



PowerScribe® 360 Reporting

V4.x System Technical Specifications



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Best Practices




- Nuance provides minimum and optimal specifications for PowerScribe 360 servers. Minimum specifications are necessary and sufficient to run PowerScribe 360; optimal configurations are recommended for best performance.
- Nuance recommends following Microsoft best practices as outlined in

[Microsoft TechNet General Security Advice and Best Practices](#)

- **PowerScribe 360 Reporting** stores data containing Protected Health Information (PHI) in the product databases as well as in various locations throughout the file system. Nuance recommends encrypting **PowerScribe 360 Reporting** at the operating system and/or storage system levels to ensure that PHI is encrypted consistent with the customer's data encryption policies.
- **PowerScribe 360 Reporting** is compatible with several currently supported versions of Microsoft Windows Server operating systems, Nuance recommends using the latest compatible version listed in the **PowerScribe 360 Reporting** System Specifications, currently *Windows Server 2016*.
- **PowerScribe 360 Reporting** is compatible with several currently supported versions of Microsoft SQL Server, Nuance recommends using the latest compatible version listed in the **PowerScribe 360 Reporting** System Specifications, currently *SQL Server 2016*.
- Nuance recommend that all **PowerScribe 360 Reporting** network communication be secured and encrypted using Hypertext Transfer Protocol Secure (HTTPS). Nuance also recommends that the customer obtain a certificate from a trusted Certificate Authority consistent with the customer security policies.
- Nuance fully supports all third-party hardware and software updates related to critical security fixes immediately upon release. Nuance recommends that customers apply third party updates consistent with their internal security policies.
- **PowerScribe 360 Reporting** supports Lightweight Directory Access Protocol (LDAP). Nuance recommends the use of LDAP for end-user authentication to **PowerScribe 360 Reporting** to ensure consistency with the customer's authentication and password management policies.
- During the **PowerScribe 360 Reporting** installation process several system level users and associated passwords need to be created. Nuance recommends that the Customer's site administer provides the system level passwords consistent with the customer's internal password policies. Nuance recommends the use of strong/complex passwords consistent with the customer's password management policies.
- Nuance recommends that any Passwords created during **PowerScribe 360 Reporting** installation and configuration only be communicated over secure encrypted channels and/or stored in secure encrypted locations.
- Nuance does not recommend exposing network services to untrusted networks unless otherwise advised by Nuance documentation or Support.

Notations

This section defines notations that may appear throughout the document.

<p>Best Practice</p> 	<p>This Best Practice icon indicates the recommended Nuance procedure to follow when installing or configuring the Nuance PowerScribe 360 application.</p> <p>For example:</p> <ul style="list-style-type: none">● PowerScribe 360 Reporting supports Lightweight Directory Access Protocol (LDAP). Nuance recommends the use of LDAP for end-user PS360 access.● During the PowerScribe 360 Reporting installation process several system level users and passwords need to be created. The Customer's site administrator should provide system level passwords consistent with the customer's internal password policies. Passwords should only be communicated over secure encrypted channels and/or stored in secure encrypted locations.● Microsoft General Security Advice and Best Practices.● Client workstations rebooting recommendations.● Nuance Anti-Virus recommendations.
 <p>IMPORTANT</p>	<p>The IMPORTANT icon indicates to the reader's attention to important information you don't want them to miss.</p>
	<p>The NOTE icon provides auxiliary information or further explanation to the adjacent paragraph(s).</p>



Product: PowerScribe® 360 Reporting
Subject: V4.x System Technical Specifications

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System Overview

PowerScribe 360 Reporting v4.0 is the latest version of Nuance Communication's industry leading front-end speech recognition solution. It provides workflow productivity tools that improve the day-to-day tasks of everyone involved in the interpretation and delivery of diagnostic imaging exams.

At the core of the PowerScribe 360 Reporting application is the latest in structured speech recognition technology optimized specifically for the radiology domain. PowerScribe 360 Reporting goes beyond speech recognition, offering numerous dictation options to meet the unique needs of every radiologist in the department.

PowerScribe 360 Reporting supports orders-based Radiology and Cardiology only.

