



# Nuance Dragon<sup>®</sup> Medical Compatibility with VMware<sup>®</sup> View

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vmware<sup>®</sup>

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## Introduction

Dictation and transcription are ubiquitous functions in healthcare. Clinicians are able to spend more time with patients by dictating prescriptions, case notes, and diagnosis directly into clinical applications rather than using a keyboard to type data. Medical dictation software recognizes healthcare specific vocabulary and seamlessly converts dictated speech to text. This software is typically integrated into ambulatory and inpatient healthcare applications. Users interact with the application using a variety of USB and Analog multi-function microphones. Nuance is the leader in healthcare speech recognition and dictation software and Dragon Medical is integrated with the majority of the clinical applications used today.

VMware View, the market leading desktop virtualization software, is the cornerstone for VMware AlwaysOn Point of Care™ solution. This tested and validated solution provides clinicians with constant availability to their point of care applications and data through a virtual desktop that “follows” the user from device to device. Virtual desktops are fast, secure and mobile. The VMware AlwaysOn Point of Care solution enables clinicians to spend more time with patients and less time logging into desktops and applications.

Providers are eager to leverage Dragon Medical on VMware View, and to respond to this demand, Nuance and VMware conducted a series of tests to ensure that Dragon Medical running on VMware View provides the same dictation experience that end users are familiar with in a physical desktop environment. This document describes the functionality, hardware, and software that were tested, and provides the results of this testing.

## About Nuance Dragon Medical

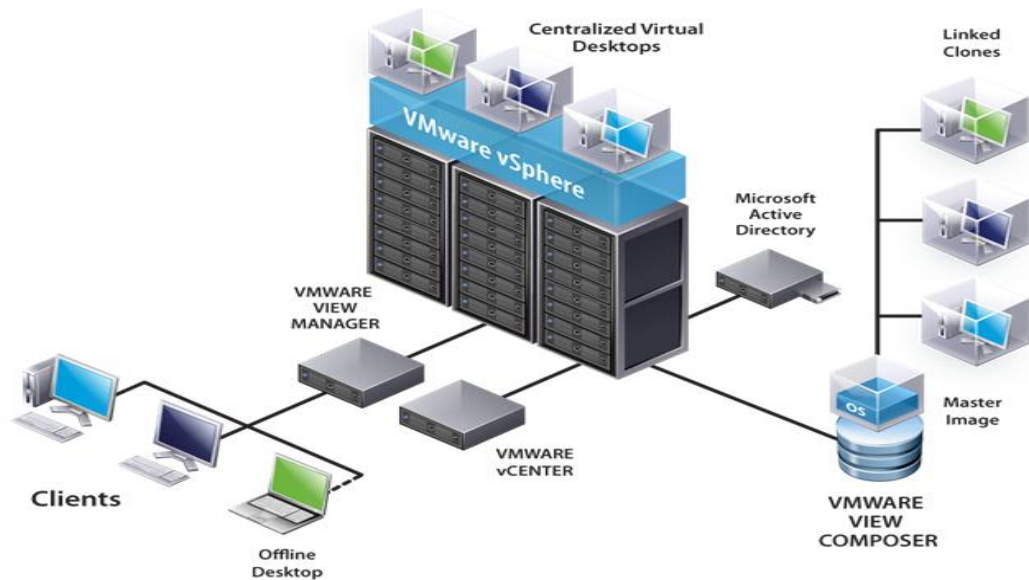
Dragon Medical is a real-time speech recognition program that works with virtually any Microsoft Windows®-based electronic health records (EHR) system or other application, for efficient report completion and voice-driven navigation. Its medical vocabularies cover over 60 specialties and subspecialties. Clinicians also save additional time by using customized voice commands, or “macros,” to enter frequently-dictated text with a single voice command. Additionally, the Dragon Medical Template Library—a library of more than two dozen macros for standard notes and an extensive list of “medical normals” by body system—facilitates rapid note creation.

## About VMware View

VMware View is the industry’s leading desktop virtualization platform, and the only purpose-built solution for delivering desktops as a secure managed service. Built on the proven power of VMware vSphere™, VMware View provides the platform, management tools and rich user experience that organizations need to reduce costs, streamline administration and increase end-user satisfaction.

Figure 1 depicts the typical architecture of a VMware View implementation showing its different features.

