



PNMsoft Knowledge Base

Sequence Administrator Guides

Sequence 7.x Installation Guide

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Document Purpose

This document describes the steps involved in installing Sequence 7.x. While the majority of the installation is achieved simply by executing the install set, make sure you complete all the required tasks prior to the installation, as well as the required post-installation steps.

Introduction

An installation of Sequence can range from a single computer (Single-Server installation) to multiple servers (Distributed Installation). The installation requirements will depend on the availability and scaling requirements of your solution. This guide describes both the minimum and the recommended hardware requirements based on whether you are deploying a single-server installation or a distributed solution. This guide also lists the software prerequisites for installing Sequence 7.x with:

- Microsoft SharePoint Server 2010.
- Microsoft SharePoint Server 2013 (for Sequence 7.2 and above).

This guide does not provide advice on choosing a distributed topology or hardware setup based on availability or performance and capacity requirements.

Please see [this guide](#) for a description of Sequence topologies.

Instructions for Specific Versions

When installing Sequence for the first time or upgrading from a previous version, it's important to review the Release Notes of the version you are installing, in addition to this guide.

The installation section of the Release Notes includes specific guidelines for your version. Reading this section will help you perform a smooth installation.

You can find the Release Notes for the version you are installing in the [Downloads Library](#).

Hardware and Software Requirements

IMPORTANT Note: The Hardware and Software requirements below are written for SharePoint 2010 installations. For changes in Hardware and Software requirements for SharePoint 2013 installations, see Appendix B.

Single Server Installation

Hardware Requirements

The following table lists both the minimum and the recommended hardware requirements for deploying Sequence in a single server topology.

Component	Minimum	Recommended
Processor	2.5 gigahertz (GHz) , 64-bit four cores	Quad Core processors that are each 3.3 GHz or faster
RAM	4 GB	8 GB
Disk	NTFS file system–formatted partition with a minimum of 36 GB of free space.	NTFS file system–formatted partition with 72 GB of free space plus adequate free space for your Web sites.
Drive	DVD drive	DVD drive or the source copied to a local or network-accessible drive.
Display	1024 x 768	1024 x 768 or higher resolution monitor.
Network	256 kilobits per second (Kbps) connection between client computers and server.	512 Kbps or faster connection between client computers and server.

Software Requirements

Database

MS SQL 2008 R2 Standard Edition or higher.

Operating System

Windows Server 2008 64-bit SP2 or later.

We recommend applying all Microsoft critical updates.

Note: SQL Server 2012 and Windows Server 2012 are supported for Sequence 7.2 and higher. SQL Server 2014 is supported from Sequence 7.7 and higher.

Windows Components

After you have installed the operating system and applied all critical updates, configure the server to be a Web Server by enable the Internet Information Services (IIS) role, and including its built-in services:

- Common files
- WWW

SharePoint 2010 / 2013*

The Flowtime user interface is hosted in SharePoint Server. Therefore SharePoint Server must be installed on the Windows Server. SharePoint Foundation is also supported.

SharePoint must be installed in at least single farm mode.

**Note: Sequence 7.2 and above supports SharePoint 2013. See Appendix B for requirements for SharePoint 2013.*

Microsoft.NET Framework 3.5 SP1 or 4.0*

Before installing Sequence, you must install Microsoft .NET Framework 3.5 SP1 or 4.0 and then ensure that ASP.NET 2.0 is enabled.

**Notes: Sequence 7.2 and above supports .NET 4.0. SharePoint 2013 installation requires .NET 4.0.*

You can download the .NET Framework 3.5 from the Microsoft Website:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=ab99342f-5d1a-413d-8319-81da479ab0d7&displaylang=en>.

You can download .NET Framework 4.0 from this link:

<http://www.microsoft.com/en-us/download/details.aspx?id=22833>

To enable ASP.NET v2.0.50727, open the Web service extension in the IIS snap-in on the Microsoft Management Console (MMC). If ASP.NET 2.0 is installed on the computer before IIS is enabled, enable ASP.NET 2.0 by running the command `aspnet_regiis -i`.