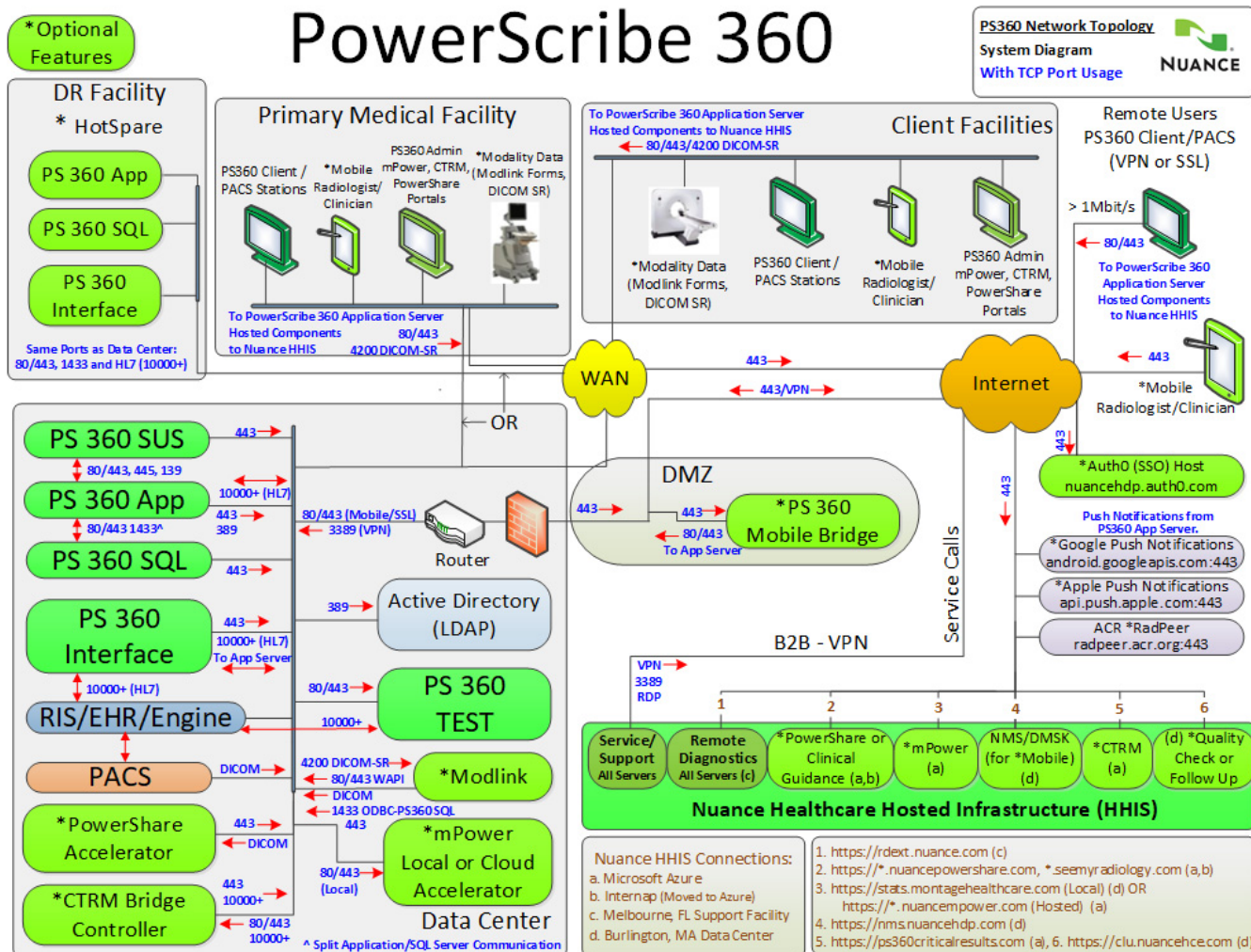


***Note:** The PowerScribe 360 Reporting v4.0 System Technical Specifications have been updated to support the full and expanded feature set available in PowerScribe 360 Reporting v4.0. Clients upgrading from prior versions that are not significantly increasing the annual exam volume or the PowerScribe 360 Reporting feature set and are satisfied with current system performance may remain on hardware platforms that meet or exceed the PowerScribe 360 Reporting v3.5 System Specifications. Clients are encouraged to use the PowerScribe 360 Reporting v4.0 System Specifications to plan for expansion to ensure optimal system performance.*

Operating environments not specifically stated in this document are not supported by Nuance. Clients who deploy PowerScribe 360 Reporting in unsupported environments do so at their own risk and take on the responsibility of supporting those environments.

Nuance reserves the right to update the PowerScribe 360 Reporting technical specifications periodically throughout the year based on changes in technology and Client feedback. Nuance is not responsible for costs incurred due to changes in the system technical specifications. Please contact Nuance Technical Support or Sales Engineering to ensure that you have the most recent version of the PowerScribe 360 Reporting technical specifications.

Nuance's policy is to test the latest updates made available for the supported Microsoft operating systems and SQL Servers. If there are specific issues with individual updates or service packs, Nuance Healthcare Support Platform Article 6384: PowerScribe 360 Reporting Third Party Updates. (Log in to Nuance Healthcare Support Platform and search for the article number) will provide the list of the unapproved updates.



System Architecture

PowerScribe 360 Reporting Application Server

The PowerScribe 360 Reporting Application Server runs the PowerScribe 360 Reporting application. It acts as a Web Server and is responsible for enabling access to web pages (such as the PowerScribe 360 Reporting Administrator Portal) via Internet Explorer.

The PowerScribe 360 Reporting Application Server hosts the RadBridge application, which is responsible for sending and receiving all HL7 messages for the PowerScribe 360 Reporting application. Depending on the number of annual exams dictated by the Client, the Application Server may also host the SQL Server database and facilitate the storage of user voice profiles and system generated audio files.

PowerScribe 360 Reporting SQL Server (If separate from Application Server)

The PowerScribe 360 Reporting SQL Server runs Microsoft's SQL Server software and hosts the PowerScribe 360 Reporting SQL Server database (COMM4). SQL Services and SQL Server Reporting Services are installed on this server.

Nuance supports a Client running the PowerScribe 360 Reporting database on a corporate SQL system; however, the database needs to be placed in a SQL instance by itself. A named instance can be used, if necessary. Nuance will require access and permissions to manage the database and when updating the database, Nuance will need SQL Administrator (SA) level access.

Nuance recommends running the SQL Server Reporting Services (SRSS) on the same server as the PowerScribe 360 Reporting database. If necessary, Nuance will support running the SSRS on a separate server. The SQL Server Agent and Database Engine components are required to be installed on the SSRS server for the PowerScribe 360 Reporting component to install correctly.

SQL Services should run under the Local System except for SQL Reporting, which runs best under the Network Service account. The Services should be set to automatic. All installations and updates to the SQL database must be completed under the SA account or by a SA level account. Once the install or upgrade is complete, the Client may disable or change the password for the SA account.

PowerXpress2008 Server

The PowerXpress2008 Server runs the PowerXpress 2008 gateway application. The server handles HL7 interface communications between the Client's RIS and the PowerScribe 360 Reporting RadBridge service, which runs on the PowerScribe 360 Reporting Application Server. Each PX2008 Server can handle up to four bidirectional HL7 interfaces. The PX2008 Server is optional for Clients with less than 150,000 annual reports; in these cases, the PowerXpress software may be installed on the PowerScribe 360 Reporting Application Server.

Speech Utility Server

The PowerScribe 360 Reporting speech engine requires that the Speech Utility Server (SUS) be configured on a separate, dedicated machine so that speech profile optimization can be performed without impacting other processes. The system must have one SUS Server Node for every 99 dictator accounts. The first node is installed with the primary SUS server. An additional Node will need to be installed to a separate server when the system hosts 100 dictators, and a 3rd when the system hosts 200 dictators, and so on.

The SUS performs both acoustic model adaptation and language model adaptation for each user, resulting in improved recognition accuracy based on the radiologist's dictation style and report context. The SUS also ensures that speech profile updates made on a given client workstation (added words, trained words) are aggregated centrally and pushed out when a user roams between workstations. This ensures consistent accuracy results on all workstations.

The Speech Utility Server processes data for each user as it is collected. A maximum of 500 MB (~5 hours) of data is collected for each user. The processing of the data requires 1 hour for each hour of collected data per user. When speech optimization is running, it will take all system resources available on the machine. Optimization will run until all collected data has been processed.

There are two primary processes that occur on the SUS: the SUS management server and a SUS processing node. The SUS management server communicates with the PowerScribe 360 Reporting server and manages the scheduling of jobs. The SUS processing node processes the data. A typical SUS will have one instance of the management server and one processing node. For optimal performance in larger configurations, Nuance requires one SUS processing node per 99 dictators. Multiple SUS processing nodes can be configured as virtual servers using VMWare or Hyper-V.

Speech Utility Servers are typically not installed in Test or Hot Spare environments.

Test Server

A test system may be configured on one server, which hosts the primary components of PowerScribe360 | Reporting. If desired, the Client may set up a test system that is identical to their production system. Nuance recommends that all changes to the PowerScribe 360 Reporting environment be tested prior to their deployment in the production environment. These changes include testing future upgrades and updates, interface modifications, and updates to integrated solutions such as the RIS and PACS.

