



Electronic Plan Solutions

Implementing ProjectDox® v. 9



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About this Guide

This guide is intended to assist in planning the implementation of ProjectDox Software. It describes hardware, operating system, software, and network-related requirements and recommendations for a successful implementation.

Audience

This guide is intended for use by application engineers, system administrators, integrators, and other IT professionals responsible for planning the implementation of ProjectDox software. Effective use of the guide requires advanced technical knowledge.

Installing and Maintaining On-Premise ProjectDox Installation

Server Access

- Provide Avolve with the necessary information regarding servers' setup for the installation to be completed exclusively by an Avolve Installation Engineer.
- Provide remote access to Avolve Installation, Implementation and Support teams at the appropriate times throughout the life of the project.

Server Health

- Maintain Server operating system, keeping up to date with Microsoft Updates including SQL and Office applications as listed in the Avolve Support Knowledgebase.
- Perform regularly scheduled ProjectDox database maintenance as stated in the installation manual.
- Maintain backups of the SQL databases used by ProjectDox according to documentation provided by Avolve installation services.
- Create and maintain backups of servers and data as required by your specific configuration.
- Setup server notification to your company's technical contact, investigate and troubleshoot any errors that occur within the Event Logs not related to ProjectDox.
- Maintain appropriate server and network resources for the ProjectDox server environment based on usage.
- Maintain server security related to antivirus, firewalls rules, restricting access and setting up exclusion rules for ProjectDox where necessary.

Server Liaison

- Handle requests from your company's ProjectDox system administrators to modify logos and/or email templates used by the site, or requests to view specific log files when Avolve makes the request during troubleshooting.
- Provide a Technical Contact for Avolve regarding issues entered in Avolve's Support portal by end-users.
- Assist with the setup, configuration and maintenance of any integration points to ProjectDox from 3rd party systems, such as a Permitting or EDMS solution.
- Provide end-users with 1st level support for issues related to accessing ProjectDox site due to browser or machine-specific problems.
- Assist with updates and upgrades to the ProjectDox application as needed.

ProjectDox® System Requirements

Server Operating System

The ProjectDox® servers (1 Web Server, 1 Application Server, 2 Job Processor Servers) are formally certified on Windows Server 2012 R2 64-bit operating system.

LDAP implementation supports a single Active Directory with programmatic syncing. Additional AD's can be included with manual user additions and manual syncing.

Microsoft SQL 2012 R2, 2014, 2016 Database Engine

ProjectDox® is formally certified on Microsoft SQL Server 2012 R2, and 2014, 2016 database engine 64-bit, with current service packs and Windows updates. System requirements are listed in this document. SQL Reporting Services are required as part of the installation and must be in the same domain as the SQL server.

SSL Certificate

Avolve Software requires secure (SSL) communications between the client's browser and the ProjectDox[®] server with 256-bit encryption. Utilizing standard SSL requires the purchase of an SSL certificate for the ProjectDox Web Server.

Avolve recommends a wild card (*) certificate be issued from a trusted root authority for the IIS web server(s).

Avolve requires an Apache certificate for the Tomcat server with a certificate format of PKCS#7.

Requirements

A wild card (*) certificate is certified and issued from a trusted root authority and can be converted for use with Tomcat and IIS when provided in .P7B or .PFX formats.

- The Avolve Installer will require the password for the certificate
- The URL for the ProjectDox user login should be determined prior to installation. You can select the URL/Domain name for your ProjectDox site. For example:
eplans.cityofabc.com

Apache Tomcat and Brava Updates

It is a requirement to disable auto updates or policies that auto update Apache and Java products for all the ProjectDox web servers. The web servers will continue to successfully publish and allow viewing of non-Internet Explorer file formats with this restriction put in place. Avolve supports the officially certified versions as listed below. As new versions of Apache and Java are certified with ProjectDox releases, they will be applied as part of the upgrade process by the Avolve Installation Team.

ProjectDox 9 new installations include the latest released viewer version, BESS 16.2, and officially supports:

- Apache Tomcat 8.5
- Java 7 and 8

Production vs. Test Environments

For the best possible outcome, a Test environment should always duplicate your production environment and have the same network configuration

General Hardware and Software Information

Client Hardware and O/S Specifications

Uniform specifications on end-user hardware, software capabilities and configuration will have a big impact on the end-user experience. We recommend deploying (at most) two types of end-user hardware with standard configurations.

