Dragon® Medical 360 | Network Edition and Citrix®

A White Paper from Nuance Healthcare
DRAGON® MEDICAL 360 AND CITRIX®

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INTRODUCTION

As the number of deployed enterprise applications increases, organizations are seeking solutions that simplify application delivery without sacrificing performance, security, or cost. Citrix® Systems has been providing innovative software solutions that enable the best delivery methods for all applications. The Citrix XenApp™ architecture provides a centralized, scalable, and secure application virtualization platform.

Citrix is one of the most trusted names in computing virtualization. More than 230,000 organizations worldwide rely on Citrix to deliver applications to users anywhere with the best performance, highest security, and lowest cost. Citrix customers include 100 percent of the Fortune 100 companies, 98 percent of the Fortune Global 500, and more than 200 U.S. federal agencies, as well as hundreds of thousands of small- to mid-sized businesses.

The award-winning Dragon® Medical 360 | Network Edition speech recognition software from Nuance Healthcare has long been used in Citrix environments. Tens of thousands of clinicians today use Dragon Medical 360 | Network Edition in an electronic health record (EHR) environment supported by Citrix. Nuance offers three deployment options, which are explored in this white paper. The options (presented in order of when Nuance introduced them) are:

DEPLOYMENT OPTION 1:
Dragon Medical 360 | Network Edition can be installed on a Windows® client PC for dictation into applications deployed through Citrix XenApp. This is possible with almost any version and edition of Dragon, although Dragon Medical 360 | Network Edition is the sole Dragon solution compatible with EHRs from Epic®, Cerner®, Allscripts®, Practice Partner®, GE®, and other EHRs.

DEPLOYMENT OPTION 2:
Dragon Medical 360 | Network Edition introduces a technology called vSync that eliminates the limitations in option 1. It offers users an enhanced dictation experience with minimal consumption of server and network resources.

DEPLOYMENT OPTION 3:
In version 9 of the Dragon NaturallySpeaking® Professional, Medical, and Legal editions, released in 2006, Nuance introduced support for server-based Dragon deployment through Citrix.

This white paper shows how healthcare institutions can benefit from using Dragon Medical 360 | Network Edition in a Citrix environment and helps IT departments decide which deployment option to choose. It supplements the Dragon Medical IT Administrator’s Guide and the Administration Guide for Dragon in a Citrix Environment, which contain details on installing and configuring Dragon Medical 360 | Network Edition and vSync in Citrix environments.
CITRIX OVERVIEW

Citrix provides a server-based centralized architecture to deliver applications to end users. In Citrix, all application processing and logic occur on the server; the client PCs only display data and allow the user to interact with the graphical user interface of the program.

This approach is ideal for highly distributed environments where the administrative costs of maintaining a consistent PC desktop image on diverse workstations are substantial, or in scenarios where network bandwidth and/or client workstation processing power is limited. Citrix also eliminates the need for software updates to be installed on client workstations.

Nuance Healthcare understands the value that Citrix brings to large healthcare organizations, and it is for this reason that Dragon Medical 360 | Network Edition supports deployment in Citrix environments.
DRAGON MEDICAL 360 | NETWORK EDITION DEPLOYMENT OPTIONS IN A CITRIX ENVIRONMENT

There are three configurations in which Dragon Medical 360 | Network Edition can be deployed in a Citrix environment. These configurations are discussed below.

DEPLOYMENT OPTION 1: Running Dragon Medical 360 | Network Edition on a Citrix Client Workstation

The traditional configuration in a Citrix environment is to run the target application, generally an EHR system, through Citrix (‘thin,’ in which the target application’s executable files reside and run on a centralized server) and Dragon Medical 360 | Network Edition on each client workstation (‘fat’).

BENEFITS

The advantages of running Dragon on each dictator’s client workstations compared with running it on the Citrix server are:

• Small-scale deployment of Dragon Medical 360 | Network Edition can be done at the individual user or department level without involving the server administration staff.

• Dragon Medical 360 | Network Edition takes advantage of the CPU and memory resources on the workstations and does not overburden the available server resources. (See Appendix for CPU and memory requirements when Dragon Medical 360 | Network Edition runs on Citrix servers.)

• High-resolution audio does not need to be streamed over the network, minimizing Dragon Medical 360 | Network Edition users’ impact on network resources. (See Appendix for bandwidth requirements when Dragon Medical 360 | Network Edition runs on Citrix servers.)

• Dragon Medical 360 | Network Edition can be used to dictate directly into applications that are installed “fat,” as is often the case with productivity applications such as Microsoft® Office.