Mobile Bridge Server (Optional)

The PowerScribe 360 mobile applications require a Mobile Bridge service to broker the communications between the mobile clients and the PowerScribe 360 Reporting servers. This service may be run on the PowerScribe 360 Reporting Application Server. However, if the Client requires mobile access to the PowerScribe 360 Reporting system from outside of their secure network, a separate server residing inside the DMZ will be needed to run the Mobile Bridge service.

Nuance offers several mobile solutions within the PowerScribe 360 Suite. The PowerScribe 360 | Mobile Radiologist application allows radiologists to create, edit, and sign reports, access their signature queue, and utilize a limited version of Assisted Diagnosis. PowerScribe 360 | Mobile Clinician allows clinicians to access preliminary and final reports for their ordered exams as well as receive messages from PowerScribe 360 | Critical Results. The PowerScribe 360 mobile applications are available for download on both the Apple and Android App Stores. All users who download and install the applications on their mobile devices will be able to use the Assisted Diagnosis functionality; however, connectivity to the PowerScribe 360 Reporting servers for report access requires the purchase of an add-on license for the Mobile Bridge interface.

In order for users to receive notifications, the facility must allow traffic through the firewall to [Feedback.push.apple.com](https://feedback.push.apple.com) and android.googleapis.com. Additionally, Apple load balances their push notification services and according to their developer's guide, it's best to allow access to the following ports across the 17.0.0.0/8 address block:

- TCP port 5223: For communicating with Apple Push Notification services (APNs)
- TCP port 2195: For sending notifications to APNs
- TCP port 2196: For the APNs feedback service
- TCP port 443: For a fallback on Wi-Fi only, when devices can't reach APNs on port 5223

Nuance currently supports devices running iOS 8.0 and higher and Android 4.4 and higher.

ModLink Server

(Optional – Used for DICOM Integrations / Implementations)

The PowerScribe 360 Reporting DICOM Bridge can receive and parse DICOM SR objects and supports DICOM version NEMA PS3 and above. Nuance has partnered with Hyland and all DICOM data now routes through ModLink. ModLink is a translation engine that accepts DICOM SRs, translates and normalizes values from those messages, and forwards the translated values to PowerScribe 360 Reporting via an API integration. A ModLink Server is required if this Advance Data Integration add-on is purchased.



mPower Cloud Solution (Optional)

mPower Clinical Analytics enables practice leaders, clinicians, researchers, and educators to easily search PowerScribe 360's information-rich radiology reporting database for key business and clinical data. Users can access a birds-eye view of all prior radiology reports and corresponding data elements along with practice management metrics and Quality Control dashboards. In addition, proprietary data-mining techniques allow for sophisticated searches to extract marketing, quality, business, and billing/coding analytics, which can measure and enhance business performance and provide clinical decision support.

As a hosted solution the mPower Clinical Analytics database and application resides in the Microsoft Azure data center. Each customer is given a unique URL to access their specific instance of the mPower application.

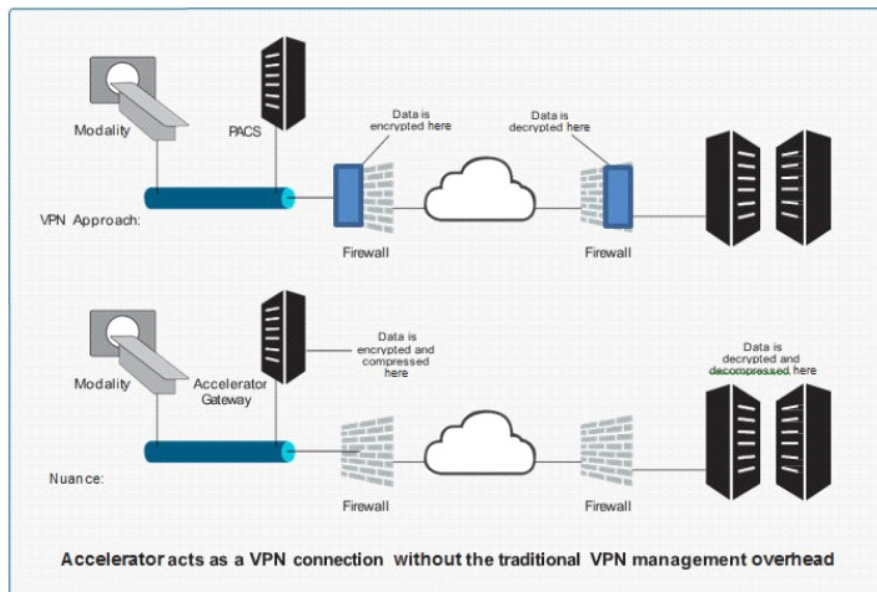
mPower Clinical Analytics does require an Edge Device (mPower Accelerator) which is able to connect to Nuance radiology reporting database to securely transmit data from the customers network to the hosted application. This light weight app will be configured as a behind-the-scenes automated process during the setup of mPower Clinical Analytics.

PowerShare Image Accelerator Server (Optional)

PowerShare allows Clients to send images around the globe, sharing them with other physicians, organizations, and other healthcare service providers. Other features available with PowerShare are complete reporting, PACS, and result distribution capabilities – all provided as managed services through PowerShare's robust and secure data center infrastructure. Unlike most imaging systems today, which typically require a Virtual Private Network (VPN) for outside image communications, PowerShare requires only a standard Internet connection.

A key component in securing the communications between the imaging facility and the servers is the PowerShare Image Accelerator Server. The PowerShare Accelerator software is installed at the imaging facility and communicates broadly with multiple imaging modalities; e.g., PACS, via standard DICOM-3 protocol. On the back-end, the Accelerator employs strong data encryption for communication with the PowerShare servers to assure a high level of security. In addition, the Accelerator provides image compression and data integrity checks to assure that the transmission of images over the Internet is not only secure, but also efficient and accurate.

The diagram on the following page illustrates how the Accelerator acts as a VPN connection between the imaging facility and the PowerShare Network:



Specific URLs are:

- upload1.seemyradiology.com:443
- www1.seemyradiology.com:443/80
- gwconfig.seemyradiology.com:443
- api.seemyradiology.com:443
- turbo.seemyradiology.com:443

Adding “*.seemyradiology.com:443” to firewall exclusions would cover the URL and port range.

PowerShare allows providers to quickly and securely access and share medical images. As part of this solution, PowerShare provides a Viewer for rapid assessment of the images.

Virtual Server Environments

PowerScribe 360 Reporting has been qualified in a virtual server environment using VMWare ESX V5.5 or greater with the latest patches and Microsoft Hyper-V with Windows Server 2012 R2 or with Windows Server 2016. As a general rule, virtual machines should be configured using the same recommended specifications for physical machines listed in this document. The CPU and RAM resources assigned to the virtual servers must be dedicated resources and not shared with other VM Guests.

