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Product: PowerScribe® 360 Workflow Orchestration	**Doc. Num:** 889820
Subject: System Technical Specifications	**Date:** 11 Jul 2018

System Overview

Nuance PowerScribe® 360 Workflow Orchestration is a comprehensive system to a site's Radiology Workflow Orchestration program management. This centralized diagnostic control center uses a common report-driven platform. Nuance PowerScribe® 360 Workflow Orchestration connects your entire network of sites and technologies. This system can be easily configured to fully optimize your current workflow. Workloads may be balanced and distributed based on subspecialty reading requirements and target service levels, right down to physician schedules and peak-hour distribution, inclusive of relevant priors, increasing efficiency, maximizing productivity and improving quality of assessment. Nuance PowerScribe® 360 Workflow Orchestration's prioritization engine intelligently assigns each exam to the right clinical resource, at the right time, empowering radiologists to focus on their clinical review and optimal care delivery.
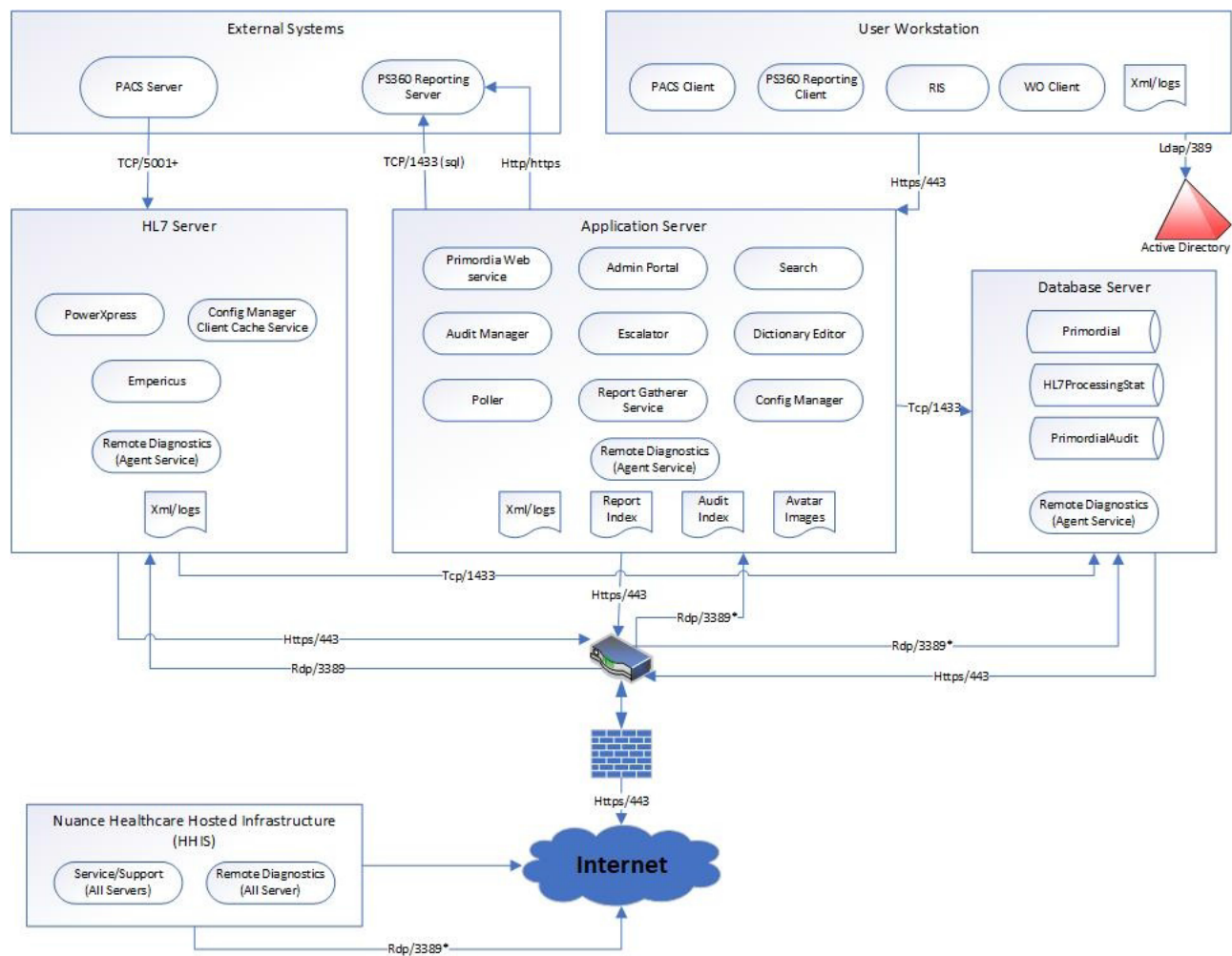
System Architecture

Nuance PowerScribe® 360 Workflow Orchestration is an on-premise client-server application utilizing web-based communication protocols. The application is accessed by the primary end-users MS windows application communicating with the server on https protocol. All processing is performed server side with no local Personal Health Information (PHI) storage.