Client Specifications	
Operating System	Windows 10, Windows 8 (32/64 bit), Mac OS 10, iPad, Windows Tablet
Processor	Dual Core or Quad Core Processors 2.0 GHz or faster
Memory	4 - 8 GB RAM

Browser Cache	In Internet Explorer, this is 50MB by default and in most browser it can be increased to 250MB or up to 1GB
Graphics Card	For dual monitor support, a minimum 1GB of dedicated video memory
Recommended Web Browsers	Internet Explorer 11 (32-bit only), Edge, latest releases of Chrome, Safari, and Firefox.
Display	22" or larger with at least 1920 x 1080 screen resolution

ProjectDox Port Usage

Internet Inbound Access

This section defines what connections are permitted from the Internet to this system.

Protocol	Source	Destination	Source Port	Destination Port	Service
TCP	Client	Web Server IIS <i>(external IP)</i>	Any	443	HTTPS / Wildcard SSL / ActiveX Viewer <i>(URL: https://eplans.cityofabc.com)</i>
TCP	Client	Web Server Apache <i>(external IP)</i>	Any	8443 or 8080	HTTPS / Wildcard SSL / HTML Viewer <i>(URL: https://eplans.cityofabc.com:8443)</i>
EMAIL	Web Server	Mail Relay Server	Any	25 or 587*	Outgoing email from ProjectDox

DMZ Inbound Access

This section defines what connections the server is permitted to create from the DMZ network to the Internal network.

Protocol	Source	Destination	Source Port	Destination Port	Service
TCP/UDP	Web Server	Job Processor Server 1	Any	Bi-directional 445	UserFilesSource Share
TCP/UDP	Web Server	Job Processor Server 2	Any	Bi-directional 445	UserFilesPublish Share for ActiveX Viewing (IE)
TCP/UDP	Web Server	Application Server	Any	Bi-directional 445	DLCache Share for HTML Viewing (non-IE), PDoxLogs WFlowDLLCache
TCP	Application Server	Web Server	Any	80 or 443	ProjectDox Services
TCP	Job Processor Servers 1&2	Web Server	Any	8080*	Allows internal communication
TCP	Web Server	SSRS Report Server	Any	Bi-directional 80*	ProjectDox Reporting must be in the same domain as ProjectDox, the firewall devices must allow a Post back from the SSRS server**

TCP	Web Server	Web Server	Any	8080	License Verification Loopback
TCP	Application Server	Web Server	Any	8879*	Workflow Service dual workflow only
TCP	Web Server	Application Server	Any	8879*	Workflow Service dual workflow only
TCP	Web Server	Application Server	Any	8000*	Search Service
TCP	Web Server	SQL Server	Any	1433*	MSSQL
LOAD BALANCED					
TCP/UDP	Web Server	SAN or NAS Network Storage	Any	445	Publishing, Downloading Source, Viewing Files, ProjectFlow
TCP/UDP	Job Processor Servers 1 & 2	SAN or NAS Network Storage	Any	445	Publishing
LDAP					
TCP/UDP	ProjectDox LDAP Web Server	LDAP Server	Any	389	LDAP Single Sign-On
PROJECTDOX INCOMING EMAIL					
SMTP	Mail Relay Server	Web Server	Any	25	Incoming Email

(* indicates Port number can be specified by customer)

(**The ProjectDox Reports Wizard is run on the web server for importing standard and custom reports into the SSRS Server. To verify the Wizard configuration, it relies upon receiving a POST back from the SSRS Server.)

Note: The ProjectDox URL should resolve to the internal IP address of the Web Server for internal users on the network. Additional Ports may be required depending on the customer's environment. Please consult with a member of Avolve's Installation Team.

ProjectDox Server Specifications

ProjectDox® requires the following **minimum** 5-server configuration and software, and it is always preferred that the file store reside on a SAN or a NAS configured as a mapped (LUN) drive to the servers with expandable growth capabilities. Avolve Software will review and discuss configurations with you prior to implementation.

Network-attached storage varies in protocols and characteristics. It is required that the type of NAS or SAN is reviewed with the Avolve technical contact prior to finalizing the customer environment.

The ProjectDox platform requires very specific settings on the web server. Due to this fact, ProjectDox must be installed on its own web server. When other applications are installed on this server, the likelihood that these other applications will compromise ProjectDox settings increases exponentially. As such, Avolve will not provide technical support for the ProjectDox application when other applications are installed on the same web server. The only exceptions will be made for standard Windows server default applications that support the operating system, enterprise-level virus scanning software, and those applications that Avolve will install to support ProjectDox and its adjoining applications.