The Client is responsible for acquiring, configuring, and maintaining the virtual environment. Nuance is responsible for installing, configuring, and maintaining the PowerScribe 360 Reporting applications. Nuance will assist the Client and make recommendations where applicable and will support the PowerScribe 360 Reporting product.

Virtual Environment Recommendations

1. Turn off VMware snapshots. Automated snapshots as part of a backup strategy, via the VMware Consolidated Backup or VMware Data Recovery applications can impact performance.
2. Turn off Automatic VMotion. This is used as part of a load balancing option to make sure that all servers are running optimally.
3. Make sure that all firmware and driver updates are installed and kept up to date on the host platform. Patches are constantly being released to address the issue of virtualized connection issues with MSSQL systems by both hardware and software vendors.
4. Ensure all Windows updates are appropriately applied within each guest platform Operating System.
5. Make sure that the VMware Tools are up to date on guest operating systems.
6. Make sure that the ESX/VSphere hosts are up to date with a regular patch schedule.
7. NIC settings - by default, NICs are configured to hibernate which enables device to be powered down - this feature needs to be turned off.
8. Anti-Virus settings: Exclusions will need to be set, as they can cause extra delays
9. Ensure that the SAN is not overloaded when nightly backups run, so that it can still handle normal operational traffic.
10. If utilizing memory over-commit in VSphere, calculate any server running SQL at 1:1 as well as the Web server, and the Recognition server if running a separate SQL server.
11. Any SQL server and Web server will need a minimum of 320MB/s disk speed on the SAN connection. Anything less will cause latency issues, and cause server instability.
12. Configure backup schedule for database dumps to not occur while the servers are running a backup.
13. Failover on the NICs - needs to be turned off. When random failovers between NICs occur, it can cause a SQL disconnect. NIC settings – with a teamed NIC, make sure that the team is only set to Fault Tolerance Only, instead of Load Balancing.
14. NIC vs. Switch settings - need to match properly. If the speeds are not set correctly for physical servers that connect to a virtual environment, it can cause unnecessary latency and packet loss.

15. If the SQL server is running on a SAN, the SAN will need a minimum of 320Mb/s bandwidth, and the logical drives for the Data and Dump drives should be on separate drives.

References

Configuring NIC Speed in ESX:

http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1004089

Application and SQL Server Specifications

		Level 1	Level 2	Level 3A	Level 3B (Recommended)	
Report Volume		150,000 or Less Reports / YR	150,000 - 300,000 Reports / YR	300,000 - 600,000 Reports / YR	300,000 - 600,000 Reports / YR	
Server Function		Application ⁵ / SQL ⁷ / PX2008	Application ⁵ / SQL ⁷	Application ⁵ / SQL ⁷	Application ⁵	SQL ⁷
Processor (Intel Xeon or Equivalent)	Optimal	Hex-Core 2.4GHz	Hex-Core 2.4GHz	Hex-Core 2.4GHz	Hex-Core 2.4GHz	Hex-Core 2.4GHz
	Minimum	Quad-Core or Above 1.8 GHz	Quad-Core or Above 1.8 GHz	Quad-Core or Above 1.8 GHz	Dual-Core 2.3 GHz Quad-Core or Above 1.8 GHz	Quad-Core or Above 1.8 GHz
RAM	Optimal	12GB (16GB) ⁹	16GB	24GB	12GB	16GB
	Minimum	8GB	8GB	16GB	8GB	8GB
Windows Server Operating System (64-Bit O/S)	Optimal	WIN 2016	WIN 2016	WIN 2016	WIN 2016	WIN 2016
	Minimum	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2
Database Application (64-Bit) (Note: 8)	Optimal	MS SQL 2016	MS SQL 2016	MS SQL 2016	N/A	MS SQL 2016
	Minimum	MS SQL 2014 MS SQL 2012	MS SQL 2014 MS SQL 2012	MS SQL 2014 MS SQL 2012	N/A	MS SQL 2014 MS SQL 2012
C: (O/S) Drive Size (Notes: 1, 2)	Optimal	Physical: 2 x 146GB Virtual: 100GB	Physical: 2 x 146GB Virtual: 100GB	Physical: 2 x 146GB Virtual: 100GB	Physical: 2 x 146GB Virtual: 100GB	Physical: 2 x 146GB Virtual: 100GB
	Minimum	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB
Initial Data Drive Size (Notes: 3, 4) (5 yrs. est.)		250GB Available Space	400GB Available Space	500GB Available Space	350GB Available Space	200GB Available Space
Network Card		1 - 1GB	1 - 1GB	1 - 1GB	1 - 1GB	1 - 1GB



Notes:

- 1. In a physical environment, C (Operating System) drive are recommended to be configured as RAID 1.*
- 2. The C: (O/S) drive is sized to allow sufficient free space for growth and storage of the operating system and added third party applications by Clients. Not sizing the C: Drive sufficiently can result in system outages.*
- 3. In a physical environment, the (Data) drives are recommended to be configured as RAID 5*
- 4. Data Drive space for servers will vary, depending expected growth, adding additional facilities and internal testing requirements. Initial drive requirements will be calculated by the Sales Engineering team during discovery.*
- 5. RadBridge and RAS services must be installed to the Application server.*
- 6. Requirements may vary depending on number of concurrent users, number of HL7 feeds, and other variables.*
- 7. Nuance no longer provides MS SQL Server software bundled with the PowerScribe 360 Reporting application. For Clients who cannot provide the appropriate MS SQL Server licenses, Nuance can sell MS SQL Server 2014 and MS SQL Server 2016 separately as an add-on.*
- 8. Hot Spare configurations require SQL 2016 Standard or Enterprise, or SQL 2014 Enterprise; see additional detail in the Hot Spare section.*
- 9. Additional 4 GB RAM is required, if uploading PDF multimedia reports through PX 2008.*
- 10. Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing PowerScribe 360.*

Application and SQL Server Specifications (Continued)