SSRS

To use the Sequence Analytics feature you must have SSRS (SQL Server Reporting Services) installed.

Distributed Server Installation

The primary difference between a single server and a farm topology is that you can use one or more computers to host the following server roles:

- Application server
- Front-end Web server
- Database server

This section describes both the minimum and the recommended system requirements for each server role. If you install more than one role on a single computer, ensure that the computer meets the minimum requirements for all server roles.

Application Server

Hardware Requirements

The following table lists the minimum and recommended hardware requirements for deploying Sequence application server.

Component	Minimum	Recommended
Processor	2.5 gigahertz (GHz) , 64-bit four cores	Quad Core processors that are each 3.3 GHz or faster
RAM	4 gigabyte (GB)	8 GB

Component	Minimum	Recommended
Disk	NTFS file system–formatted partition with a minimum of 36 GB of free space.	NTFS file system–formatted partition with 72 GB of free space plus adequate free space for your Web sites.
Drive	DVD drive	DVD drive or the source copied to a local or network-accessible drive.
Display	1024 × 768	1024 × 768 or higher resolution monitor.
Network	256 kilobits per second (Kbps) connection between client computers and server.	512 Kbps or faster connection between client computers and server.

Software Requirements

Operating System

Windows Server 2008 64-bit SP2 or later.

OR

Windows Server 2012 (supported on Sequence 7.2 and higher).

We recommend applying all Microsoft critical updates.

Windows Components

After you have installed the operating system and applied all critical updates, configure the server to be a Web Server by enabling Internet Information Services (IIS) role.

Microsoft.NET Framework 3.5 SP1 or 4.0*

Before installing Sequence, you must install Microsoft .NET Framework 3.5 SP1 or 4.0 and then ensure that ASP.NET 2.0 is enabled.

Notes: Sequence 7.2 and above supports .NET 4.0. SharePoint 2013 installation requires .NET 4.0.

You can download the .NET Framework 3.5 from the Microsoft Website:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=ab99342f-5d1a-413d-8319-81da479ab0d7&displaylang=en>.

You can download .NET Framework 4.0 from this link:

<http://www.microsoft.com/en-us/download/details.aspx?id=22833>

To enable ASP.NET v2.0.50727, open the Web service extension in the IIS snap-in on the Microsoft Management Console (MMC). If ASP.NET 2.0 is installed on the computer before IIS is enabled, enable ASP.NET 2.0 by running the command `aspnet_regiis -i`.

Front-end Web Server

Hardware Requirements

The following table lists the minimum and recommended hardware requirements for deploying the Front-end web server.

Component	Minimum	Recommended
Processor	2.5 gigahertz (GHz) , 64-bit four cores	Quad Core processors that are each 3.3 GHz or faster
RAM	4 GB	8 GB
Disk	NTFS file system–formatted partition with a minimum of 36 GB of free space.	NTFS file system–formatted partition with 72 GB of free space plus adequate free space for your Web sites.
Drive	DVD drive	DVD drive or the source copied to a local or network-accessible drive.
Display	1024 × 768	1024 × 768 or higher resolution monitor.
Network	256 kilobits per second (Kbps) connection between client computers and server.	512 Kbps or faster connection between client computers and server.

Software Requirements

Operating System

Windows Server 2008 64-bit SP2 or later.

OR

Windows Server 2012 (supported on Sequence 7.2 and higher).

We recommend applying all Microsoft critical updates.

Windows Components

After you have installed the operating system and applied all critical updates, configure the server to be a Web Server by enabling Internet Information Services (IIS) role.

SharePoint 2010 / 2013*

The Flowtime user interface is hosted in SharePoint Server. Therefore, SharePoint Server must be installed on the Windows Server. SharePoint Foundation is also supported.

SharePoint must be installed in at least single farm mode.