ProjectDox Web Server Server 1 (1of 5) - ProjectDox® Web Server	
Purchased and Installed by Customer	Description
Operating System	Windows Server 2012 R2 64-bit. Note: It is required that all Windows Updates and service packs must be current
Processor	Dual or Quad Core Processors (8 total cores preferred)

Memory	16 GB RAM
DNS resolution	Must be implemented prior to ProjectDox install
Hard drive partitioning	C:\ drive - 100 Gigabytes (minimum) D:\ drive - 150 Gigabytes for the ProjectDox application and ProjectDox Queue and PDoxTemp WFlowDLLCache Share Folders
Secure Sockets Layer (SSL)	Wildcard (*) Certificate - .PFX for IIS (Port 443) Wildcard (*) Certificate - .P7B for Apache Tomcat (Port 8443) SSL certificate must be installed prior to ProjectDox install; Avolve will configure and password will be needed.
SMTP	SMTP is certified with IIS 7.5, 8 and 8.5 (Port 25 or 587) Relays to/from main mail server (recommended), or direct to the Internet
Antivirus Software - Server Edition	Latest virus definition updates Note: Only the web server requires antivirus software. It is recommended that the Job Processor and Application server do not include installs of antivirus software
.NET Framework	.NET 4.5.1, all current Service Packs, and Updates must be installed
Installed by Avolve	Description
Avolve Applications	ProjectDox ProjectDox License Server (Port 10116) ProjectDox Viewer Server Process Incoming Service (optional)
Shared Folders	PdoxTemp and Queue Note: For standard configuration, attach from SAN or NAS as the D: drive

ProjectDox Job Processor Server

Two Job Processors are required. At least one Job Processor server will require an installation of Microsoft Word and Excel, plus the Tools, if customer is uploading Office files.

Server 2a and 2b (2 and 3 of 5)- ProjectDox® Job Processor	
Purchased and Installed by Customer	Description
Operating System	Windows Server 2012 R2 64-bit Note: It is required that all Windows Updates and service packs must be current
Processor	Dual or Quad Core Processors (8 total cores preferred)
Memory	16 GB RAM
Hard Drives	C:\ drive - 100 Gigabytes for the operating system D:\ drive - 150 Gigabytes for applications E:\ drive on Job Processor 1 UserFilesSource E:\ drive on Job Processor 2 for UserFilesPublish Folder Shares are stored typically on a dedicated LUN created from SAN or NAS (if capable) storage hardware and split up between the Job Processor Servers
Microsoft Office	Word, Excel, and Tools. All Service Packs & Updates must be installed Office requires activation prior to Job Processor install Only Microsoft Office 2013, 2016, or Office 365 are supported

Purchased and/or Installed by Avolve	Description
.NET Framework	.NET 3.5 SP1 and .NET 4.0
Antivirus Software	The Job Processor is not supported on machines running anti-virus software. If you have this configuration and you are experiencing problems, you will be asked to turn the anti-virus software off and restart the Job Processor Note: If you must run virus protection software on the Job Processor server, directories that should be excluded from scanning will be listed in the ProjectDox Installation document
Installed by Avolve	Description
Job Processor Application	Publishes all files uploaded into ProjectDox
IGCWriter	Publishes Office files

ProjectDox Database Server & Reporting Server

Note: A separate Database server is not mandatory. If an existing Microsoft SQL Server or SQL cluster is available in their environment it can be utilized. It must have sufficient resources.

Server 3 (4 of 5) - Database Server	
Purchased and/or Installed by Customer	Description
Operating System	Windows Server 2012 R2, 2016 Note: It is required that all Windows Updates and service packs must be current
Processor	Dual, Quad or Octa Core Processors (12 total cores preferred)
Type of server	Existing SQL cluster, physical server or virtual only if your team is well versed on virtual host configuration
Memory	32 GB RAM
Microsoft SQL Server	2012 R2, 2014, 2016 database engine either Enterprise or Standard Editions. Note: It is required that all SQL Updates and service packs must be current
Account permissions	Grant permissions to the SQL Services login account under the "Local Security Policy" to "Lock pages in memory"
Hard drives – Individual drives	C:\ drive - 100 Gigabytes minimum D:\ drive - 50 Gigabytes for the SQL Server Application E:\ drive - 20 Gigabytes for the Page File F:\ drive - 50 Gigabytes for the TempDB G:\ drive – 100 Gigabytes for the Databases H:\ drive – 50 Gigabytes for the Log Files I:\ drive – 100 Gigabytes for Backups Databases and Database Log files are stored typically on a dedicated LUN created from SAN or NAS storage hardware. Note: Drives listed above are recommendations. Each implementation is unique and requires discussion to determine the best configuration. All drives are recommended to be individual drives or separate LUNs, not logical partitions, SSD if available. *Recommended configuration for High Availability requires the TempDB and Pagefile reside on separate physical hardware

Server 3 (4 of 5) - Database Server	
SSL	Port 80 or 443 is recommended and should be implemented for the report server.
Installed by Avolve	Description
Database scripts	ProjectDox Database Workflow Persistence Database if dual workflow