Figure 1: VMware View Components



Some of the features and benefits of VMware View are:

- **Reduce Operational Costs:** Centralizing your desktop infrastructure with VMware View makes it faster, easier and less costly for IT staff to provision, deploy, maintain and monitor desktop images across their entire life cycle.
- **Simplify Desktop and Application Management:** Using VMware View, we can manage tens of thousands of virtual desktops, applications and user data from a centralized administrative interface while simplifying key IT processes such as provisioning, configuration management, connection brokering, policy enforcement, and application assignment.
- **Deliver Rich User Experiences on Demand:** VMware View is the only solution that lets you deliver rich user experiences for end-users across your organization on any device at any location—online or off the grid. High-performance PC-over-IP (PCoIP) technology lets users work with their virtual desktops via a LAN or WAN connection, while VMware View Client with Local Mode enables them to work offline and leverage local processing resources. The result is a seamless user experience that combines the best of VDI and client virtualization.
- **Automated Desktop Provisioning:** Provides a single management tool to provide new desktops or groups of desktops, and an easy interface for setting desktop policies. Using a template, you can customize virtual pools of desktops and easily set policies, such as how many virtual machines can be in a pool, or logoff parameters.
- **Advanced Virtual Desktop Image Management:** Based on the mature Linked Clone technology, VMware View Composer enables the rapid creation of desktop images from a golden image. Updates implemented on the parent image can be easily pushed out to any number of virtual desktops in minutes, greatly simplifying deployment, upgrades and patches while reducing desktop operational costs. With the core components of the desktop being managed separately the process does not affect user settings, data or applications, so the end-user remains productive on a working desktop, even while changes are being applied to the master image.
- **Availability and Scalability:** VMware View delivers high availability, with no single point of failure. VMware High Availability (HA) ensures automatic failover and provides pervasive, cost-effective

protection within your virtualized desktop environment to ensure service level agreements are met and downtime is minimized. Advanced clustering capabilities on the physical and virtual layers provide enterprise-class scalability with no single point of failure. VMware View can also be integrated with existing systems management platforms already deployed within the enterprise.

## VMware View: “AlwaysOn” Point Of Care Desktop

As healthcare makes the transformation from a paper-based model to a digitized electronic medical record model, clinical desktops and applications have to be available at all times. This is not just mission critical; it is life critical. That is why modernization of the Point-of-Care desktop and increasing access to these new clinical workspaces has become an urgent priority for hospital IT professionals as well as hospital caregivers. Desktops and patient care applications must be immediately accessible at all times, security mandates must be met; and the access to these systems must be fast and easy for the clinician.

VMware View, a key component of the AlwaysOn Point of Care solution, modernizes desktops and applications by moving them into the cloud and delivering them as a highly available managed service. From the end user’s perspective, View makes it easy to use any qualified device (PCs, thin clients, zero clients, iPads, etc.) to access clinical desktops and Point of Care applications. Since the desktop is always up and running in the datacenter, access is immediate without boot-up times and the caregiver can roam from device to device and have their desktop and applications “follow” them from room to room. Integration with major single sign on vendors allows clinicians to use proximity cards or biometric authentication to gain access – no more passwords to remember, and strong authentication means IT has an audit trail. PHI data is secure as all data and information is in the datacenter and nothing is stored on the device that is accessing the desktop.

The ability to use Nuance’s industry leading Dragon Medical software with the VMware Point of Care desktop solution enhances the clinical workflow by allowing clinicians to leverage familiar dictation devices like the Philips SpeechMike and the Nuance PowerMic™ to interact with clinical applications running on the virtual desktop.

## Validation Testing Process

### Testing Goals

Testing was conducted to validate the interaction of USB and Analog microphones attached to thick and thin client devices, with Dragon Medical running on a VMware View virtual desktop. The primary goal of these tests was to determine if audio quality and control functionality from USB/Analog peripherals attached to the end user device connected to a VMware View virtual desktop met the requirements for Dragon Medical to be able to perform speech-to-text conversion and application control.

The testing had the following objectives:

- Verify the functionality of representative end-user features of Dragon Medical when running on a VMware View virtual desktop.
- Verify the functioning of the following microphones/peripherals when interacting with the Dragon Medical software running on a VMware View virtual desktop and ensure accurate functionality:
  - Nuance PowerMic II, including button and integrated barcode scanner functionality in Dragon
  - Philips SpeechMike, including button and mouse/trackball functionality
  - Analog headset such as the standard headset shipped with Dragon, without the USB



pod installed

- Measure the network bandwidth consumed by dictation traffic between the microphone on the end user device and Dragon Medical running on VMware View virtual desktop. Determine maximum number of virtual desktops that could be run on a specific host with simultaneous ongoing dictation sessions.
- Measure Dragon Medical speech recognition engine performance when the View Desktop environment is saturated
- Provide best practices for optimal functioning of USB and Analog microphones with Dragon Medical running on a VMware View desktop.
- **Note:** Though this testing was performed with Dragon Medical Practice Edition, the results also apply to Dragon Medical 360 | Network Edition (DM360 Network Edition).
  - In Both the Dragon Medical Practice Edition and DM360 Network Edition, the speech recognition occurs on the client desktop – which is virtualized with VMware View.
  - Although the speech engine for these versions vary slightly, the CPU and memory load are similar, and won't affect performance in any significant way.