		Level 4		Level 5		Custom
Report Volume		600,000 – 1,500,000 Reports / YR		1,500,000 – 3,000,000 Reports / YR		3,000,000+ Reports /
Server Function		Application ⁵	SQL ⁷	Application ⁵	SQL ⁷	More than 3,000,000 annual reports/year requires a custom configuration. Nuance Sales Engineering will work with the client to provide the most optimal solution to support the large-scale requirement.
Processor (Intel Xeon or Equivalent)	Optimal	Hex Core 2.3 GHz	Hex Core 2.3 GHz	2 - Hex Core 2.3	2 - Hex Core 2.3	
	Minimum	Quad-Core 2.6 GHz or	Quad-Core 2.6 GHz or	Hex-Core 1.8 GHz	Hex-Core 1.8 GHz	
RAM	Optimal	16GB	24GB	32GB	64GB	
	Minimum	12GB	16GB	18GB	32GB	
Windows Server Operating System (64 Bit)	Optimal	WIN 2016	WIN 2016	WIN 2016	WIN 2016	
	Minimum	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2	
Database Application (64 Bit) (Note: 8)	Optimal	N/A	MS SQL 2016	N/A	MS SQL 2016 or MS SQL 2016 Ent	
	Minimum	N/A	MS SQL 2014 MS SQL 2012	N/A	MS SQL 2014 MS SQL 2012	
C: (O/S) Drive Size (Notes: 1, 2)	Optimal	Physical: 2 x 146GB Virtual:	Physical: 2 x 146GB Virtual:	Physical: 2 x 146GB Virtual: 100GB	Physical: 2 x 146GB Virtual:	
	Minimum	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	Physical: 2 x 146GB Virtual: 75GB	
Initial Data Drive Size (Notes: 3, 4) (5 yrs. est.)		700GB Available Space	450GB Available Space	1.5TB Available Space	850GB Available Space	
Network Card		2 cards Teamed - 1GB Each	2 cards Teamed - 1GB Each	2 cards Teamed - 1GB Each	2 cards Teamed - 1GB Each	



Notes:

1. In a physical environment, C (Operating System) drive are recommended to be configured as RAID 1.

2. *The C: (O/S) drive is sized to allow sufficient free space for growth and storage of the operating system and added third party applications by Clients. Not sizing the C: Drive sufficiently can result in system outages.*
3. *In a physical environment, the (Data) drives are recommended to be configured as RAID 5*
4. *Data Drive space for servers will vary, depending expected growth, adding additional facilities and internal testing requirements. Initial drive requirements will be calculated by the Sales Engineering team during discovery.*
5. *RadBridge and RAS services must be installed to the Application server.*
6. *Requirements may vary depending on number of concurrent users, number of HL7 feeds, and other variables.*
7. *Nuance no longer provides MS SQL Server software bundled with the PowerScribe 360 Reporting application. For Clients who cannot provide the appropriate MS SQL Server licenses, Nuance can sell MS SQL Server 2014 and MS SQL Server 2016 separately as an add-on.*
8. *MS SQL 2014 and 2016 Enterprise Edition or MS SQL 2016 Standard Edition is required to support a Hot Spare configuration, see additional detail in the Hot Spare section.*
9. *Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing PowerScribe 360.*

Sizing Guidelines

The sizing guidelines below provide an estimate of data drive space required for the number of annual exam volume and number of users with Speech Recognition profiles.

PowerScribe 360 Reporting now supports multimedia reporting. Multimedia reporting utilizes Microsoft SQL Filestream feature to store the images captured by the radiologist screen grabbing an image or by images sent by the PACS system.



IMPORTANT

Important: If this feature is going to be used, work with the Nuance Sale Engineer to determine correct disk sizing.

User Sizing

Number of Users	10	20	25	30	50	75	100	150	200
Storage Required	15GB	30GB	37.5GB	45GB	75GB	112.5GB	150GB	225GB	300GB



Note: Each user is allocated 1.5GB for their user/voice profile.

Audio File Sizing

Audio Files/Exam Volume	150,000	300,000	600,000	1,500,000	3,000,000
Storage Required	45GB	90GB	180GB	445GB	890GB



Note: Audio storage is based on the following data: report length of 3 minutes and audio file storage set for 30 days.

Database Sizing

Annual Exam Volume	150,000	300,000	600,000	1,500,000	3,000,000
Database Size	2.2GB	4.5GB	9GB	22.5GB	45GB



Note: Database size after one year of system usage.

Bridge Logs

Annual Exam Volume	150,000	300,000	600,000	1,500,000	3,000,000
Bridge Logs	11.2GB	22.4GB	45GB	112.5GB	225GB

SQL Server Sizing (Database, Database Backup, and Transaction Logs)

Annual Exam Volume	1-Year	3-Years	5-Years
150,000			
Database	2.2GB	6.7GB	11.2GB
Database Backup	4.5GB	13.5GB	22.4GB
Transaction Logs	1.3GB	4.0GB	6.7GB
300,000			
Database	4.5GB	13.5GB	22.4GB
Database Backup	9.0GB	27GB	44.9GB
Transaction Logs	2.7GB	8.1GB	13.5GB
600,000			
Database	9GB	27GB	45GB
Database Backup	18GB	54GB	90.1GB
Transaction Logs	5.4GB	16.2GB	27GB
1,500,000			
Database	22.5GB	67.5GB	112.5GB
Database Backup	45GB	135GB	225GB
Transaction Logs	13.5GB	40.5GB	67.5GB
3,000,000			
Database	45GB	135GB	225GB
Database Backup	90GB	270GB	450GB
Transaction Logs	27GB	81GB	135GB

Specific Functions Servers

PX2008 Server / Speech Utility Server / Test Server / Mobile Bridge Server (Optional)

		PX2008 Server ¹	Speech Utility Server ^{1,2}	Test Server ^{1,4}	Mobile Bridge Server ¹
Processor (Intel Xeon or Equivalent)	Optimal	Quad-Core or Above 2.4GHz	Quad-Core or Above 2.4GHz	Quad-Core or Above 2.4GHz	Quad-Core or Above 2.4GHz
	Minimum	Dual-Core or Dual-CPU 2.4 GHz	Dual-Core or Dual-CPU 2.4 GHz	Dual-Core or Dual-CPU 2.4 GHz	Dual-Core or Dual-CPU 2.4 GHz
RAM	Optimal	8GB (12GB) ⁶	8GB	8GB	8GB
	Minimum	4GB (8GB) ⁶	4GB	4GB	4GB
Windows Server Operating System (64-bit)	Optimal	WIN 2016	WIN 2016	WIN 2016	WIN 2016
	Minimum	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2	WIN 2012 R2
Database Application (64-Bit)	Optimal	N/A	MS SQL Express 2016 ³	MS SQL 2016 ^{4,5}	N/A
	Minimum	N/A	MS SQL Express 2014 Express 2012	MS SQL 2014 ^{4,5} MS SQL 2012 ^{4,5}	N/A
C: (O/S) Drive Size	Optimal	Physical: 2 x 146GB ¹ Virtual: 100GB	Physical: 2 x 146GB ¹ Virtual: 100GB	Physical: 2 x 146GB ¹ Virtual: 100GB	Physical: 2 x 146GB ¹ Virtual: 100GB
	Minimum	Physical: 2 x 146GB ¹ Virtual: 100GB	Physical: 2 x 146GB ¹ Virtual: 100GB	Physical: 2 x 146GB ¹ Virtual: 75GB	Physical: 2 x 146GB ¹ Virtual: 100GB
Data Drive Size (5 Years Estimated)		(Optional) 100GB Available Space	(Optional) 100GB Available Space	100GB ^{1,4} Available Space	N/A
Network Card		1 - 1GB	1 - 1GB	1 - 1GB	1 - 1GB