Typical configuration consists of 1 – 4 servers or virtual hosts as described below.

Application Server

The Application Server functions as an IIS Web Server responsible for client access via supported browsers. This connection requires access to the Public internet over port 443. All internal and external communication requires SSL encryption. Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing Application server components.

The application server also hosts the data files used by the application. Report Indexes are final reports gathered from the PowerScribe 360 Reporting application. Audit Indexes are data entries for user activities in the application. Avatar are images of the users

Depending on the overall annual report volume processed by the Customer, the Application Server may also host the SQL Server database and PowerXpress2008 server components.

PowerXpress2008 Server

The PowerXpress2008 Server runs the PowerXpress2008 HL7 gateway application and functions as an IIS Web Server. The server handles HL7 interface communications between the Customer's RIS and the PowerScribe 360 Workflow Orchestration service. The PowerXpress2008 Server is optional for Customers up to 300,000 annual reports; in these cases, the PowerXpress2008 software may be installed on the PowerScribe 360 Workflow Orchestration Application Server.

Database Server

The PowerScribe 360 Workflow Orchestration SQL Server runs Microsoft SQL Server software and hosts the PowerScribe 360 Workflow Orchestration SQL Server databases. SQL Services and SQL Server Reporting Services are installed on this server. The PowerScribe 360 Workflow Orchestration Database Server is optional for Customers up to 300,000 annual reports; in these cases, the MS SQL software may be installed on the PowerScribe 360 Workflow Orchestration Application Server.

Test Server

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

Network Communication

Source	Destination	Protocol	Port	Public Internet
Client Workstation	Active Directory	LDAP	389	No
Application Server	Database Server	TCP	1433	No
Application Server	HHIS / Remote Diagnostics service https://rdext.dictaphone.com	HTTPS	443	Yes
PowerXpress2008	Database Server	TCP	1433	No
PowerXpress2008	HHIS / Remote Diagnostics service https://rdext.dictaphone.com	HTTPS	443	Yes
External System	HL7 Server	TCP	5001+	No
Workstation	Application Server	HTTP/HTTPS	80/443	No

Nuance Healthcare Hosted Infrastructure (HHIS)

Remote Diagnostic Services is the Nuance-hosted infrastructure responsible for monitoring and supporting the solution hosted at the hospital site. Relevant support data alerts the Nuance support organization of system performance issues that may require immediate attention.

Each server is configured to run the *Remote Diagnostics* agent as a background service. Monitored events can be configured to include event logs, application logs, and database performance issues.

Virtual Server Environments

The solution is qualified in a virtual server environment using VMWare ESX V5.5 U2 or greater, or ESX v6.0 U2 or greater and Microsoft Hyper-V with Windows Server 2012 R2 or with Windows Server 2016. The CPU and RAM resources assigned to the virtual servers must be dedicated resources and not shared with other VM Servers.

> **NOTE** *Refer to VMWare or Hyper-V documentation for product and version to support hospital chosen OS and SQL Server.*

Storage Environments

Supported storage environments include SAN and NAS.

Clustering

This solution can support 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. An Enterprise SQL Cluster Configuration is supported for hosting of the application database.

It is the Customer's responsibility to acquire, configure, and maintain the clustered environment. Nuance is responsible for installing, configuring and maintaining the PowerScribe 360 Workflow Orchestration application. Nuance will assist the Customer and make recommendations where applicable and will support the PowerScribe 360 Workflow Orchestration product. Prior to implementation, Nuance will require a detailed site discovery of clustering. It is a Nuance requirement that our Customer 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 Workflow Orchestration application.

Application and Database Server Specifications

Server		Application Server	PowerXpress2008 Server	Database Server
Processor (Intel Xeon or Equivalent)	Optimal	4 core 3.0Ghz VM: 4 vCPUs	4 core 3.0Ghz VM: 4 vCPUs	4 core 3.0Ghz VM: 4 vCPUs
	Minimum	2 core 3.0Ghz VM: 2 vCPUs	2 core 3.0Ghz VM: 2 vCPUs	2 core 3.0Ghz VM: 2 vCPUs
RAM	Optimal	16 GB	8 GB	16 GB
	Minimum	8 GB	4 GB	8 GB
Windows Server Operating System (64 Bit O/S)	Optimal	Windows Server 2016	Windows Server 2016	Windows Server 2016
	Minimum	Windows Server 2012 R2	Windows Server 2012 R2	Windows Server 2012 R2
Database Application (64 bit)	Optimal	MS SQL 2016	MS SQL 2016	MS SQL 2016
	Minimum	MS SQL 2014 MS SQL 2012	MS SQL 2014 MS SQL 2012	MS SQL 2014 MS SQL 2012
C: (O/S) Drive Size	Optimal	100 GB Total Size	100 GB Total Size	150 GB Total Size
Initial Data (D:) Drive Size	Optimal	500 GB	100 GB	500 GB
	Minimum	50 GB	50 GB	250 GB
Network Card		1 - 1GB	1 - 1GB	1 - 1GB

　　Notes:

1. In a physical environment, C (Operating System) drive is recommended to be configured as RAID1.

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 Customers. 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, based on volume. Initial drive requirements will be calculated by the Sales Engineering team during discovery.