### Test Methodology

The Dragon Medical application was installed within a VMware View virtual desktop and a series of functional user scenarios were tested using different peripheral microphones attached to a variety of end user clients connected to the virtual desktops.

Different test scenarios were executed against Dragon Medical running in the VMware View virtual desktop, such as Dictation, speech-to-text conversion, Play Back, and Roaming User Profile etc. Details of testing are discussed in “Test Results” section.

### Physical Hardware and System Host Configuration

Table 1 describes the configuration of servers, storage and client hardware used in the solution architecture.

**Table 1: Client Hardware Configurations**

Hardware	Configuration
Microphones Tested	<ul style="list-style-type: none"> <li>• Philips SpeechMike 6274</li> <li>• Nuance PowerMic II</li> <li>• Nuance PowerMic II – SC (with Scanner)</li> <li>• Wireless Mic: xTag from Revolabs, Inc.</li> <li>• Pen Mic: Buddy StylusMic from InSync Speech Technologies, Inc.</li> <li>• Andrea NC-181 (Analog Headset)</li> </ul>
Thin Client	<ul style="list-style-type: none"> <li>• Wyse R90LW WES (Windows XP embedded OS) (RealTek Sound Card)</li> </ul>
Teradici Zero Client	<ul style="list-style-type: none"> <li>• Wyse P20 (Firmware Version 3.3) (There was no speaker in it)</li> </ul>
Thick Client	<ul style="list-style-type: none"> <li>• Intel Core (TM) 2 U7600 @ 1.20 GHz, 2 GB RAM Windows XP SP3</li> </ul>

Hardware	Configuration
	( SigmaTel Sound Card)

## Installed Software

Table 2: Software Installed

Software Provider	Software Configuration
VMware	vSphere 5.0, vCenter Server 5.0 (Windows Version), VMware View 5.0
Microsoft	Microsoft AD/DNS
Nuance	Dragon Medical (Dragon Medical Practice Edition and DM360 Network Edition)
Philips	Philips SpeechMike Control Application (Downloadable from Philips website)

## Virtual Machine Configuration

Table 3 describes the configuration of VMware View virtual desktops and the infrastructure virtual machines used for this testing.

Table 3: Virtual Desktops Used in Testing

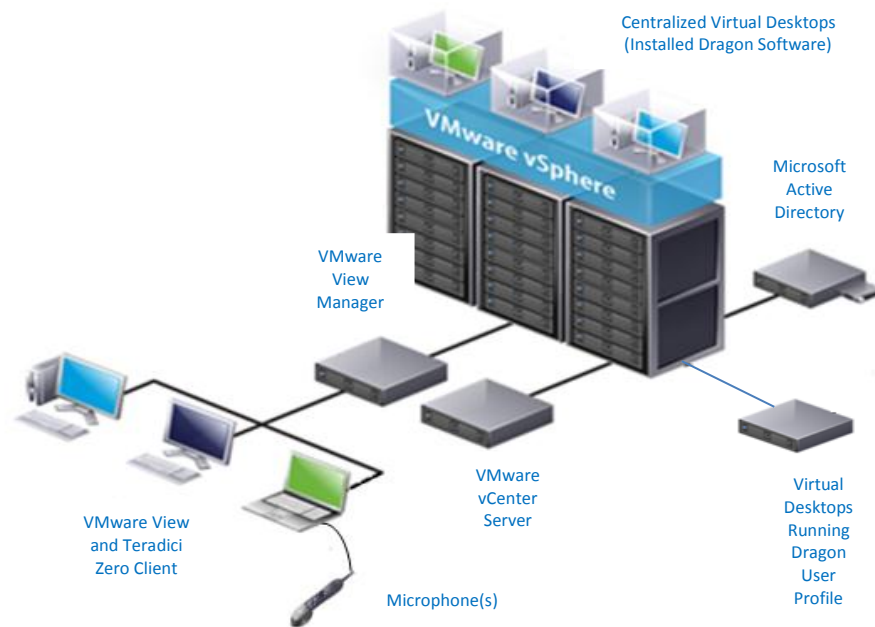
Virtual Machine (VIEW Desktops)	Hardware Configuration
Windows XP SP3 – 32 bit	<ul style="list-style-type: none"> <li>• 1 vCPU</li> <li>• 2 GB memory</li> <li>• 1 Ethernet card (flexible)</li> <li>• 30 GB storage (vmdk only)</li> </ul>
Windows 7 Professional 64-bit	<ul style="list-style-type: none"> <li>• 1 vCPU</li> <li>• 4 GB memory</li> <li>• 1 Ethernet card (e1000 driver)</li> <li>• 32 GB storage (vmdk only)</li> </ul>
Virtual Machine (SERVERS)	Hardware Configuration
VMware View Manager Server: Microsoft Windows Server 2008 R2 – 64 bit	<ul style="list-style-type: none"> <li>• 2 vCPU</li> <li>• 4 GB memory</li> <li>• 1 Ethernet card (E1000 driver)</li> <li>• 40 GB storage (vmdk only)</li> </ul>
VMware vCenter Server: Microsoft Windows Server 2008 R2 – 64 bit	<ul style="list-style-type: none"> <li>• 2 vCPU</li> <li>• 4 GB memory</li> <li>• 1 Ethernet card (E1000 driver)</li> <li>• 40 GB storage (vmdk only)</li> </ul>
AD/DNS Server:	<ul style="list-style-type: none"> <li>• 1 vCPU</li> </ul>

