

**Dragon[®]
Medical** | **360**
network edition

Using Dragon Medical with VMWare



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Introduction

Dictation and transcription are important tasks in the healthcare industry. When these tasks are streamlined, clinicians can spend more time with patients. Medical dictation software increases the speed of dictation and transcription. Nuance is the leader in healthcare speech recognition and dictation software. Nuance provides Dragon Medical for clinicians. Dragon Medical is integrated with the majority of the clinical applications that clinicians use today.

Virtual desktops provide a fast, secure, mobile desktop experience for clinicians. A virtual desktop solution allows clinicians to spend more time with patients and less time logging into desktops and applications. VMware is the leader in virtual desktop software. VMware provides VMware View; the most comprehensive desktop virtualization platform in the healthcare industry.

Nuance and VMware have tested Dragon Medical running on VMware View. This document describes the functionality, hardware and software that were tested.

Note:

The VMware client runs on the endpoint where the microphone is physically attached. The VMware agent runs on the same operating system as Dragon medical.

To use a microphone with Dragon Medical on a VMware View, you must configure the VMware platform on both the endpoint and the operating system. The microphone, its feature set, and functionality exist in the domain of the VMware View platform.

Due to the variability in Virtual Desktop environments, the customer is ultimately responsible for configuring, validating, and maintaining their virtual desktop environment for use with Dragon Medical.

Dragon Medical does not include any specific drivers or plugins that implement microphone functionality in a virtual desktop environment accessed using VMware View.

Dragon in a Virtual Desktop Infrastructure

Using Dragon Medical on a VMware view desktop is very similar to using Dragon Medical on real computer. However, there are some differences that you should be aware of:

- Use of peripherals by the virtual computer
- How to administer the virtual computer
- The Dragon user workflow
- Shared hardware resources

Use of peripherals by the virtual computer

When a peripheral is connected to an endpoint, there are two ways to make the peripheral “available” within the guest operating system of the VMware View desktop:

- Special purpose virtual devices or channels
- USB re-direction.

Each option has advantages and disadvantages when used with Dragon Medical. The option you choose depends on multiple factors, including the type of microphone, the type of endpoint, the version of the VMware View software, and the Dragon user workflow.

Types of microphones

A microphone can be wired or wireless. There are two key types of microphones:

- Composite devices with multiple functions: For example, the Nuance PowerMic II and the Philips SpeechMike.
- Audio only devices: For example, the wired headset microphones, Bluetooth earpieces and desktop array microphones.

Types of endpoints

A physical endpoint is where the Dragon user works and where the physical microphone peripheral is attached. There are two key types of endpoints:

- Windows devices that are a View client. For example, workstations, laptops, and Windows Embedded devices.
- “Thin” clients that do not run Windows but have a View client implementation. For example, Wyse ThinOS, Linux, MacOS, and iOS.
- “Zero” clients that have no operating system and contain a Teradici chipset and firmware based View client functionality.

The version of the VMware View software

VMware View agent 5.2 and older

Known issues make USB redirection of the microphone peripheral unreliable. The issue is independent of the type of endpoint device where the VMware View client runs on:

- Hanging of the guest operating system: Due to problems with the interaction between the VMware View agent and the Windows operating system. The solution is power cycling or resetting the VMware View desktop virtual machine.
- Unreliability of the USB device state within the guest operating system: Intermittent nonexistence of the device, or input/output errors when the device is accessed by other applications, like Dragon Medical, that run on the guest operating system. The solution is to reboot the VMware View desktop virtual machine.

VMware View agent 5.3 and newer

Known issues make USB redirection of the microphone peripheral unreliable. The issues do not affect non-Windows View clients, such as including non-Windows thin and zero clients:

- The View client cannot view the locally attached microphone: The solution is to either:
 - Reboot the Windows endpoint.
 - Unplug the physical microphone device, then plug it back in to a different USB port.
- The View client can view the locally attached microphone but cannot “attach” the device to the View agent on the VMware View desktop: The VMware client returns error messages when a microphone is attached. The microphone is unavailable and cannot be used within the VMware View desktop on the guest operating system (that Dragon is running on).