5. Requirements may vary depending on number of concurrent users, number of HL7 feeds, and other variables.

6. Microsoft .NET Framework 4.6.2 or greater must be installed prior to installing Application server components.

Server	All-In-One Server
Processor (Intel Xeon or Equivalent)	4 core 3.0Ghz VM: 4 vCPUs
RAM	16 GB
Windows Server Operating System (64 Bit O/S)	Windows Server 2016 or Windows Server 2012 R2
Database Application (64 bit)	MS SQL 2016, or MS SQL 2014, or MS SQL 2012
C: (O/S) Drive Size	150 GB Total Size
Initial Data (D:) Drive Size	150 GB
Network Card	1 - 1GB

NOTE	*All-In-One servers can be used if annual volume is 300,000 reports or less.*

Client Workstation Specifications

Processor	Dual-Core or Dual-CPU 2.4 GHz or above
RAM	4GB
Operating Systems	Windows 7, Windows 8.1 and Windows 10 Pro/Ent
#NIC/Speed	100 MB to 1 GB
Minimum Display	1024 x 768
C: Drive (O/S) Size	25 GB available space
Browser	Internet Explorer 11 & above or Google Chrome

System Disk Space and Storage

Sizing needs to account for variables including exam volume, report volume (Radiology, Laboratory, Pathology, etc.), and other site-specific factors. Unless otherwise noted, all scaling is linear.

PowerXpress2008

For 300,000 annual radiology exams, an estimated 500MB of space should be allocated on the PowerXpress2008 Server data drive per year.

Database

Go-live size expectations should allocate 16 GB of Space for a site performing 300,000 annual radiology exams. Annual growth at 300,000 annual radiology exams should allocate an additional 7 GB per year.

Application

For 300,000 Radiology exams a year, Nuance estimates that the reports (before being indexed) take up to 1.2GB per year, we estimate that data like patient letters, audit and log files will consume 300MB per year.

System Security

PowerScribe 360 Workflow Orchestration meets all HIPAA compliance requirements for both Privacy and Security. Nuance logs user activity and access to PHI. Detailed logging information can be supplied through support channels.

Web Services

Generated during installation.

SSL

PowerScribe 360 Workflow Orchestration requires an appropriately provisioned SSL certificate to communicate with the ACR Transaction Service. Certificate(s) must be sourced from an appropriate trust authority. Acquisition, configuration, and maintenance of the SSL certificate is a Customer responsibility.

LDAP

LDAP is a required protocol. All systems will be configured using LDAP. PowerScribe 360 Workflow Orchestration utilizes standard Microsoft .NET routines to connect via LDAP. The application supports multiple AD domain connections per system. The PowerScribe 360 Workflow Orchestration web application will attempt to authenticate to the LDAP server using the application username and password. This will work so long as the username matches the LDAP common name (CN).

The application utilizes the concept of roles-based access. Different access rights options vary by application.

Server Installation

All installations must be completed under a local administrator account. 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 restricted rights due to active directory permissions.

MSSQL System Administrator Account (SA)

The MSSQL SA account (or equivalent) is required when installing or upgrading the PowerScribe 360 Workflow Orchestration 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. This account will need to be a member of the local servers Administrators Group on each server. The password for the account should meet the site's security requirements.

The Distributed Framework Service: Agency (Remote Diagnostics) runs as a service under a named account. This account needs to be a member of the local servers Administrators 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

The remaining application services are run under Local System rights, and do not require an account to operate.

System Maintenance

It is the Customer's responsibility to maintain the PowerScribe 360 Workflow Orchestration system. This includes checking server space, reviewing logs, applying Microsoft updates, and verifying backups. PowerScribe 360 Workflow Orchestration database and data files should be backed-up regularly. It is the Customer's responsibility to maintain and follow a backup protocol to archive valid copies of the data and database in case of disaster.

The Nuance policy is to test the latest updates made available for the supported Microsoft operating systems and SQL Servers.

Antivirus

Nuance recommends installation of anti-virus software on all servers and workstations. Running anti-virus and malware-prevention software in real-time mode may compromise the operation of PowerScribe 360 Workflow Orchestration. Nuance will provide an exceptions/exclusions list to enable the Customer to configure a compatible AV policy for the system.

For the full list of anti-virus and malware application exclusions, as well as required maintenance processes, please refer to Nuance support document 889822, PowerScribe® 360 Workflow Orchestration Server Maintenance and Management.