Virtual Machine (VIEW Desktops)	Hardware Configuration
Windows Enterprise Server 2003 – 64 bit	<ul style="list-style-type: none"> <li>• 1 GB memory</li> <li>• 1 Ethernet card (E1000 driver)</li> <li>• 15 GB storage (vmdk only)</li> </ul>

## Functional Test Configuration

The technical architecture for testing Nuance’s Dragon Medical application with VMware View is described below.

**Figure 2: Test Configuration**



- VMware View 5.0 virtual desktops configured with different versions of Dragon Medical, running on vSphere 5.0.
- The VMware View Manager, VMware vCenter Server and Windows AD/DNS running as virtual machines on vSphere.
- Thin, thick and zero clients on a shared corporate 100Mbps LAN.
- Connectivity between client devices and virtual desktops was over a shared corporate network.
- Different types and models of microphones (listed in table 1.2) were connected to thin, thick and zero clients.
- Philips SpeechMike speech control drivers were installed inside the virtual desktops in order to make the microphone control buttons work.
- Thin and Thick clients were configured to “auto connect” USB devices. See Recommendations section



for details.

- Human Interface Device (HID) USB redirection was configured for the microphones wherever needed. See Recommendations section for details.

## Functional Test Results and Findings

### Summary of Test Scenarios and Results

The summary of the tests and resulting observations is given below.

**Table 4: Test Results Summary:**

View Desktop	Desktop Accessibility <sup>1</sup>	Microphone	Dragon Medical Application Version	Test Status
Win XP SP3 Prof – 32 bit	Thin Client	Nuance PowerMic II (Without Scanner)	Practice Edition	PASS
Win 7 Prof – 64 bit	Zero Client	Philips SpeechMike	Practice Edition	PASS
Win 7 Prof – 64 bit	Thick Client	Analog Headset Mic <sup>2</sup>	DM360   Network Edition	FAIL <sup>3</sup>
Win XP SP3 Prof – 32 bit	Zero Client	Nuance PowerMic II – SC (WithScanner)	Practice Edition	PASS
Win 7 Prof – 64 bit	Thin Client	Philips SpeechMike	Practice Edition	PASS
Win 7 Prof – 64 bit	Thick Client	Nuance PowerMic II – SC (With Scanner)	Practice Edition	PASS
Win 7 Prof – 64 bit	Thick Client	Wireless Mic: xTag from Revolabs, Inc.	Practice Edition	PASS
Win XP SP3 Prof – 32 bit	Thin Client	Pen Mic: Buddy StylusMic from InSync Speech Technologies, Inc.	Practice Edition	PASS
Win 7 Prof – 64 bit	Thin Client	Nuance PowerMic II (Without Scanner)	DM360   Network Edition	PASS
Win 7 Prof – 64 bit	Zero Client	Philips SpeechMike	DM360   Network Edition	PASS

<sup>1</sup> VMware View Client is used when the desktop is accessed from thin or thick clients.

<sup>2</sup> Teradici bidirectional audio driver is installed in the virtual desktop to conduct the tests. Both the “playback” function and “recording” function were configured to use the Teradici audio driver.

<sup>3</sup> This scenario did not pass the voice quality check test and the use of this device (Analog Headset Mic) is not recommended with Dragon Medical running on VMware View.

## Bandwidth Utilization Measurements

During dictation with the various microphones connected to the desktop, PCoIP network bandwidth utilization is measured. The following table describes the utilization matrix for various operations:

**Table 6: Network Bandwidth Utilization**

Type of Operation	Avg. Network Utilization (Mbps)
Moderate Activity* in View Desktop with No Microphone Connected	0.16
Moderate Activity in View Desktop with PowerMic II connected and configured with Dragon Medical application. Microphone is turned on in Dragon Medical but no dictation is being done.	1.07
Moderate Activity in View Desktop and PowerMic II connected and configured. Microphone is turned on in Dragon Medical and dictation is being done.	1.08

\* Moderate activity is a series of manual steps including screen resize of Dragon Medical, typing text into DragonPad, and minimizing/maximizing DragonPad for a period of two minutes.

## Summary of Findings

The Dragon Medical application works well in a VMware View environment when using different makes/models of USB microphones.

The test results show that the user experience with Dragon Medical is the same as expected in physical desktop environment.