Important components of using Dragon with VMware

The Dragon user workflow impacts and is impacted by the chosen method for making the microphone available within the guest operating system.

Endpoint disconnection

When the VMware View agent and the VMware client are connected, the VMware View agent creates a virtual device that acts as a USB controller. The VMware Agent USB controller allows for a recording device to appear as 'plugged into' the guest operating system and available to applications like Dragon Medical.

When an endpoint is disconnected from the VMware View agent computer, there is no longer a connection between the VMware View agent and the VMware client. Recording devices available within the guest operating system, through USB redirection, no longer exist in the guest operating system.

- **Impact of endpoint disconnection on a Dragon user:** A Dragon user can no longer view the "screen" of the VMware View desktop.
- **Impact of endpoint disconnection on an application:** An application, like Dragon medical, can see the VMware Agent USB controller; however there is nothing 'plugged into' the controller. The application can no longer find the recording device. The impact on Dragon is the same as if Dragon was running on a physical computer and someone unplugged the dictation microphone.
- **Impact of endpoint disconnection on a monitor, a keyboard, a pointing device:** A monitor, keyboard, or pointing device can no longer exchange data between the VMware View agent and the VMware View client. Video output to the screen, keyboard input, and pointing device movements and button clicks may not work as expected.
- **Impact of endpoint disconnection on an audio only virtual microphone device:** An audio only virtual microphone device will continue to exist in an online, error free state within the guest operating system. Dragon can still use the recording device. However, the device does not provide any audio data to Dragon because there is no client connection or actual physical microphone source available to provide audio input.

Session roaming

Session roaming is when a Dragon user moves from one endpoint to another. The same VMware View desktop that the Dragon user accessed from one endpoint is now being accessed from another endpoint. The specific VMware View client instance changes from one client on one endpoint device, to another client on another endpoint device. Even if the two VMware View clients are of the same type and version, and the two endpoint devices are identically configured, session roaming always includes the following events:

- Disconnection of the VMware View desktop from the VMware View client on the first endpoint
- A time interval during which the VMware View desktop is not connected to any endpoint
- Connection of the VMware View desktop to the VMware View client on the second endpoint

Even disconnection from a View desktop, and subsequent reconnection to the same View desktop, by the same user on the same endpoint, constitutes session roaming because all of the previously listed events still occur. This is often caused by an endpoint screen lock /unlock sequence that occurs when single sign-on software such as Imprivata OneSign or Caradigm Vergence is used to manage authentication and VMware View desktop access from endpoints.

Input source selection when starting Dragon medical

When a Dragon user opens a user profile, the user can choose a vocabulary and input source. When only one vocabulary/input source combination is available, Dragon may not present the user with a choice. Dragon can be configured to allow or not allow a user to choose a vocabulary and input source.

The chosen vocabulary and input source impact both the physical microphone type that the Dragon user speaks into, and, the type of Windows multimedia recording device that Dragon uses to obtain an audio stream containing the user's speech.

- If USB redirection is used to access the microphone from a VMware View desktop, and the physical microphone is a Nuance PowerMic II, then, within the guest operating system, Dragon detects the PowerMic II USB device, and the Dragon user can select the input source. Dragon has direct access to input from the Nuance PowerMic II, including the audio input, button presses, etc.
- If virtual audio only microphone access is setup in the VMware View desktop, and the physical microphone is still a Nuance PowerMic II, then within the guest operating system, Dragon detects the non-USB, virtual microphone device, and the Dragon user cannot select the "PowerMic II" input source. Instead, the Dragon user must select a "Microphone (Mic-in)" input source.
 - Dragon can access the VMware View audio-only virtual microphone device.
 - Dragon does not have access to the special purpose buttons on the Nuance PowerMic II. However, a Dragon user can access the PowerMic II buttons on the endpoint device where the microphone is physically attached. It is also possible to make use of an endpoint-side utility to map button presses to hotkeys. This allows the Dragon user to press buttons and perform actions in their VMware View desktop, such as turning Dragon's logical microphone state on and off, and navigating between among fields in a template.

