’ symbol is used to enable the following parameters used.

‘✓’ symbol is used to disable the following parameters used.

Table 1. Parameter Settings

PARAMETERS	PRESET 1	PRESET2	PRESET3
Desktop Background	x	x	✓
Font Smoothing	x	x	✓
Desktop Composition	x	x	✓
Show Window Content While Dragging	x	x	✓
Menu and Window Animation	x	x	✓
Visual Styles	x	✓	✓
Bitmap Caching	✓	✓	✓
Transmission Line Speed	56 kbps	256 kbps	LAN

IV. RESULTS

The first test thus performed represents (Figure 3) monitors memory consumption when the terminal session of the RDP protocol is established. The test depends on parameter settings (Table 1) of user sessions [2]. The test is conducted on both Windows 7 and Windows 8.1 (professional version). The successful establishment of the terminal session is said to happen when the user successfully logs into the system and the user is successfully able to see the displayed desktop.

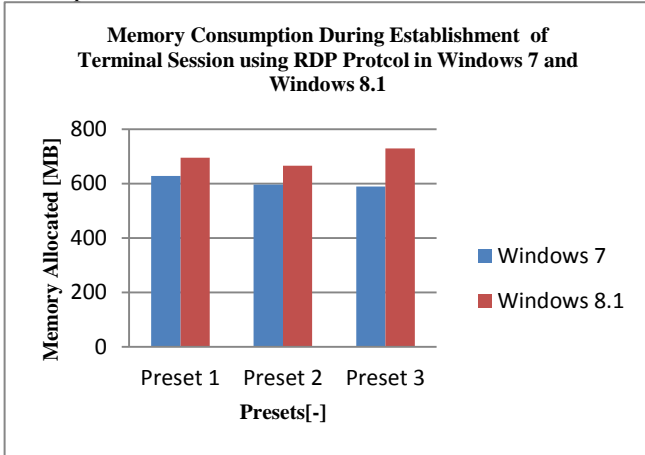


Figure 3. Memory Consumption during Establishment of Terminal Session Using RDP Protocol in Windows 7 and Windows 8.1

For Preset 1, the memory consumption is 61% and 67% in Windows 7 and Windows 8.1 respectively. Similarly, for Preset No.2 and Preset No.3, the memory consumption values are found. It is found that memory consumption increases by 4% in Preset 3 as compared to Preset 1 (Windows 8.1) and a 4% decrease in memory consumption in Preset 3 as compared to Preset 1 (Windows 7). Thus, a change in parameters leads to a change in memory consumption values.

The next test focuses on the consumption of memory consumption on the basis of system requirements. Figure 4 shows memory consumption values for both low and high system requirements in Windows 7 while figure 5 depicts memory consumption value for low and high system requirement for Windows 8.1.

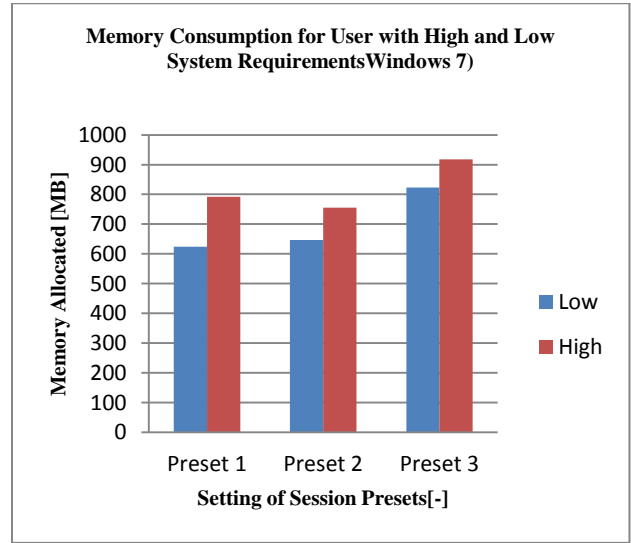


Figure 4. Memory Consumption for User with High and Low System Requirements (Windows 7)