The dictation audio quality and speech-to-text conversion accuracy was excellent and no errors were observed.

The playback of dictation worked well with the built-in speaker on the Philips SpeechMike and the Nuance PowerMic II as well as thin and thick client integrated speakers.

There was no delay observed while dictating the sentences into DragonPad or WordPad.

All the tested microphone button operations worked as expected during dictation. The barcode scanner functionality of the PowerMic II microphone worked well.

A small delay (2-3 sec) is observed in reconnecting the microphone, when a user disconnects from one client/endpoint and reconnects from another client/endpoint.

In each case, Dragon Medical was configured to use Dragon Roaming User profiles.

These tests verified a cross section of functionality:

- Creating a Dragon Medical user profile with and without training
- Dictating into WordPad and DragonPad
- Correcting and editing text using Full Text Control commands in WordPad and DragonPad
- Using the Dictation Box within Dragon Medical
- Transcribing a recorded file; playing back and correcting the transcription

We also verified microphone functionality with several types of microphones:

- Nuance PowerMic II: microphone, speaker, joystick mouse controller, mouse buttons, customizable buttons, and barcode scanner all function correctly.
- Philips SpeechMike model 6724 with SpeechMike Control Software: microphone, speaker, trackball mouse controller, mouse buttons, and customizable buttons all function correctly (with some exceptions. See recommendations section)
- Buddy StylusMic: microphone only (we did not test the buttons). It functions correctly as a standard USB microphone.
- Revolabs xTag: microphone only (we did not test the earphone). It functions correctly as a standard USB microphone.

During a session roam, where a user disconnected from the virtual desktop at one location and signed on to the same virtual desktop at another location, Dragon Medical worked well when with the same or different make/model of USB microphone attached at the two endpoints. The ongoing session of Dragon Medical within the virtual desktop was not impacted and the user could continue dictating when reconnected.

When the View desktop session is disconnected from Thin or Thick clients and reconnected to the same session from Zero clients using Dragon Roaming User profiles, the user profile needed to be reloaded to continue the existing session, though there was no loss of text dictated from the previous connections.

## Performance Testing

Load tests were conducted with Dragon Medical Practice Edition running on VMware View to simulate a deployment scenario of concurrent virtual desktop dictation sessions deployed on a single physical host. The goal of this testing was to determine resource utilization impact and the maximum number of virtual desktops that could be run on a specific host with simultaneous ongoing dictation sessions. The results of this test are specific to a simultaneous dictation scenario on a specific host configuration and may not be directly applicable to a customer deployment for the following reasons:

- a. Customer's host configuration is different
- b. Not all clinicians are dictating simultaneously
- c. Virtual desktops with Dragon Medical might not all be deployed on the same host

### Performance Testing Methodology and Tools

VMware View Planner is a performance testing tool used to systematically simulate workloads and adjust sizing and configuration parameters to demonstrate the impact. View Planner simulates application workloads for various user types, (task workers, knowledge workers, and power users) by running applications typically used in a Windows desktop environment. During the execution of a workload, applications are randomly called to perform common desktop user operations, including open, save, close, minimize and maximize windows; view an HTML page, insert text, insert words and numbers, conduct a slideshow, view a video, send and receive email, and compress files. View Planner uses a patent pending watermark technique to quantify the user experience and measure application latency on a user client/remote machine. View Planner also has the capability to exercise custom applications like Dragon Medical using the AutoIT scripting framework.

Using VMware View Planner's customized workload capability, the Dragon Medical Practice Edition load testing script is automated using the AutoIT framework.

“Virtual Audio Cable (VAC)”, an application to simulate audio devices, is installed and configured in the View desktop to simulate a user dictation scenario. The purpose of VAC is to simulate the dictation audio stream coming into a virtual desktop through the Nuance PowerMic II or the Philips Speech Mike as manual dictation cannot be done for a load test.

The load is driven from View Planner and user load is incremented with 8, 16 and 24 users. The load script executed two key functions against the Dragon Medical application running on the View desktop:

**Dragon-Open:**

Open the Dragon Medical application and connect the microphone.

**Dragon-Dictate:**

Dictate 35 line of text including medical terminology needed to describe the medical condition of a patient. The dictation is accomplished using Virtual Audio Cable software installed in each virtual desktop.