The initial input source that a Dragon user selects depends on:

- The physical microphone type attached to the endpoint
- The type of endpoint device
- The type of multimedia recording device in the guest operating system associated with the physical microphone

If a Dragon user moves between different endpoints (a roaming session), the currently open input source may no longer apply to the currently connected microphone/endpoint combination. The input source may only be valid for one microphone/endpoint combination.

Dragon may display an error message and the Dragon user may be unable to perform dictation. The Dragon user may need to perform additional steps to align the input source type with the endpoint from which they are accessing the VMware View desktop. There is no input source type auto-switching capability in Dragon. The only recourse in this circumstance is for the user to know how to use the DragonBar to open a different input source if required. Ideally, the following steps would occur when a Dragon user roams between endpoints:

- Closing of the user profile in Dragon
- Session roaming
- Reopening of the Dragon user profile, including correct input source selection

Since this process cannot be automated, some user training or experience is necessary.

Managing a virtual computer versus a physical computer

Due to the transient nature of View desktops, it is more common to use Windows profile management in a VDI environment than in a physical computer environment. A virtual machine is rarely assigned to a specific Dragon user. When a View desktop is rebooted, they usually revert to or boot from a read-only master image and retain nothing from the previous session.

While Dragon is in use, it maintains a local copy of a user's files on the Dragon workstation. Some of these files are in constant use for speech recognition. Dragon does not store all speech recognition data files in random access memory. If anything slows down access to speech recognition data files, Dragon's performance may be negatively impacted.

Profile redirection and its effect on Dragon performance

A common method of managing Windows profiles in a VMware View environment is to use Windows, VMware View Persona, or third party software, to redirect all or portions of the Windows user's profile to a network share. This is a valid and compatible method of managing the part of the user's Windows profile where Dragon stores its local files. However, this always causes Dragon performance issues. The protocol used for accessing files on a network share is not optimal for the way Dragon accesses local files.

To maximize Dragon's performance, do one of the following:

- Exclude Dragon's local files within the Windows user profile from redirection
- Configure Dragon to store its local files in a place other than within the Windows user profile.

Impact of relocating Dragon local user files outside of the Windows profile storage location

Dragon's local files store the most current copy of the user's profile. If you choose to exclude Dragon's local files from redirection or configure Dragon to store local files outside of the Windows user profile, you must remember to save the local user files before they are discarded by recycling the VMware View desktop.

The Dragon user can manually save their user profile or synchronize the profile with the master copy on a file server. By default, Dragon saves the user profile when the Dragon closes. A user can disable this behavior.

If Dragon automatically logs out a user due to a period of inactivity, the user's local files are **not** saved to the master copy of the profile on the file server. The local user files will be different than the master copy of the files.

To prevent loss of Dragon user profile data, automate the following steps:

- Create a script that uses command-line switches to save the user profile and close Dragon before closing the VMware View desktop. To enable this script, you may need to configure Windows, VMware View, or both.

- Disable the automatic logout of Dragon users that run Dragon in VMware View desktops. Automatic logout is a feature that is enabled or disabled at the site level using the Nuance Management Console. Users belong to a primary site and group. Dragon obtains the automatic logout setting from a user's primary site.

Microphone and CPU usage and Dragon on a physical computer versus a virtual computer

Microphone usage and Dragon on a physical computer

Dictation with Dragon requires a microphone attached to the computer. The microphone must be attached the entire time Dragon is in use. If the microphone is unplugged, Dragon produces an error message. The reason behind the error is clear and the Dragon user can rectify the situation as needed.

Physical computers are often left to run for days or weeks. The Windows operating system caches important runtime elements, resulting in optimization of frequently used applications.