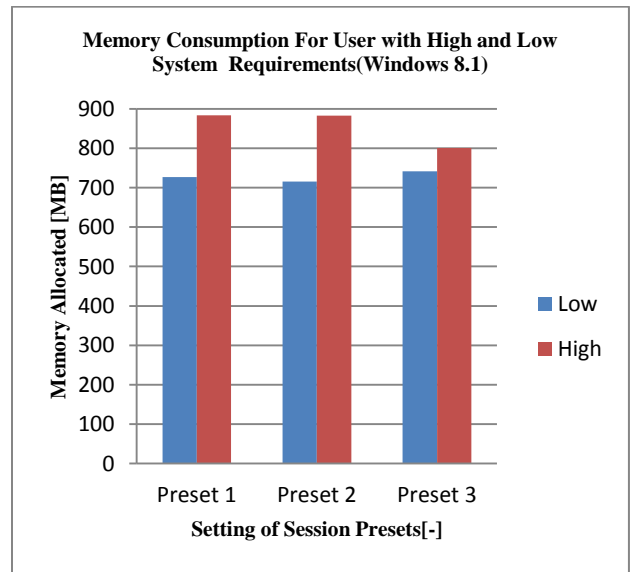


Figure 5. Memory Consumption for User with High and Low System Requirements (Windows 8.1)

Thus, the memory consumption of the three Presets in Windows 7 and Windows 8.1 is analyzed.

Further, we analyze bandwidth usage and system response time for both in both Windows 7 and Windows 8.1 for the three presets by implementing the RDP Protocol. Figure 6 and Figure 7 represent the bandwidth usage of various applications on implementing the RDP Protocol in Windows 7 and Windows 8.1. The bandwidth usage of Windows 8.1 is much more than Windows 7.

Figure 8 and Figure 9 represent the system response time on implementing the RDP Protocol in Windows 7 and Windows 8.1. These tests are conducted on the various applications installed for implementing the test sequences. These applications are Whatsapp, Chrome, Microsoft PowerPoint 2007, Microsoft Word 2007 and VLC Media Player.

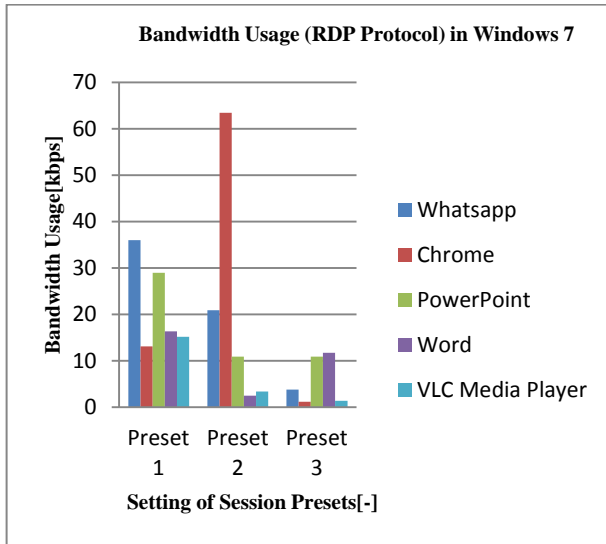


Figure 6. Bandwidth Usage (Windows 7)