Note: Sequence 7.2 and above supports SharePoint 2013. See Appendix B for requirements for SharePoint 2013.

Microsoft.NET Framework 3.5 SP1 or 4.0*

Before installing Sequence, you must install Microsoft .NET Framework 3.5 SP1 or 4.0 and then ensure that ASP.NET 2.0 is enabled.

Notes: Sequence 7.2 and above supports .NET 4.0. SharePoint 2013 installation requires .NET 4.0.

*You can download the .NET Framework 3.5 from the Microsoft Website:
<http://www.microsoft.com/downloads/details.aspx?FamilyID=ab99342f-5d1a-413d-8319-81da479ab0d7&displaylang=en>.*

*You can download .NET Framework 4.0 from this link:
<http://www.microsoft.com/en-us/download/details.aspx?id=22833>*

To enable ASP.NET v2.0.50727, open the Web service extension in the IIS snap-in on the Microsoft Management Console (MMC). If ASP.NET 2.0 is installed on the computer before IIS is enabled, enable ASP.NET 2.0 by running the command `aspnet_regiis -i`.

Database Server

The computer that hosts the database server role must have Microsoft SQL Server 2008 R2 Standard Edition or higher.

Note: SQL Server 2012 is supported on Sequence 7.2 and higher. SQL Server 2014 is supported on Sequence 7.7 and higher.

SSRS

To use the Sequence Analytics feature you must have SSRS (SQL Server Reporting Services) installed. You can choose to install it on whichever server makes sense for your organization. Please be aware that there are licensing considerations.

Sequence Clients

Sequence Clients are developers using Sequence Administration and end-users using Flowtime.

Hardware and Software Specifications

Processors	Pentium III or higher
Memory	512 MB RAM or higher
Software	OS: Windows® XP or higher; Browsers: - Microsoft Internet Explorer 8.0 or higher, Firefox 5.0– for Flowtime. - Microsoft Internet Explorer 9.0 or higher – for Sequence Administration. Adobe Shockwave Player
Network	Transmission Control Protocol / Internet Protocol (TCP/IP)

Required Accounts

Account	Description	Account Type	Needs	Usage in the installation process
Installation Account	Use to install Sequence.	A domain user account or Local Account	<p>Member of the Administrators group on each server on which Setup is run.</p> <p>A member of the SQL Server Logins, which grants login access to your SQL Server instance.</p> <p>A member of the SQL Server Database Creator server role, which grants permission to create and alter databases.</p> <p>SharePoint_Shell_Access role on the SharePoint SQL server, on the SharePoint configuration database and SharePoint Admin content database.</p> <p>A member of the SharePoint Farm Administrators Group.</p>	Initiation of the installation application.
Application Pool Identity Account	Use to run Sequence administration site and optionally the SharePoint integration site. This account will also be used During the Flowtime site installation.	Windows domain or local user account	<p>It must have permission to run WMI query.</p> <p>It must be part of the IIS_IUSRS group.</p>	Application pools user setting window.
Sequence Database Account	SQL Server account that is used to create the Sequence database, and enables all the communications to the database server.	SQL account	<p>For the duration of the installation, the SQL account user must be a member of the system administrators group.</p> <p>It must belong to the Security Administrators and Database Creators roles.</p>	<p>Database setting window.</p> <p>After installation, the user should be set as db_owner on Sequence database.</p>
Sequence Windows Services Account	Uses to run the Background Runtime Windows Service and optionally the Active directory synchronization windows service.	Windows domain or local user account.	<p>It must have permission to the SMTP server.</p> <p>It must be a domain account to query the active directory.</p> <p>It must be a valid Sequence user (otherwise it won't be able to move processes forward).</p> <p>Logon as a service rights on the machine.</p>	Windows service account setting.
SharePoint Administrator Account	Defined as the site creator.	Windows domain or local user account.	It must be assigned to a user who is part of the Administrators group on the computer that is running SharePoint.	In the Flowtime site setting.