ProjectDox Application Server

Server 4 (5 of 5)– Application Server	
Purchased and Installed by Customer	Description
Operating System	Windows Server 2012 R2 64-bit <i>Note: It is required that all Windows Updates and service packs must be current</i>
Processor	Dual or Quad Core Processors (8 total cores preferred)
Memory	16 GB RAM
Hard Drives	C:\ drive - 100 Gigabytes for the operating system D:\ drive - 200 Gigabytes for the ProjectDox Service installations DLCache, PdoxLogs Share Folders, typically dedicated LUNs created from SAN or NAS storage hardware.
.NET Framework	.NET 4.5.1
Installed by Avolve	Description
Software	ProjectDox Windows Communications Server includes Lucene Search Engine (WCF Port 8000) ProjectDox Windows Workflow Foundation Server (WWF Port 8879) if dual workflow ProjectDox Utility Service ProjectDox Project Creator Integration (Custom Port)

Changes to the standard configuration require written approval from Avolve Software Corporation, prior to scheduling the installation of ProjectDox. Before confirming an installation date, the assigned Avolve Software Professional Services contact will conduct a remote review of each of the servers' configurations, for the benefit of the customer. Once the servers are confirmed to meet the requirements, a firm installation date will be offered to the customer.

ProjectDox® VMware Enterprise Hardware Requirements

ProjectDox® requires a robust server environment for a VMware or Hyper-V implementation. The following example should be used as a guideline for any ProjectDox solution that will be running on virtual software. Please note that Avolve Software does **NOT** support any ProjectDox installation using VMware Workstation, VMware Server edition, or VMware Free Edition software. Only VMware Enterprise class software will be considered as a candidate for a VMware implementation (VMware ESX, VMware ESXi and VMware Infrastructure). Again, Avolve recommends the SQL Server be installed on a physical server unless your team is well versed in the virtual host resources configuration.

ProjectDox Web Server VM

VM Configuration: The virtual machine requirements are the same as those described above for physical servers.

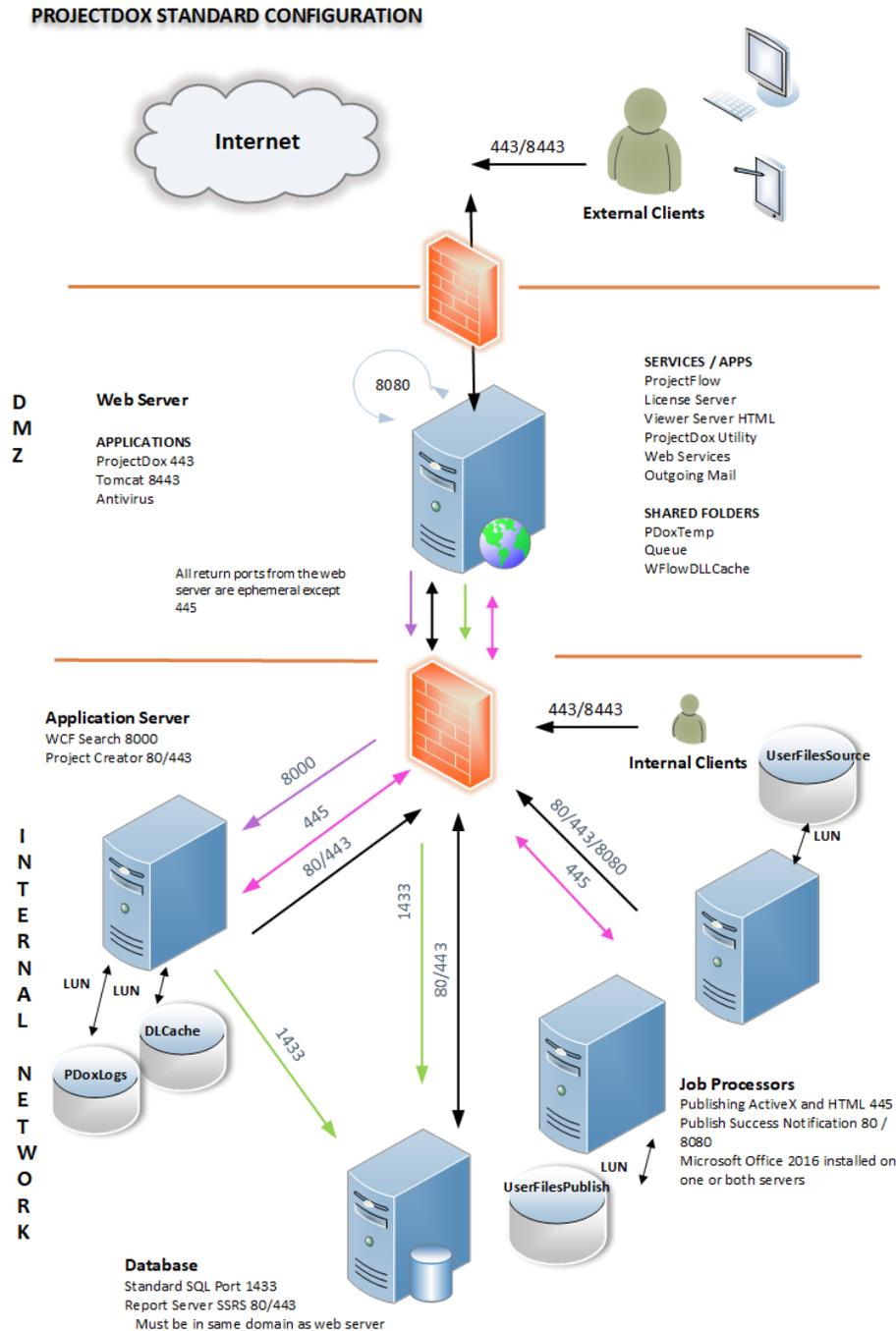
Tested MAX Allowable Load: The resource configurations of the virtual guest servers cannot exceed the maximum resources available on the host.