RESTRICTIONS

Dragon Medical 360 | Network Edition is engineered so that users can interact by voice with the target application, such as the EHR system, in many ways. Not only can users dictate into free-text fields of the application, but they can also edit that text using voice commands. In addition, users can navigate through the screens and input fields of the application using voice commands.

In the Dragon Medical 360 | Network Edition-fat/EHR-thin scenario, however, many of the above interactions fail to work because Dragon Medical 360 | Network Edition is not running on the same system as the target application.
Deployment Option 1: Restrictions (cont.)

Features that work in Dragon Medical 360 | Network Edition-fat/EHR-thin configurations:

- Conversion of speech into text and sending that text directly into the EHR system.
- Controlling the EHR system by saying a command that sends it keystrokes and/or mouse clicks.
- Editing text using certain rudimentary commands, such as “delete last word.”

Features that do not work in Dragon Medical 360 | Network Edition-fat/EHR-thin configurations:

- Certain essential voice commands for editing text, including “Correct <words>” and “Select <words>.” This ability to edit text by voice is called Full Text Control, and an application in which Full Text Control does not work is called a non-standard window. Dragon Medical 360 | Network Edition treats all applications run through Citrix as non-standard windows.
- Automatic capitalization and spacing of text. This feature is not lost entirely but often becomes unreliable.
- Controlling the EHR system by saying the names of application-specific menus and buttons.

Many users find it extremely frustrating to use Dragon Medical 360 | Network Edition in this scenario because it is difficult to edit their text by voice once dictated. Frustration may be especially keen for users who use the built-in Dragon Medical 360 | Network Edition tutorial to learn the editing commands, and then find that these commands do not work in the EHR system, as well as for users who previously used Dragon Medical 360 | Network Edition on a home PC, or in a healthcare practice that does not use Citrix.

At a healthcare facility where the EHR system runs fat on some workstations and thin on others, users may perceive an inconsistency in the way the Dragon Medical 360 | Network Edition software operates when they move from workstation to workstation.

This scenario is workable if Dragon Medical 360 | Network Edition training staff are prepared to set users’ expectations, and if they train users to apply one or both of these workarounds:

- Edit their text manually, using keyboard and mouse. This is most appropriate for short dictations of no more than a few words.

- Dictate into the Dictation Box, which is a component of Dragon Medical 360 | Network Edition. All of the editing commands work reliably in the Dictation Box. After dictating and editing text in the Dictation Box, the user transfers the text into the EHR system.

Support personnel such as trainers and help-desk staff need to become familiar with the limitations and workarounds, so that they can assist users who find that Dragon Medical 360 | Network Edition is not working according to their expectations.
DEPLOYMENT OPTION 2: RUNNING DRAGON MEDICAL 360 | NETWORK EDITION ON A CITRIX CLIENT WORKSTATION WITH VSYNC FOR EHRs

Dragon Medical 360 | Network Edition introduces vSync for EHRs, a feature that enhances Dragon Medical 360 | Network Edition usability when using Dragon Medical 360 | Network Edition fat (on a client PC) with an EHR system that is deployed thin (via Citrix).

It enables Dragon Medical 360 | Network Edition’s Full Text Control dictation and correction capabilities, including voice navigation and text selection, to be used in the popular Dragon Medical 360 | Network Edition-fat/EHR-thin scenario.

vSync for EHRs requires Dragon Medical 360 | Network Edition—Network Client or higher—to be installed on the client workstations, and the vSync for EHRs Plug-In to be installed on the Citrix servers on which the EHR system runs.

Dragon Medical 360 | Network Edition and the vSync application exchange information via a Citrix virtual channel, so that Dragon Medical 360 | Network Edition receives information about the application state that allows the editing commands to function reliably. This virtual channel uses minimal bandwidth. Most users will perceive no difference in functionality or performance when using Dragon Medical 360 | Network Edition-fat/EHR-thin with vSync as compared with the ideal Dragon Medical 360 | Network Edition-fat/EHR-fat scenario.

BENEFITS

When compared with Deployment Option 1 (Dragon Medical 360 | Network Edition-fat, EHR-thin), vSync offers these benefits:

• End users save time because they do not need to take the extra step of dictating into the Dictation Box, as Full Text Control (formerly known as “Select and Say”) works correctly and reliably.

• The learning curve for end users is shortened because they do not need to learn special workarounds.

• Technical support calls are reduced because the Dragon Medical 360 | Network Edition software functions predictably.

• Increased user satisfaction leads to an increased rate of adoption of speech recognition.