## Performance Testing Setup

**Table 7: Physical Server Specifications**

Server	Specifications
ESX Hosts	<ul style="list-style-type: none"> <li>• 2 x Genuine Intel(R) Xeon(R) CPU X5560 processors (Hyperthreading Active)</li> <li>• 48 GB memory</li> <li>• 4 x 1 Gb/s network interface cards</li> </ul>

**Table 8: VM Configuration**

Server	VMs
vSphere Host A	vCenter, View Manager, AD/DNS, View Planner Appliance, View Planner Client VMs (Windows XP SP3, 1vCPU, 1GB RAM)
vSphere Host B	View Desktops (Windows 7 Professional, 2vCPU, 2GB RAM)

## Performance Testing Results

Figure 3: View Desktop Host Utilization Summary

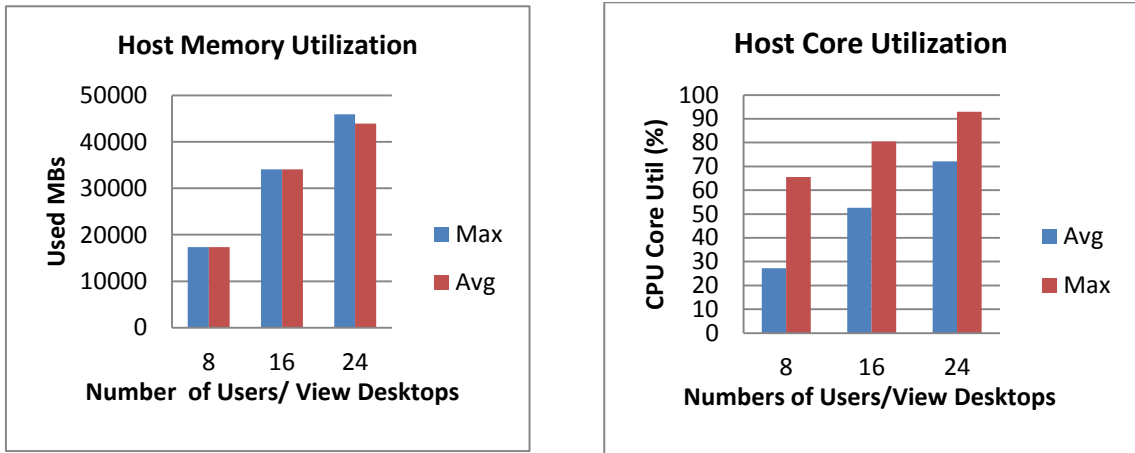


Table 9: The following table describes VM level CPU Utilization measured using esxtop:

No. of Users	Avg. CPU Utilization of Each View Desktop (%)
8	28.74
16	29.18
24	31.11

Table 10: The following table describes VM level Memory Utilization measured using esxtop:

No. of Users	Avg. Memory Utilization of Each View Desktop (MB)
8, 16, 24	1230

## Performance Testing Summary

It was observed that the host utilization peaked when 24 virtual desktops were running on the host with simultaneous ongoing dictation being done on each desktop. The performance of the Dragon Medical application, dictation, speech recognition and conversion to text was not impacted at this level. For this physical hardware configuration, it was thereby found that 24 virtual desktops would be the maximum number that could be run under the scenario of simultaneous dictation without exceeding host resources and impacting performance.

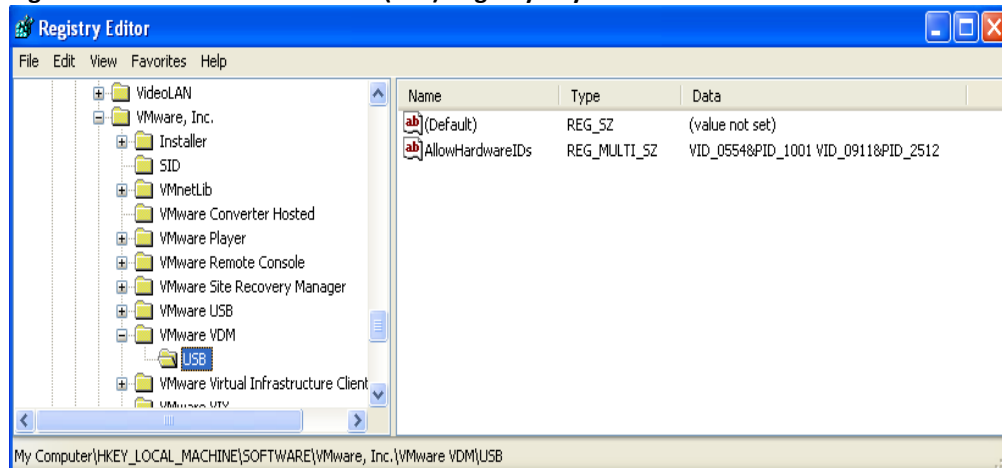
However, most healthcare providers dictate intermittently, not continuously, so the practical limit on the number of virtual desktops with Dragon Medical running simultaneously is much higher (100 or more in some installations). As you add Dragon users, carefully observe the load on your servers.

## Summary of Results and Recommendations

This section summarizes the best practices for the use of various USB and non-USB peripherals with Dragon Medical on VMware View.