Pre-Installation Tasks

Prepare your Web Server

Configure SharePoint Services

You can install Sequence on SharePoint 2010 / 2013*. Microsoft provides guides for installing SharePoint on Windows Server. See the following links:

- SharePoint 2010 - <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=7604212e-67a6-407d-ae5c-9bb9d6325e17&displaylang=en>
- SharePoint 2013 - <http://technet.microsoft.com/en-us/sharepoint/fp142376.aspx>

Note: Sequence 7.2 and above supports SharePoint 2013.

To configure SharePoint 2010 as a Single Server farm:

Please see this article: <http://technet.microsoft.com/en-us/library/cc262243.aspx>

To configure SharePoint 2013 as a Single Server farm:

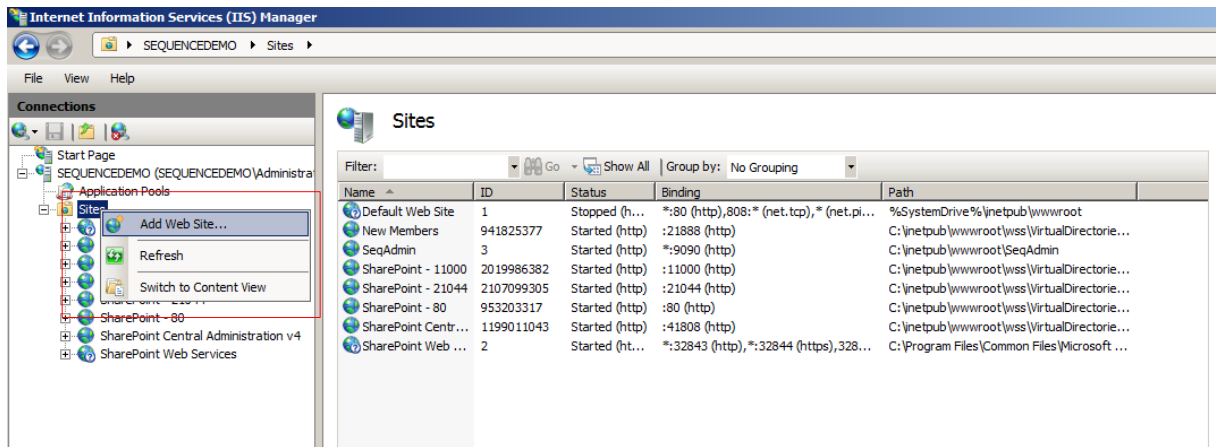
Please see this article: <http://technet.microsoft.com/en-us/library/cc262243.aspx>

Create a new web site for the administration site (IIS 7.0 / 7.5)

Usually, you will want to create the Management Console (administration site) on a dedicated web site with a specific port.

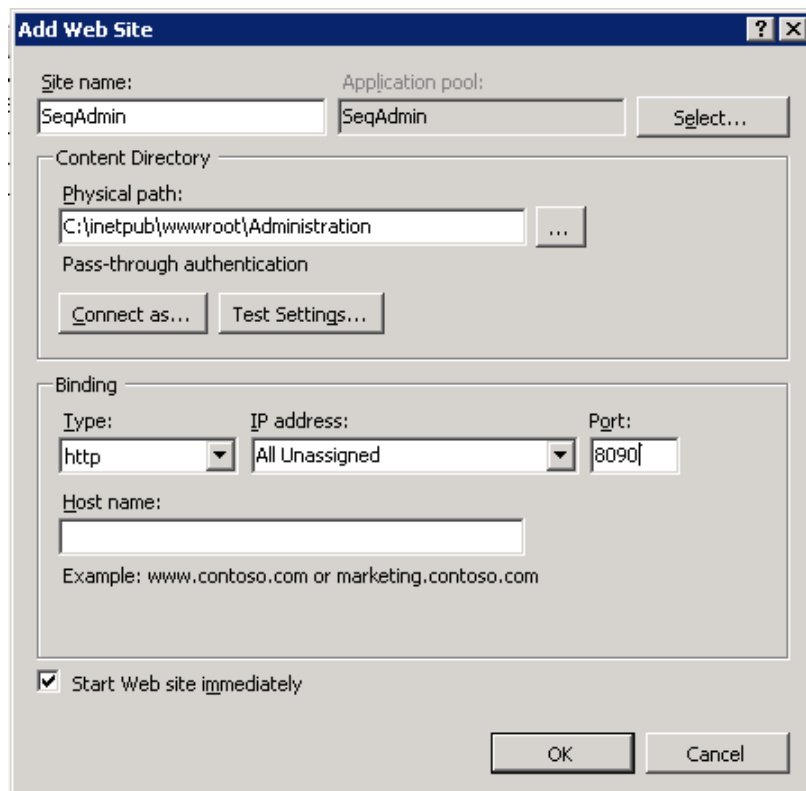
To define new web site for the administration application:

1. Click **Start**, and then click **Run**, type `inetmgr` and click **OK**. The IIS management console should open.
2. Right-click the local IIS server and click **Add Web Site**.



IIS – Add Web Site

The *Add Web Site* window opens.



Add Web Site Window

3. Insert the site name (e.g. *SeqAdmin*).
4. Browse to select or create a folder (i.e. *C:\inetpub\wwwroot\Administration*), and click **OK**.
5. Click **Test Settings** to verify that the IIS management has appropriate permissions to read/write into the chosen site folder.
If you receive a negative result, provide enough security permissions to the chosen site folder.
6. Insert a port number between 81 to 65535, and then click **Next**.
Note: Make sure you do not have conflict with other sites on the server.
7. Click **OK**. A new web site has been created.

Use this web site for the Sequence Administration site and its installed SharePoint Services site IIS location (see the section Specifying the Component Installation Location below).

Prepare your Database Server

The database server must be running Microsoft SQL Server 2008 R2 Standard Edition or higher with the most recent service pack (note: Sequence 7.2 and above also supports Microsoft SQL Server 2012).

The SharePoint 2010/2013 Setup program automatically creates the necessary databases when you install and configure SharePoint 2010/2013. Optionally, you can preinstall the required databases if your IT environment or policies require this. Make sure the surface area settings are set to enable Local and Remote Connections.