When compared with Deployment Option 3 (Dragon Medical 360 | Network Edition-thin, EHR-thin), vSync offers these benefits:

• No audio transfer over the network is needed. Therefore, no extra network bandwidth is needed, which means no additional infrastructure investment is required.

• Many concurrent users can be supported by vSync on one Citrix server. There are no extra hardware or Citrix licensing costs because your current server and clients can be used. Deployment Option 3 has substantial limitations on the number of concurrent users supported.
RESTRICTIONS

- The current version of vSync has one limitation as compared with the Dragon Medical 360 | Network Edition-fat/EHR-fat scenario: the user cannot control the EHR by saying the names of menus and buttons.

- Dragon Medical 360 | Network Edition requires the use of the Nuance Management Server.

CERTIFIED EHRS

Dragon Medical 360 | Network Edition is designed expressly for provider organizations using EHRs such as Epic®, Hyperspace®, Allscripts™ Enterprise, Cerner® PowerChart®, GE® Centricity® EMR, McKesson Practice Partner®, and other Citrix-based clinical systems.

SYSTEM REQUIREMENTS

vSync for EHRs requires the following Citrix components:

Server:
Citrix Presentation Server 4.5 (Advanced, Enterprise, or Platinum) on:
- Microsoft® Windows® Server 2003 R2, 32-bit
- Microsoft® Windows® Server 2003 R2, 64-bit

Citrix XenApp Server 5.0 (Advanced, Enterprise, or Platinum) on:
- Microsoft® Windows® Server 2003 R2, 32- or 64-bit
- Microsoft® Windows® Server 2008 R2, 32- or 64-bit

Client:
Citrix XenApp Client 10.2 or 11.2 on:
- Microsoft® Windows® XP, 32-bit, Windows 7
- Microsoft® Windows® Vista, 32- or 64-bit
DEPLOYMENT OPTION 3: RUNNING DRAGON MEDICAL 360 | NETWORK EDITION ON A CITRIX SERVER

Dragon Medical 360 | Network Edition supports installation on Citrix servers, enabling users to dictate from workstations that do not have Dragon Medical 360 | Network Edition installed. In this configuration, the Dragon Medical 360 | Network Edition application is only installed on the Citrix server.

BENEFITS

Deployment of Dragon Medical 360 | Network Edition on Citrix servers delivers the following benefits:

- End-user functionality is identical to the configuration in which Dragon Medical 360 | Network Edition and the EHR system are both running fat. No special end-user training is required.

- The Citrix Management Console can be used to control which users have access to the Dragon Medical 360 | Network Edition application.

- Dragon Medical 360 | Network Edition can be used from a Windows® PC that does not meet the system requirements for a full installation of Dragon Medical 360 | Network Edition.

- The time and effort needed to install Dragon Medical 360 | Network Edition on each workstation is almost completely eliminated. Only a small DLL called the Citrix Client Update needs to be installed on each workstation.

RESTRICTIONS

- Dragon Medical 360 | Network Edition is a heavy consumer of CPU and memory. It consumes server resources much more rapidly than do most other end-user applications, such as EHR systems. A large deployment of Dragon Medical 360 | Network Edition often requires the addition of server capacity. (See the Appendix for server sizing information.) The typical maximum number of concurrent users per Citrix server is 6 to 8.

- High-resolution audio must be transferred from client workstations to servers. Each Dragon Medical 360 | Network Edition user requires 1.3 Mbps of network bandwidth any time the microphone is turned on. This can make Dragon Medical 360 | Network Edition unusable from a remote workstation with a low-speed Internet connection, or on a network with many users dictating simultaneously.

- Dragon Medical 360 | Network Edition running on the server cannot be used to dictate directly into applications, such as Microsoft Word, that are running on the client workstation. As a workaround, text can be dictated into the Dictation Box and then copied and pasted into applications that are running on the client.