- Nuance PowerMic II (with or without scanner) does not require installing any additional device drivers inside the View desktops. This is because the Dragon Medical application has built-in drivers for this device.
- To enable the functioning of the control buttons on the Philips SpeechMike, , download the speech control application and drivers from Philips web site and install and configure this software inside the View desktops.
- By default, the View Client excludes certain devices such as Human Interface Devices (HID) from the drop-down menu for configuring redirection. This affects the mouse controller (trackball) in the Philips SpeechMike. To allow redirection of this HID, use the instructions provided in VMware KB <http://kb.vmware.com/kb/1011600>. The screen shot below shows the the modified registry key in thin or thick client machines after the change described in the KB has been made (\HKLM\Software\VMware Inc.\VMware VDM\USB)

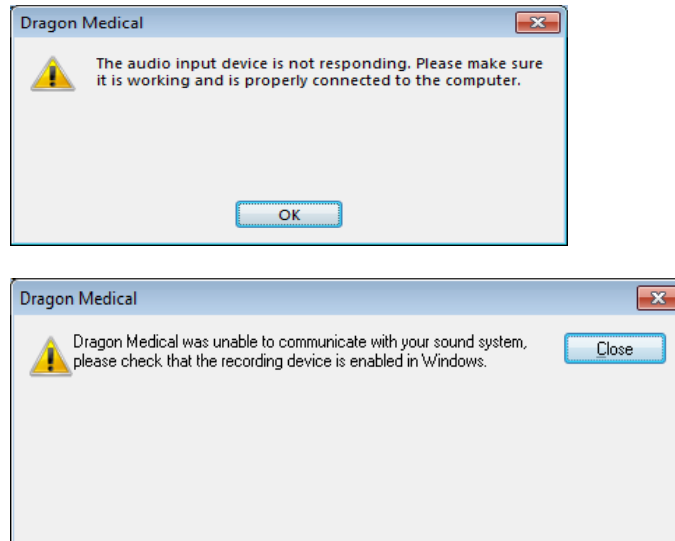
**Figure 4: Human Interface Device (HID) Registry Key**



- Do not configure Nuance PowerMic II (with or without scanner) for HID redirection. This device is automatically shown in the drop down menu of available USB devices within a View session.
- Sometimes the position of the mouse pointer is not updated on the guest system's display as you move the device. This behavior was observed with the Philips SpeechMike model that was tested, but not with the Nuance PowerMic II. Refer to VMware KB article <http://kb.vmware.com/kb/1022076> for further details and resolution.
- With a Windows 7 View desktop, there is a limitation seen with Philips SpeechMike where the mouse pointer movement is not updated while using the trackball. An older model of the Philips SpeechMike was used for this testing and this issue may not occur with newer model of Philips SpeechMike and mouse pointer movement may work fine.
- For the analog headset, the Teradici audio driver needs to be installed in the View Desktop. Please note that VMware does not provide support for this driver. This driver can be downloaded from the Teradici website. Nuance does not recommend using the analog headset with VMware View as it did not pass the voice quality tests of Dragon Medical.
- Different users have different choices to playback their audio.
  - To playback audio through the thin/thick clients' built-in speakers, follow these steps:
    - On Win XP thick/thin clients: Configure the playback to the built-in sound card/speakers. This can be done by going to the "Sound and Audio Devices" option available in the "Control Panel". Launch the "Sound and Audio Devices" and select the "Audio" tab and from the drop down option of "Sound Playback" select the built-in sound card as default device.
    - On Win 7 clients: Configure the playback to the built-in speakers. This can be done by launching the "Sound" option available in the "Control Panel". In the "Playback" tab, select the built-in speakers as the Default device for playback.
    - Configure the playback to "VMware Virtual Audio" in View Desktop. It needs the same steps as mentioned above depending on the version of Windows used.
  - For playing back the audio through the built-in speaker on the USB microphone, follow the below steps:
    - Use steps mentioned in the VMware KB <http://kb.vmware.com/kb/1014686> to disable the audio in PCoIP session.
    - Configure the playback to the microphone device audio output in both the View Desktop and thin/thick client. This can be done using the steps described above.

The above settings are applicable to the SpeechMike, PowerMic II and any other microphone.

- VMware View provides a feature where the user can disconnect from one client and access the same desktop from another client without losing the running virtual desktop session. While using this feature, follow the below instructions:
  - While switching between thin or thick clients connected with same make and model of microphone, Dragon Medical will display the pop-up error messages shown below in the reconnected View Desktop session. These errors do not cause any loss of functionality and can be closed out without impacting the application. The microphone and all its button functionality will start working in 2-3 seconds.