Notes:

1. *In a physical environment, C (Operating System) drive and Data Drive are to be configured as RAID 1.*
2. *Sites must have one SUS Server Node for every 99 dictator accounts. The first node is installed with the primary SUS server. An additional Node will need to be installed to a separate server when the system hosts 100 dictators, and a 3rd when the system hosts 200 dictators, and so on.*
3. *MS SQL Express 2014 is provided by Nuance and installed on the Speech Utility Server to facilitate communication with the PowerScribe 360 Reporting SQL Server.*
4. *The SQL Server installed on the test server should be equivalent to the production PowerScribe 360 Reporting SQL Server. It will be used to validate system upgrades and patches.*
5. *Nuance no longer provides MS SQL Server software bundled with the PowerScribe 360 Reporting application. For Clients who cannot provide the appropriate MS SQL Server licenses, Nuance can sell MS SQL Server 2014 and MS SQL Server 2016 separately as an add-on.*
6. *Additional 4GB RAM is required, if uploading PDF multimedia reports.*
7. *Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing PowerScribe 360.*

mPower Server Cloud Solution - Accelerator Edge Device (Optional)

The mPower Edge Device is used to connect to PS360s SQL DB to crawl the necessary data fields for mPower cloud application. The Edge Device server must be able to reach the PS360 SQL DB.

Processor	CPU cores	RAM	Storage	Internet Speed
x86-64 (i5, i7, Xeon)	4	8GB	60GB	20-40+ Mbps (recommended for quicker upload times)

Operating Systems Considerations

Windows Server 2012 R2 or Windows Server 2016. VM environments are acceptable. The network interface must have a static or reserved IP address, no DHCP.

Firewall Considerations

Firewall must allow outbound connections to gateway, content filters, and local proxies should bypass the external URLs below:

- Accelerator Mapper acceleratormapper.nuancempower.com port 443
- Customer Cell URL *.nuancempower.com port 443

Central Authorization – SSO Connector (Optional)

When a customer wants to connect to mPower or PS360 Critical Results using their AD/LDAP credentials and does not have ADFS, SAML, or WS-Federation they can install a “Connector” application which will securely proxy up the AD/LDAP credentials of the user to log into the mPower application.

The Connector can be installed on an existing server (like mPower Accelerator Edge Device). However, more often it's installed on virtual machines provisioned just for the Connector. The Connector server must be installed with access to the LDAP server. The host server should have the following hardware and software specifications/configurations:

Processor	CPU cores	RAM	Storage
x86-64 (i5, i7, Xeon)	2	2GB	500MB

Operating Systems Considerations

Windows Server 2012 R2 or Windows Server 2016. VM environments are acceptable. The network interface must have a static or reserved IP address, no DHCP.

Firewall Considerations

Firewall must allow the following outbound connections to

- Central Authentication nuancehdp.auth0.com port 443
- Auth0 auth0.com port 443

PowerShare Image Accelerator Server (Optional)

Image Accelerator Server (PowerShare)	Image Daily Volume 0 – 200 per Day	Image Daily Volume 200 – 600 per day	Image Daily Volume 600 + per Day
CPU	Core2Duo 2.4 GHz+	Core2Quad, i5-Dual, i7-Dual, Xeon-Dual	i5-Quad, i7-Quad, Xeon (Quad or Hex)
Processor Threads	4	8	12
Sender Threads	5	10	20
RAM	4GB	8GB	8GB
Windows Server Operating System (64 Bit O/S)	Win 2016 Win 2012 R2	Win 2016 Win 2012 R2	Win 2016 Win 2012 R2
Initial Storage Capacity	50GB	200GB	400GB
Network	1 - 1GB	1 - 1GB	1 - 1GB
Internet Speed	5MB/s+	10MB/s+	10MB/s+

ModLink Server (Optional)

ModLink Server		Hardware	Virtual Machine
CPU		Quad-Core or Above, 2.6 GHz	2 Processors or Dual-Core, 2.4GHz
Windows Server Operating System (64 Bit O/S)	Optimal	WIN 2016	WIN 2016
	Minimum	WIN 2012 R2	WIN 2012 R2
RAM		8 GB +	8 GB +
Initial Storage Capacity		2 x 500GB Raid 1	150GB Free Space
Network		1 - 1GB	1 - 1GB



***Note:** Installation of WebForms will require MSSQL Express (installed with application).*

Client Workstation Specifications

		Admin / Editor Client/Standalone Dictation Client	Integrated Client ¹
Processor	Optimal	Dual-Core or Dual-CPU 2.4 GHz or above	Quad-Core 2.7 GHz
	Minimum	Single-Core 2.4 GHz	Dual-Core or Dual-CPU 2.4 GHz or
RAM	Optimal	4GB	8GB
	Minimum	4GB	4GB
Operating Systems ^{3, 13}	Optimal (64 Bit O/S)	Windows 10 Pro/Ent ¹⁰ Windows 7 Windows 8.1	Windows 10 Pro/Ent ¹⁰ Windows 7 Windows 8.1
	Minimum (32 Bit O/S)	Windows 10 Pro/Ent ¹⁰ Windows 7 Windows 8.1	Windows 10 Pro/Ent ¹⁰ Windows 7 Windows 8.1
# NIC / Speed	Optimal	1GB	1GB
	Minimal	100MB	100MB
Minimum Display		1024 x 768	1024 x 768
C: Drive (O/S) Size		25GB Available Space after install of Client	25GB Available Space after install of Client
Browser		Internet Explorer 11	Internet Explorer 11



Notes:

1. For PowerScribe 360 Reporting integrated clients, Nuance recommends verifying the integrated client specifications with the Client's PACs or Desktop Integration Vendor.
2. The PowerScribe 360 Reporting client natively supports 32bit operating systems, as well as 64bit operating systems in 32bit emulation.
3. The installer of the PowerScribe 360 client software must use a Local Administrator account.
4. The client must be able to update the registry.
 - a. The following are the keys that the client must be able to access (Read and Write):
 - HKEY_LOCAL_MACHINE\SOFTWARE\Nuance
 - HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Nuance (64-bit OS)
 - HKEY_CURRENT_USER\SOFTWARE\Nuance
5. All users must have Full control permissions on the C:\ProgramData\Nuance Folder, as well all subfolders.
6. If using an XML desktop integration, all users must have full control of the specified directory (e.g. C:\Nuance).
7. Nuance PowerScribe 360 Reporting Client can connect to different PowerScribe 360 Reporting systems; however, the systems that are being connected to MUST be at the exact same version, service pack, patch and publication.
8. In order to view images from the PowerShare network, the client must have a browser installed that supports Flash Player version 10 or greater. PowerShare uses the Client Outlook – eUnity Viewer to display images.
9. WebDAV communication is used to download and upload Dragon Naturally Speaking user profile. Communication between the client and server requires port 80 or 443 only to support this communication.
10. Windows 10 known issues running PowerScribe 360 Reporting Client.
 - a. When starting the PS 360 client using the shortcut on the desktop, the Edge Browser will start up and will not disappear or shut down, leaving a "Blank" browser page. To fix the issue, the site will need to change the default browser to from "Edge" to "IE 11".
11. Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing PowerScribe 360.