- Dragon Medical 360 | Network Edition requires a small DLL called the Citrix Client Update to be installed on each client workstation. This limits the usable workstations to those running Microsoft Windows or Windows XPe. Client workstations running other operating systems, such as Mac OS and most thin-client operating systems, are not supported as client systems.
SYSTEM REQUIREMENTS FOR DRAGON MEDICAL 360 | NETWORK EDITION ON CITRIX SERVERS

Deploying Dragon Medical 360 | Network Edition requires the following Citrix components:

**Server:**
Citrix Presentation Server Enterprise or Advanced Edition Version 3.0, 4.0, 4.5 or greater on either:
- Microsoft® Windows® Server 2003, 32- or 64-bit
- Microsoft® Windows® Server 2008, 32- or 64-bit

**Client:**
Citrix ICA Client 8.x, 9.x, 10.x, 11.x on:
- Microsoft® Windows® 2000 Service Pack 4
- Microsoft® Windows® XP Service Pack 1
- Microsoft® Windows® XP Service Pack 2
- Microsoft® Windows® XPe

CITRIX AND DRAGON MEDICAL 360 | NETWORK EDITION ROAMING USER PROFILES

Dragon Medical 360 | Network Edition supports a capability called roaming. This capability allows Dragon Medical 360 | Network Edition user profiles—sets of files that contain each user’s acoustic (voice) model, custom vocabulary, and custom commands—to be stored on a shared network drive instead of on individual workstations. Users can move from PC to PC without having to train a separate profile on each one.

Note: In Dragon Medical 360 | Network Edition, all user profiles are roaming.

In a Citrix environment, the decisions of whether to enable roaming and where to store the user profiles are completely independent of which deployment option is used. As long as the shared network location is on a drive that is accessible from every machine (whether it is a server or workstation) where the Dragon Medical 360 | Network Edition application is running, the roaming capability can be used. The profiles do not have to be on a drive that is directly connected to a Citrix server.

DRAGON MEDICAL 360 | NETWORK EDITION AND OTHER VIRTUAL ENVIRONMENTS


- Dragon Medical 360 | Network Edition can be used on a client PC to dictate into an application running in a Windows Remote Desktop session. There are many restrictions in this environment; see the tech note, “Using Dragon NaturallySpeaking® on a Citrix® or Windows Terminal Server (Remote Desktop) Client System,” in the Nuance knowledge base for details.

- Dragon Medical 360 | Network Edition cannot be used with non-Windows client systems. These systems include:
  - Macintosh computers
  - Linux® workstations
  - Thin-client hardware running any OS other than Windows XPe
APPENDIX: SIZING AND CONFIGURING
DRAGON MEDICAL 360 | NETWORK EDITION ON A CITRIX SERVER—
KEY ISSUES TO CONSIDER (DEPLOYMENT OPTION 3)

Organizations considering deployments of Dragon Medical 360 | Network Edition on a Citrix server need to take into account several items for configuring the Citrix environment and scaling client usage. This section provides some basic guidelines on how to address these issues to ensure maximum performance. Please note that these are guidelines only and not definitive specifications—actual performance will vary from customer to customer.

Organizations deploying Dragon Medical 360 | Network Edition in a Citrix environment must consider the following three items:
1. Projected user base and usage metrics
2. Server-side hardware
3. Network bandwidth

1. Projected User Base
Before considering any deployment of Dragon Medical 360 | Network Edition with Citrix, organizations need to answer key questions about the user base and potential growth. These metrics are essential since they are needed to size the appropriate network and hardware requirements.

• How many users do you plan to enable access to Dragon Medical 360 | Network Edition through a Citrix environment in the first 6 months? 12 months?
• What is the projected distribution of simultaneous user access to Dragon Medical 360 | Network Edition in a Citrix environment?
• Where will these users be physically distributed? On the same corporate LAN, WAN, remote access, or a combination?

2. Server-side Hardware
Dragon Medical 360 | Network Edition has been tested to run in a Citrix enterprise environment configured with Citrix Presentation Server 3.5, 4.0, and 4.5, and clients running Citrix ICA thin-client software. Based on answers to the questions above, your organization will need to scale and deploy an appropriate number of Windows servers to run Citrix Presentation Server 3.5, 4.0, and 4.5 to support all your Dragon Medical 360 | Network Edition users. In the Appendix, we provide some baseline performance data using standard Windows hardware.

3. Network Bandwidth
The request for network bandwidth when running Dragon Medical 360 | Network Edition derives primarily from requests issued on the virtual audio channel. Nuance recommends and checks for use of the high-quality sound on Citrix to ensure the highest quality of accuracy for speech recognition.

Based on the user population you intend to serve, you must account for and allocate the appropriate amount of network bandwidth for users to be able to utilize Dragon Medical 360 | Network Edition from a Citrix client.

For information about setting sound quality on Citrix ICA clients, refer to the "Dragon Medical IT Administrator’s Guide" in the supplied documentation.

PERFORMANCE SPECIFICATIONS OF RUNNING
DRAGON MEDICAL 360 | NETWORK EDITION WITH CITRIX

Please contact Nuance for detailed information on running Dragon Medical 360 | Network Edition in a Citrix environment.