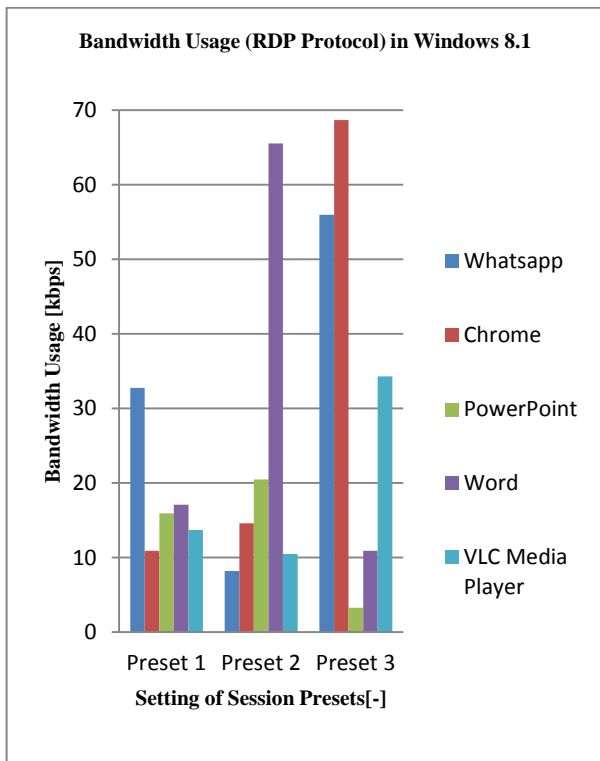


Figure 7. Bandwidth Usage (Windows 8.1)

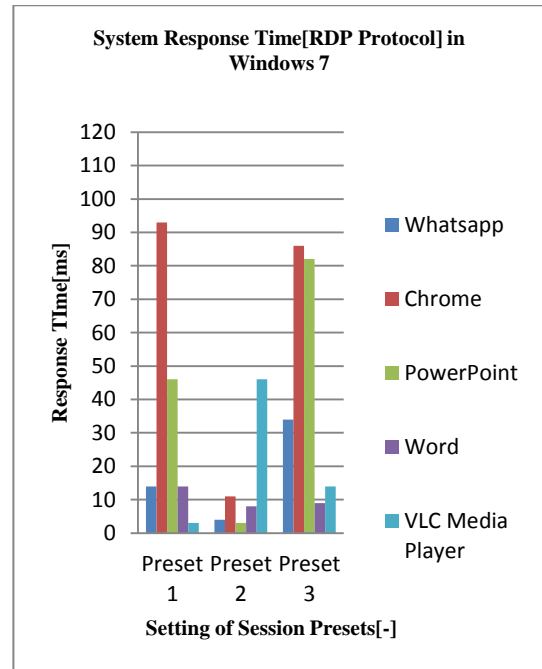


Figure 8. System Response Time (Windows 7)

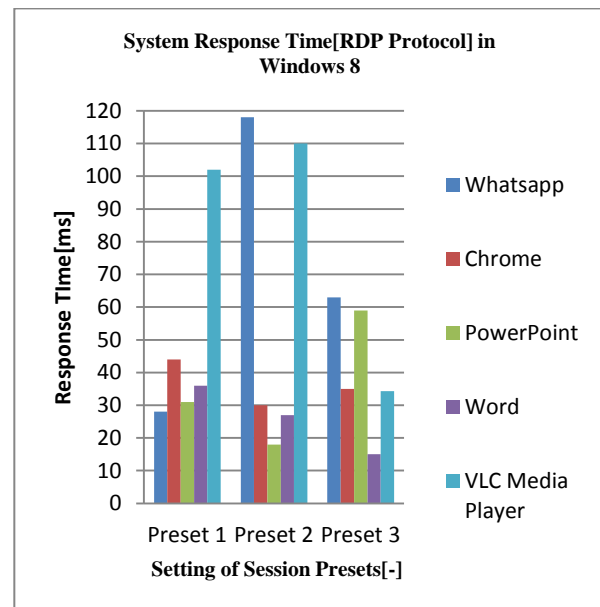


Figure 9. System Response Time (Windows 8.1)

V. CONCLUSION

Based on various parameters, a number of factors like bandwidth, memory consumption, response time and we compare the performance of Windows 7(Pro) and Windows 8.1(Pro) on VMware software environment by implementing RDP Protocol. Different test scenarios and methodologies are designed for the test. Depending on the transport

protocol, the utilization of hardware resources and the ability of a server to process user requests are computed for Windows 7(Pro) and Windows 8.1(Pro).

Remote Desktop Load Simulation Tools were primarily designed as the toolset specifically for testing the Microsoft Remote Desktop Services. The tests were used to compare the performance characteristics of Windows 7(Pro) and Windows 8.1(Pro) when RDP Protocol is implemented. Thus, it can be concluded that Windows 8.1 gives better performance.

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