Bandwidth Requirements

PowerScribe 360 Reporting is designed for use in a high volume environment. Client machines are recommended to have 1GB connectivity, with a min of 100MB for a client. Servers should be connected at 1GB.

Users should be aware that network traffic from other applications will affect the performance of the PowerScribe 360 system. This should be considered when planning your implementation.

As PowerScribe 360 Reporting system is a client-server application, users may connect to the system from remote locations, such as home or remote offices if they have security access into their corporate network. System performance and user satisfaction will vary, depending on the connection to the hospital or clinic network. Nuance recommends a broadband-type connection of at least 1MB; however, network bandwidth may vary depending on the ISP, or general network traffic.

NIC Settings

Gigabyte Cards

Gigabyte cards should be set to automatic. The switch should be set the same as the cards plugged into them.

100MB Cards

The minimum Network speed for PowerScribe 360 Reporting is 100MB. The network link speed and duplex need to be set the same on all servers, workstations, hubs, switches, etc. If there is a mismatch in settings, or if the NICs are left set at Auto Detect, the end users of the system could see degradation in performance as well as recognition. Nuance does not support the Auto-Detect setting for 100MB cards.

Clustering

PowerScribe 360 Reporting has been qualified in a clustered server environment using Microsoft Failover Clustering and MS SQL Server 2012, MS SQL Server 2014 and MS SQL Server 2016. Both the application server and MS SQL Server can be clustered in an active/passive configuration. Clusters can be configured on virtual environments as long as the required resources are allocated.



Note: Refer to VMware or Hyper-V documentation for product and version to support your OS and SQL version.

PowerScribe 360 Reporting uses Microsoft SQL Reporting Services for managerial reporting. Microsoft SQL Reporting Services does not support clustering and will not automatically fail over, unless SQL Enterprise edition is being used. If SQL Enterprise edition is being used, Microsoft SQL Reporting Services should be installed on both cluster nodes. This configuration will result in the service being fully available at failover, however it will require manual intervention.

It is the Client's responsibility to acquire, configure, and maintain the clustered environment. Nuance is responsible for installing, configuring and maintaining the PowerScribe 360 Reporting applications. Nuance will assist the Client and make recommendations where applicable and will support the PowerScribe 360 Reporting product. Prior to implementation, Nuance will require a detailed site discovery prior to implementation of clustering. It is a Nuance requirement that our Client have staff members that are trained on the configuration and testing and maintenance of Microsoft Clustering. In a clustered configuration, Nuance will only assume responsibility for installation and maintenance of the PowerScribe 360 Reporting application.

Important Considerations

1. Virtual machine clusters are supported on VMware ESX version 4 and higher.
2. All operating system and SQL installations must conform to the Specifications for your version of PowerScribe 360 Reporting.
3. GeoCluster setup is not supported.
4. The cluster should be installed using the same accounts for each node of the cluster.
5. The Quorum disk for each cluster should be 1GB.
6. The Microsoft DTC disk for the SQL cluster should be 1GB. Do not use the same disk as the Quorum disk.
7. The X:\Nuance (Data) folder must be on a different drive than the SQL DB, or it can cause failure during failover.
8. If using SSL, the SSL certificate must be installed before Nuance installs the PowerScribe 360 Reporting software.
9. The customer must provide Host names and static IP addresses for the Virtual Cluster, Virtual SQL, RadBridge, DTC, and File Service.
10. If an alias is set up for the application (i.e. alias.hospital.org), this should be pointed to the FileService Cluster Resource.
11. PowerXpress, Mobile Bridge Server, and SUS cannot be in a cluster and must be on separate machines.
12. Reporting Service is not cluster-aware for SQL Standard Edition. Nuance will install it on Node 1 only unless SQL Enterprise Edition is installed.
13. PowerScribe 360 Reporting can support the use of named instances in SQL.
14. Objects must be created in the domain in the proper Organizational Unit active directory prior to installing the PowerScribe 360 software.
15. The Application (IIS) and SQL Cluster Servers needs failover clustering, file server, IIS, and application server roles installed.
16. High Performance should be set up for Clusters.
17. The Customer should turn on Network Discovery.

Faxing (Optional)

PowerScribe 360 Reporting utilizes Microsoft Fax Server. The Client is responsible for providing and maintaining this infrastructure. It is recommended that faxing be configured on the IIS Application server for best performance. Faxing requires that the Nuance PDF application be installed on the PowerScribe 360 Reporting Application and Fax server (Nuance PDF is included with the application install software). It is the client's responsibility to install, configure and maintain the Microsoft Fax components and the fax card (virtual or physical).

Hot Spare (Optional)

Nuance offers a Hot Spare configuration for PowerScribe 360 Reporting for disaster recovery. It is available if the primary production PowerScribe 360 Reporting server becomes unavailable due to software or hardware issues. A typical Hot Spare configuration consists of duplicated PS360 Application, SQL and PX2008 Servers. The Nuance Hot Spare configuration utilizes Microsoft SQL AlwaysOn and scripting to ensure that the PowerScribe 360 Reporting Production and Hot Spare systems are in sync. Nuance Hot Spare only supports a Basic Availability Group (BAG) with one active SQL and one passive SQL. Microsoft SQL 2016 standard will support this configuration. This configuration requires the SQL servers to be installed using Windows Server Failover Clustering (WSFC).

LDAP

PowerScribe 360 Reporting utilizes standard Microsoft .NET routines to connect via LDAP. PowerScribe 360 Reporting supports only one AD connection per system.

PowerScribe 360 Reporting supports two forms of LDAP authentication:

1. **Basic Mode:** the client will attempt to authenticate to the LDAP server using the PowerScribe 360 Reporting username and password. This will work so long as the PowerScribe 360 Reporting username matches the LDAP common name (CN).
2. **Advanced Mode:** the client will authenticate to the LDAP server using an administrative username and password that must be configured in the Admin Portal. The client will search for the user and validate the password. This mode is necessary if the PowerScribe 360 Reporting username does not match the CN in the directory.

PowerScribe 360 Reporting can support the following types of LDAP Authentication Types:

Basic	Indicates that basic authentication should be used on the connection. The value is equal to 1.
Digest	Indicates that the Digest Access Authentication should be used on the connection. The value is equal to 4.
Kerberos	Indicates that Kerberos authentication should be used on the connection. The value is equal to 9.
Negotiate	Indicates that Microsoft Negotiate authentication should be used on the connection. The value is equal to 2.