Configurations

This section includes configuration diagrams showing server roles and communication. These are standard, secure configurations selected by our clients to meet specific needs.

Standard Configuration

The configuration chosen by a mid-size company or jurisdiction.



High Availability

The configuration selected by high volume companies or jurisdictions. High availability can be achieved by many different methods. The following is an example:

The load balancer can be hardware or software. Avolve does not recommend one or the other; it is the customer's decision, but we have found that hardware is preferred. This appliance or software is managed by the customer and not Avolve. Ports 443, and 8443, must be set up with persistent profiles (often referred to as sticky sessions) for successful file viewing.

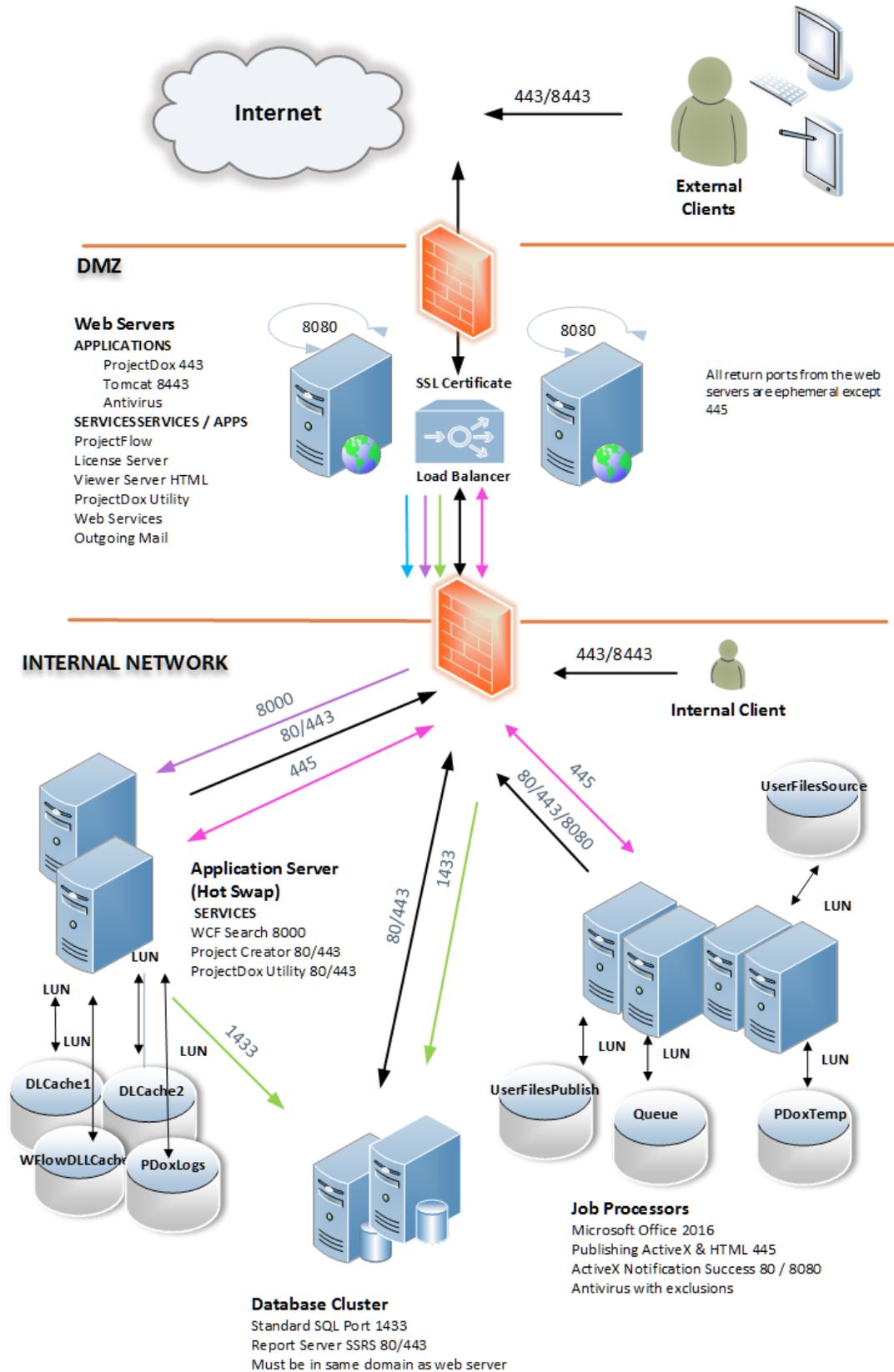
- The web servers can be configured to be high availability.
- The application server is configured to be failover only.
- The SQL Server should reside in a clustered environment which assures redundancy.
- The Job Processors are independent publishing engines; if one goes off line or fails, the others will continue to pick up the workload by default. Refer to the included diagram for additional details and consult your Professional Services engineer. **Four** Job Processors are required in a high availability configuration.
- In this case UserFilesPublish, UserFilesSource, DLCache1, DLCache2, PDoxTemp, WFlowDLLCache, PDoxLogs and the Queue folders must reside on the SAN or NAS.