Microphone usage and Dragon on a virtual computer

When single sign-on software is used for user authentication on an endpoint and in VMware View, a locked endpoint screen disconnects the endpoint from the VMware View desktop.

If a Dragon user moves to different endpoints, some of the endpoints may not have a microphone or may have a different type of microphone. This may cause a mismatch between the user-selected “input source”, chosen in the Dragon session, and the available multimedia recording device in the Windows Guest where Dragon is running.

Often, the VMware View desktop computer is ‘freshly booted’ at the beginning of each work day or work week. This may be due to policies and schedules related to virtual desktop provisioning and “recycling”. This affects the time it takes to start Dragon and open a user profile. As well, the guest operating system may not yet have cached .Net Framework runtime components, application DLLs, or other items.

CPU usage and Dragon on a physical computer versus a virtual computer

A physical computer has a relatively large amount of processing power at its disposal; idle CPU cycles are standing by to be utilized at any time for the resource intensive audio processing required for speech recognition.

A virtual computer shares physical CPUs with other VMs hosted by the same virtualization platform. The amount of processing power can vary widely from one moment to the next. This can significantly affect the perceived real-time nature of speech recognition. On average, lags in speech processing may be more evident in a virtual environment than on a physical platform with dedicated CPU resources.

Nuance testing of Dragon with VMWare

Tested functionality when running Dragon on VMWare

Functionality	Passed Test
Created and trained a user profile using the General Medical vocabulary.	✓
Opened and closed a user profile with and without a persistent user drive, with the same performance as a non-VMware configuration.	✓
Dictated a paragraph into Microsoft Word Pad.	✓
Transcribed a recorded wave (.wav) file.	✓
Moved users from one client device to another, including moving the microphone, to find out whether the users can reconnect and continue dictating with Dragon. This functionality was tested with the microphone on, off, and asleep.	Depends on specific configuration.
Verified that the buttons on the PowerMic II and the Phillips SpeechMike perform as they do in a non-VMware configuration.	Depends on specific configuration.

Tested operating system, client, and microphone configurations for Dragon and VMWare

View Desktop	Client Type	Microphone Type	Dragon Medical product	Passed Test
Win XP SP3 Prof — 32 bit	Thin Client	PowerMic II (Without Scanner)	Dragon Medical Practice Edition	✓
Win 7 Prof — 64 bit	Zero Client	Philips SpeechMike	Dragon Medical Practice Edition	✓
Win 7 Prof —	Thick Client	Analog Headset Microphone	DM360 Network Edition, SP2	✓
Win XP SP3 Prof — 32 bit	Zero Client	PowerMic II — SC (With Scanner)	Dragon Medical Practice Edition	✓
Win 7 Prof — 64 bit	Thin Client	Philips SpeechMike	Dragon Medical Practice Edition	✓
Win 7 Prof — 64 bit	Thick Client	PowerMic II — SC (With Scanner)	Dragon Medical Practice Edition	✓
Win 7 Prof — 64 bit	Thick Client	Wireless Mic: xTag from Revolabs, Inc.	Dragon Medical Practice Edition	✓
Win XP SP3 Prof — bit	Thin Client	Pen Mic: Buddy StylusMic from InSync Speech Technologies, Inc.32	Dragon Medical Practice Edition	✓
Win 7 Prof — 64 bit	Thin Client	PowerMic II (Without Scanner)	DM360 Network Edition, SP2	✓
Win 7 Prof — 64 bit	Zero Client	Philips SpeechMike	DM360 Network Edition, SP2	✓

Tested client hardware for Dragon and VMWare

Hardware Type	Configuration
Microphone	<ul style="list-style-type: none">• Philips SpeechMike 6274• Nuance PowerMic II• Nuance PowerMic II — SC (with Scanner)• Wireless Mic: xTag from Revolabs, Inc.• Pen Mic: Buddy StylusMic from InSync Speech Technologies, Inc.• Analog headset
Thin Client	<ul style="list-style-type: none">• Wyse R90LW WES (Windows XP embedded operating system) (RealTek Sound Card)
Zero Client	<ul style="list-style-type: none">• Wyse P20 (Firmware Version 3.3) (No speaker.)
Thick Client	<ul style="list-style-type: none">• Windows XP SP3 (SigmaTel Sound Card)