Ntlm	Indicates that Windows NT Challenge/Response (NTLM) authentication should be used on the connection. The value is equal to 3.
Sicily	Indicates a negotiation mechanism (Sicily) will be used to choose MSN, DPA or NTLM. This should be used for LDAPv2 servers only. The value is equal to 5.

Microphones / Headsets

The standard microphone for PowerScribe 360 Reporting is the PowerMic-III, which are sold and supported by Nuance. The PowerMic III comes only in Non-Scanner configuration.



Note: Both Non-Scanner and Scanner models of the PowerMic II are available and supported.

PowerScribe 360 Reporting will also work with the Philips SpeechMike, but only models 5276 and 5284. These models are no longer in production.

USB Headsets are supported for audio input and playback within PowerScribe 360 Reporting. All headsets are treated as generic audio input devices and can be used in conjunction with a foot pedal or voice commands for navigation and control. Wireless or Blue-tooth headsets are not supported. Please refer to the Nuance.com web site for a list of Dragon approved USB headsets: <http://support.nuance.com/compatibility/>

Headsets can also be used in combination with the PowerMic II and PowerMic III in the following configuration:

Nuance sells the VXi TalkPro USB1 Computer USB Headset – Monaural for use with PowerScribe 360 Reporting.

MFG. P/N	Nuance P/N	Description
VXI 203008	5000078-001	Headset with Microphone, USB1

Out of the box, the above headset will work as an input device on PowerScribe 360 Reporting when used standalone or in conjunction with a PowerMic II and PowerMic III microphone.

Additionally, any headset attached to the VXi x100 or x200 audio adapter will support the PowerMic II/Headset combination. Related to the VXi USB adapter, the V, P, G series is related to the quick disconnect that attaches to the different headsets.

X100 USB Adapters

X100-V USB Adapter (202926). Compatible with VXi V-series, TalkPro SP or TuffSet headsets. X100-P USB Adapter (202927). Compatible with VXi P-series or Plantronics headsets.

X100-G USB Adapter (202928). Compatible with VXi G-series or GN Netcom/Jabra headsets.

X200 USB Adapters

X200-V USB Adapter (202930). Compatible with VXi V-series, TalkPro SP or TuffSet headsets. X200-P USB Adapter (202931). Compatible with VXi P-series or Plantronics headsets.

X200-G USB Adapter (202932). Compatible with VXi G-series or GN Netcom/Jabra headsets.

The above compatibility information was provided by VXi. If you are unsure which adapter to purchase, please contact VXi or visit their website, <http://www.vxicorp.com/products/accessories/amplifiers-adapters/>.

Proxy Server

PowerScribe 360 Reporting may be run through a proxy server. However, when using the Critical Results (<https://ps360criticalresults.com>) or the Quality Check (https://*.nuanceunderstanding.com) add-ons, all traffic to and from these hosted servers must bypass the proxy server. Failure to do so will result in delays and failures of communications to the hosted servers.

Clinical Guidance (Optional)

Clinical Guidance for PowerScribe 360 Reporting uses quick and easy voice-enabled access to consensus-based clinical guidelines. Using Clinical Guidance increases referring physician satisfaction, reduces risks and improves quality of care.

Quality Check (Optional), *formerly known as Assure*

Quality Check for PowerScribe 360 Reporting provides powerful tools to improve report accuracy and consistency utilizing Nuance's sophisticated Clinical Language Understanding (CLU) technology, which considers the full context of the report.

The Nuance CLU technology utilized by Quality Check is hosted in the Nuance data center. The connection to the Nuance data center encrypts the data passed back and forth from the PowerScribe 360 Reporting system via SSL. The Client does not need an SSL certificate for Quality Guidance. However, Clients will need to open their firewall to allow PowerScribe 360 Reporting to connect to the Nuance data center over an SSL connection (https, port 443).

Roaming Profiles

Microsoft Windows Roaming Profiles are supported in PowerScribe 360 Reporting. However, if the user's personal storage is redirected to a server and not cached on the local workstation, the user will see significant performance issues.

Server Installation

All installations must be completed under an account that is a local administrator. Use caution, in that a domain account that is a local administrator may have restricted rights due to active directory permissions. It is best to use the local administrator account or a Domain user that is a member of the local administrator security group to avoid this issue.

MSSQL System Administrator Account (SA)

The MSSQL SA account (or equivalent) is required when installing or upgrading the PowerScribe 360 Reporting application. Once the installation or upgrade is complete, the facility can change the SA password for security purposes. The MSSQL SA account should never be disabled, deleted or renamed, even if it is not used.

Domain Account for Support and Application Services

Every site will need to create a Windows Domain account that will be used to provide support and be used to operate several of the application's services on different servers. This account will need to be a member of the local servers Administrator Built-In Group, on each server. A local account may be used if necessary, such as where the servers are not in a domain, however it is not recommended, for security reasons. The password for the account should meet the site's security requirements.

Most services run under Local System, and do not require an account to operate it. The ones that require a named account are:

- All Servers: Distributed Framework Service: Agency (Runs Remote Diagnostics)
- MSSQL Server: SQL Reporting Service
- SUS Server: SPARK Speech Node Manager (Speech profile Processing (ACO/LMO))
- SUS Server: SPARK Core Services (Speech profile Processing (ACO/LMO))

Best Practice



Passwords should only be communicated over secure encrypted channels and/or stored in secure encrypted locations.

SSL

PowerScribe 360 Reporting supports SSL encryption. Clients must supply their own certificate(s) from an appropriate trusted authority. It is the Client's responsibility to acquire, configure, and maintain the SSL environment.

System Maintenance

It is the Client's responsibility to maintain the PowerScribe 360 Reporting system. This includes checking server space, reviewing logs, applying Microsoft updates, and verifying backups.

In order to maintain data integrity and recoverability, PowerScribe 360 Reporting database and data files should be backed up regularly. It is the Client's responsibility to maintain and follow a backup plan / procedure to archive valid copies of the data and database in case of disaster.

Nuance recommends that anti-virus software be installed on all machines in order to protect the system from potential downtime due to viruses. Running anti-virus and malware prevention software in real-time mode may compromise the operation of PowerScribe 360 Reporting. In order to prevent performance issues, anti-virus and malware prevention software should be running with the required exclusions, which apply to certain directories and file types. For the full list of anti-virus and malware application exclusions, as well as required maintenance processes, please refer to the PowerScribe 360 Publication PN 889797 "Server Maintenance and Management Version 4.0", and PN 889795 "Client Installation and Configuration v4".

Manual Revision History

Note: In this table the most recent changes are first by date.

Date	Sec	Page	Change (Paragraph, Sentence, Figure, Table, etc.)	Initials
10/4/18	All	All	Added Best Practices	BW