High Availability with Distributed Shares

There are many ways to get a system to recognize or to connect drive space. There are a few methods that remove your control over user accounts. Specific permissions are required for the ProjectDox share folders and are set by the Installation team.

The share presented is via logical disk. Once the LUN is attached to the server, launch disk management on the server to format the new drive, and assign it a drive letter. This would allow the Avolve installation engineer to connect via the LUN, create the folder set and apply the proper windows credentials.

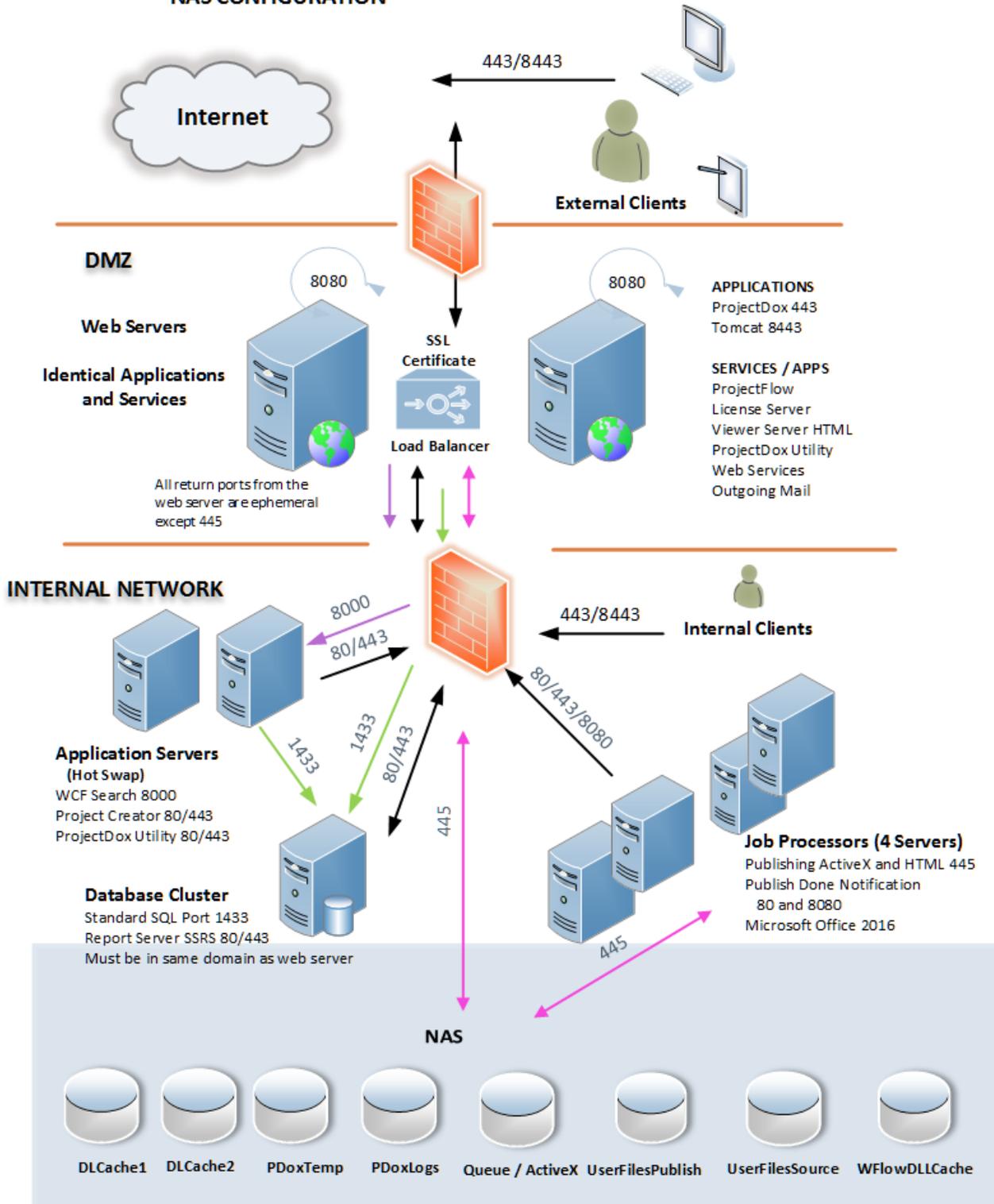
PROJECTDOX HIGH AVAILABILITY CONFIGURATION
Distributed Shares