Tested client software for Dragon and VMWare

Software provider	Configuration
Nuance	DM360 Network Edition Practice Edition, or DM360 Network Edition Network Edition
VMware	vSphere 5.0, vCenter Server 5.0 (Windows Version), VMware View 5.0
Microsoft	Microsoft AD/DNS
Philips	Philips Speech Mike Controller

Tested virtual machine desktop configurations for Dragon and VMWare

Operating system	Hardware Configuration
Windows XP SP3 — 32 bit	<ul style="list-style-type: none">• 1 vCPU• 2 GB memory• 1 Ethernet card (flexible)• 30 GB storage (vmdk only)
Windows 7 Professional 64-bit	<ul style="list-style-type: none">• 1 vCPU• 4 GB memory• 1 Ethernet card (e1000 driver)• 32 GB storage (vmdk only)

Tips and Tricks for configuring Dragon and VMWare

The following sections provide information you need to know to successfully configure Dragon with VMware View.

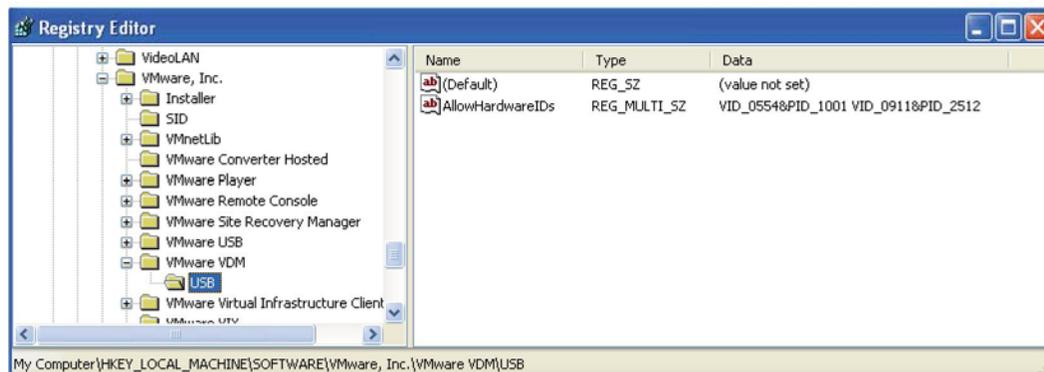
Configuring Microphones

Configuring a PowerMic II

- Nuance PowerMic II (with or without scanner) does not require installing any additional device drivers inside the View desktops; the Dragon Medical application has built-in drivers for them.
- Do not configure Nuance PowerMic II (with or without scanner) for HID redirection. This device is automatically shown in the drop down menu of USB redirection of View client.

Configuring a Phillips SpeechMike

- To use Philips SpeechMike, download the speech control application and drivers from the Philips web site and install and configure them inside the View desktops. Without this additional software, the buttons in the Philips SpeechMike will not work.
- By default, 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, follow the instructions in VMware KB <http://kb.VMware.com/kb/1011600>. The following screen shot shows the registry key in thin or thick client machine (\HKLM\Software\VMware Inc.\VMware VDM\USB):



- Sometimes the position of the mouse pointer is not updated on the guest system's display as you move the device. Refer to <http://kb.VMware.com/kb/1022076> for instructions on how to prevent this.
- When using an older version of Phillips SpeechMike with a Windows 7 View desktop, the mouse pointer movement is not updated when using the trackball (this may not be applicable for newer models of Philips SpeechMike).

Configuring an Analog Headset

To use the analog headset, the Teradici audio driver needs to be installed in the View Desktop. Please note VMware does not provide support for this driver.