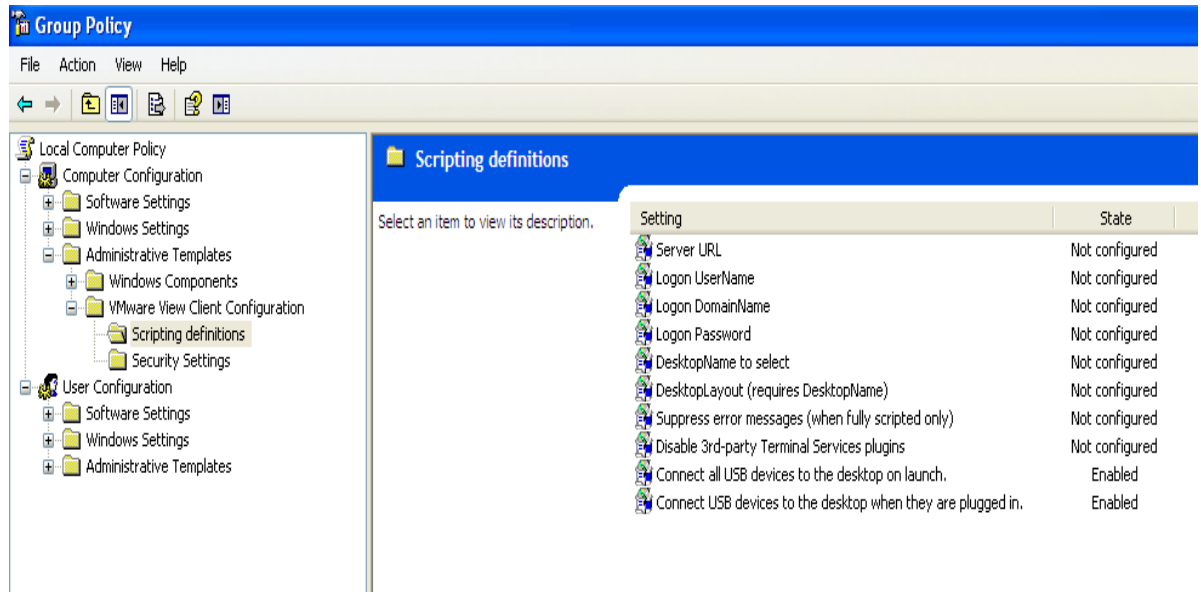


- It is recommended not to playback speech through Dragon Medical when View Desktop session is disconnected from one client and reconnected back from another client. In this scenario, the Dragon Medical session becomes unresponsive occasionally and further dictation cannot be done.
- While switching from thin/thick clients to zero clients, users will need to reload the Dragon Medical user profile when the session is reconnected through the zero client.
- While switching between thin/thick/zero clients connected with different model and make of microphones, reload the Dragon Medical user profile in the reconnected session.
- Since significant network traffic (almost 1.1 Mbps) is generated whenever the microphone is turned on, system architects should make sure there is sufficient bandwidth between the end user client and the virtual desktop to meet this requirement.
  - Since this traffic is generated whether or not the user is dictating, users should be trained to turn the microphone off (rather than putting it to sleep) when they are not dictating.
- The following configuration is implemented on thin and thick clients so that any USB microphone connected to the client device gets connected automatically to the View desktop without any manual intervention whenever the View Desktops are accessed.
  - “Connect all USB devices to the desktop on launch: Enabled”
  - “Connect USB devices to the desktop when they are plugged in: Enabled”

The above two settings are available in “vdm\_client.adm” template and can be added in “Administrative Templates” section of Windows Group Policy editor. For further details, refer the VMware View Administrative guide.

**Figure 5: VMware View Client ADM Template Group Policy for USB Devices**





## Conclusions

This document discusses the validation testing that was done with the Nuance Dragon Medical application in a VMware View virtual desktop. The critical function of speech recognition and speech-to-text conversion, when using USB microphones with the Dragon Medical application running on a VMware View virtual desktop worked well and is recommended for customer deployments. All functionality of the Dragon Medical application performed as expected in a VMware View environment.

From performance test perspective, it has been observed that even if the vSphere host resources are saturated due to a heavy concurrent user load, the recognition engine of Dragon Medical Practice Edition performed well. It can be concluded that larger hardware with more compute and memory capacity can easily accommodate a greater number of View desktops on a single host than what was achieved here.

## Acknowledgements

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- Biswapati Bhattacharjee, VMware
- Manvender Rawat, VMware
- Pramod Mahadevan, VMware

## Resources

For more information about VMware and related products, use the links and references given below:

### VMware References

- VMware Documentation:  
<http://www.vmware.com/support/pubs/>

VMware View 5.0 Architectural Planning Guide:

<http://pubs.vmware.com/view-50/topic/com.vmware.ICbase/PDF/view-50-architecture-planning.pdf>

- VMware View 5.0 Installation Guide:

<http://pubs.vmware.com/view-50/topic/com.vmware.ICbase/PDF/view-50-installation.pdf>

### Nuance References

For more information about Nuance and related products, use the links and references given below:

- Nuance Communications, Inc.:

<http://www.nuance.com>

- Dragon Medical:

<http://www.nuance.com/products/dragon-medical-family/index.htm>

- Virtual Audio Cable:

<http://software.muzychenko.net/eng/vac.htm>