High Availability with NAS

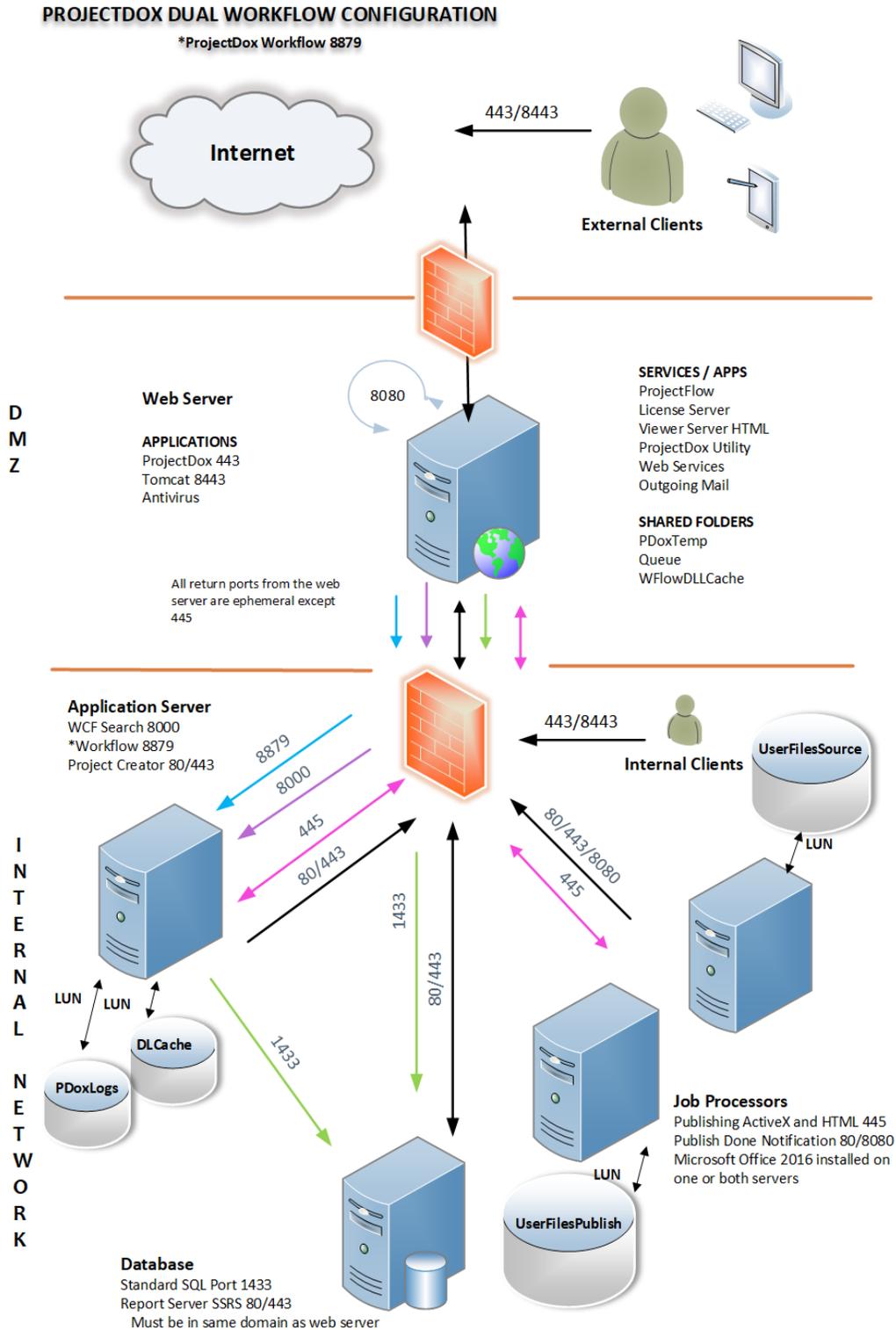
In some cases, the NAS is not able to implement LUNs. This drawing provides the configuration and port requirements for this scenario.