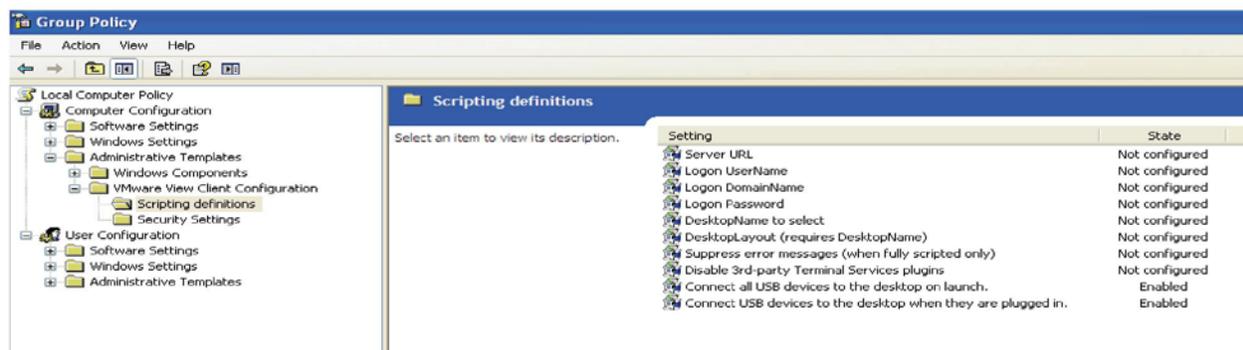
To get the driver, register at Teradici support site and it is freely downloadable. Please note that Nuance does not recommend using the analog headset with the Teradici audio driver as it did not pass the voice quality tests of Dragon Medical.

Configuring USB Microphones to Connect Automatically when accessing the View Desktop

Complete the following steps to configure thin and thick clients so that USB microphones get connected automatically whenever the View Desktops are accessed:

1. Open the vdm_client.adm template and make the following changes:
 - Set the Connect all USB devices to the desktop on launch setting to Enabled.
 - Set the Connect USB devices to the desktop when they are plugged in setting to Enabled.

Note: The preceding settings can be added in the Administrative Templates section of the Windows Group Policy editor, as shown in the following screen capture. For details, see the VMware View Administrative guide.



Configuring Audio Playback

Configure playback through a built-in sound card

The following steps apply to thin or thick clients:

1. Open the Control Panel and double click Sound and Audio Devices.
2. The Sound and Audio Devices window appears. Select the Audio tab.
3. Navigate to the Sound Playback drop down and select the built-in sound card as the default device.

Configure playback to VMware Virtual Audio

1. Open the Control Panel and double click Sound and Audio Devices.
2. The Sound and Audio Devices window appears. Select the Audio tab, then go to the Sound Playback drop down and select the built-in sound card as the default device.\
3. In the View Desktop, set the playback to VMware Virtual audio.

Configure playback through the microphone speaker

The following steps apply to any microphone, including the PowerMic II and Phillips SpeechMike:

1. Follow the steps in <http://kb.VMware.com/kb/1014686> to disable the audio in PCoP session.
2. Follow the steps in "Playback Through VMware Virtual Audio" on page 7 to configure playback to the microphone device and audio output in View Desktop and thin/thick client.

Switching Between Clients

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. Keep the following points in mind when using this feature with Dragon:

- While switching between thin and thick clients connected with same make and model of microphone, close the expected error messages in the reconnected View Desktop session. The microphone and all its button functionality will start working in 2-3 seconds.
- Do not use playback of the recorded speech in Dragon Medical when the View Desktop session is disconnected from one client and reconnected to another client; occasionally the user's Dragon Medical session hangs he cannot dictate further.
- 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 zero client.
- While switching between thin or thick or zero clients connected with different model and make of microphones, reload the Dragon Medical user profile in the reconnected session

Network Traffic and Bandwidth

- Because significant network traffic (almost 1.1 Mbps) is generated whenever the microphone is turned on, system architects should make sure there is sufficient bandwidth for Dragon when the number of client devices is large, or when the client devices are not on the same WAN as the server.
- Because 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.