PROJECTDOX HIGH AVAILABILITY NAS CONFIGURATION



Dual Workflow

Dual Workflow configuration allows for the transition from ProjectDox Workflow to ProjectFlow. Any running legacy workflows must be completed with the legacy ProjectDox Workflow engine and new workflows will begin in ProjectFlow without interference with normal business.



ProjectDox® Shared Folders

There are a number of shared folders used by ProjectDox; the largest are **UserFilesSource**, **UserFilesPublish**, **DLCache1**, **WFlowDLLCache**, **PDoxLogs** and when high availability, **DLCache2**.

1. UserFilesSource is used for storing the original files uploaded by users.
2. UserFilesPublish is used for storing the published ActiveX version of the files.
3. DLCache1 and DLCache2 are for storing published files for Non-Internet Explorer browser support.
4. WFlowDLLCache stores the ProjectFlow instances for the life of the workflow. At this time, workflow will remain even after they are completed.
5. PDoxLogs stores the archived ProjectDox LogReports table entries preserving the information without impacting the working database by reducing the number of records. The size of the share is configurable via the ProjectDox user interface.

There are other shared folders named Queue and PDoxTemp. Depending on the purchased modules, there may be additional required shared folders.

Recommended Storage:

- 1TB - UserFilesSource (LUN1)
- 1.2TB - UserFilesPublish (LUN2)

The UserFilesPublish folder is home to any Markups that have been placed on the files. This can increase the size of the folder; therefore, the same amount of room (or more) should be allotted for the UserFilesPublish folder.

- 50GB - HTML DLCache WEB1 (LUN3)
- 50GB - HTML DLCache WEB2 (LUN4)
- 50GB – WFlowDLLCache APP1 (LUN5)
- 50GB – PDoxLogs APP1

Production Site Example #1

The following information was obtained from an active ProjectDox customer’s production environment. The building and planning departments utilize the software to serve their citizens with project management and planning. This data accounts for four years and is one of the largest jurisdictions in the United States.

Users

Total	2,705
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UserFilesSource Shared Folder Metrics (Physical Drive)

Project Folders	25,702
Markup Folders	0
Total Folders	2,139,947
Files	1,406,526
Average Space Used Per Project MB	45.8
Average Files Per Project	55
Average File Size KB	836.8
Hard Drive Space Used GB	1,177

Disk Partition Size GB	3,000
Disk Free Space GB	1,823

UserFilesPublish / DLCache Shared Folder Metrics (Physical Drive)

Equal amounts of disk space must be allotted to these two shared folders if HTML Viewer will be supported. UserFilesPublish is for Internet Explorer viewing; it is the richest viewer and should be used by primary reviewers for accuracy. DLCache stores the published files to support HTML viewing.

Project Folders	25,702
Markup Folders	165,350
Total Folders	2,272,084
Files	23,259,064
Average Space Used Per Project MB	54.2
Average File Size KB	59.9
Average Number of Files Per Project	905
Hard Drive Space Used GB	1,394
Disk Partition Size GB	3,000
Disk Free Space GB	1,606

Database Size Metrics (Physical Drive)

ProjectDox Database GB	136
ProjectDox Log GB	2

Production Site Example #2

The following information was gathered from a current ProjectDox customer's site. This medium size jurisdiction's building and planning departments utilize the software to assist their citizens with managing projects and performing reviews for a five-year period.

Users

Total	8,137
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UserFilesSource Shared Folder Metrics (Physical Drive)

Project Folders	26,153
Markup Folders	0
Total Folders	1,167,063
Files	1,120,234
Average Space Used Per Project MB	26
Average File Size KB	607.9
Hard Drive Space Used GB	681
Disk Partition Size GB	800

Disk Free Space GB	119
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UserFilesPublish / DLCache Shared Folder Metrics (Physical Drive)

Equal amounts of disk space must be allotted to these two shared folders to support HTML Viewer. UserFilesPublish is for Internet Explorer viewing and should be used by reviewers for accuracy. DLCache stores the published files to support HTML viewing.

Project Folders	26,153
Markup Folders	9,013
Total Folders	1,175,546
Files	12,538,196
Average Space Used Per Project MB	33.7
Average File Size KB	70.3
Average Number of files Per Project	480
Hard Drive Space Used GB	881
Disk Partition Size GB	950
Disk Free Space GB	69

Database Size Metrics (Physical Drive)

ProjectDox Database GB	51
ProjectDox Log GB	1