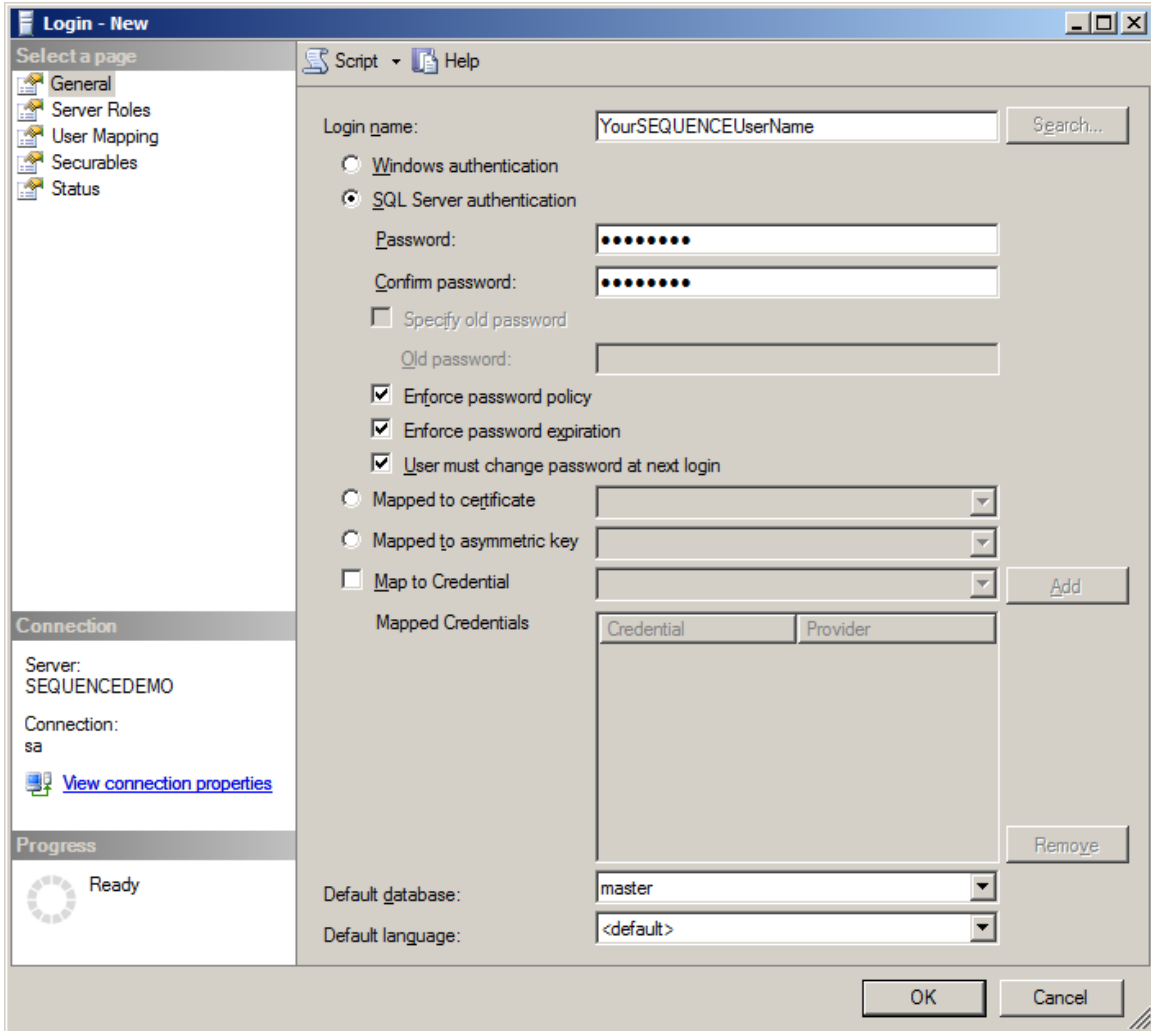
SQL Server and Database Collation

The SQL Server collation must be configured to be case-insensitive. For more information about collations, see "Selecting a SQL Collation" or "Collation Settings in Setup" in SQL Server Books Online.

Create an SQL User for Sequence

If you intend to run the background service or the user interface under SQL authentication, you should prepare a dedicated SQL user as follows:

1. Open Security then right-click **Logins** and select **New Login**.



Login – New

2. Choose a username, SQL Server authentication and password and click **OK**.

Verify Installation Package Contents

The Sequence Installation Package includes the Setup executable and a separate folder with SQL scripts for manually creating the database (used when executable files cannot be run on the database server).

Pre-Installation Checklist

Verify the following before installing Sequence:

- You have created a new site for Sequence Administration in IIS.
- Your installation user has enough permissions to create SharePoint sites including SQL permissions on the SharePoint SQL instance.
- Your installation user is a local administrator on the server.
- Your SQL user is valid and available. For the duration of the installation, your SQL user must be a member of the system administrators group.
- SSRS is installed (to enable Analytics features).
- The application pool user is valid and available.
- The Background Runtime Windows Service user is valid and available.
- You have a product key.
- You have enough disk space (at least 150 Mb).
- The port on which you intend to install the Flowtime is available.

Installation Steps

Starting Sequence Setup

1. Run the relevant *Setup.exe* file (for example *Sequence7.9_Setup.exe*) on all servers in your solution, starting with the Application server.

IMPORTANT: You must right-click the exe file and select *Run As System Administrator*.

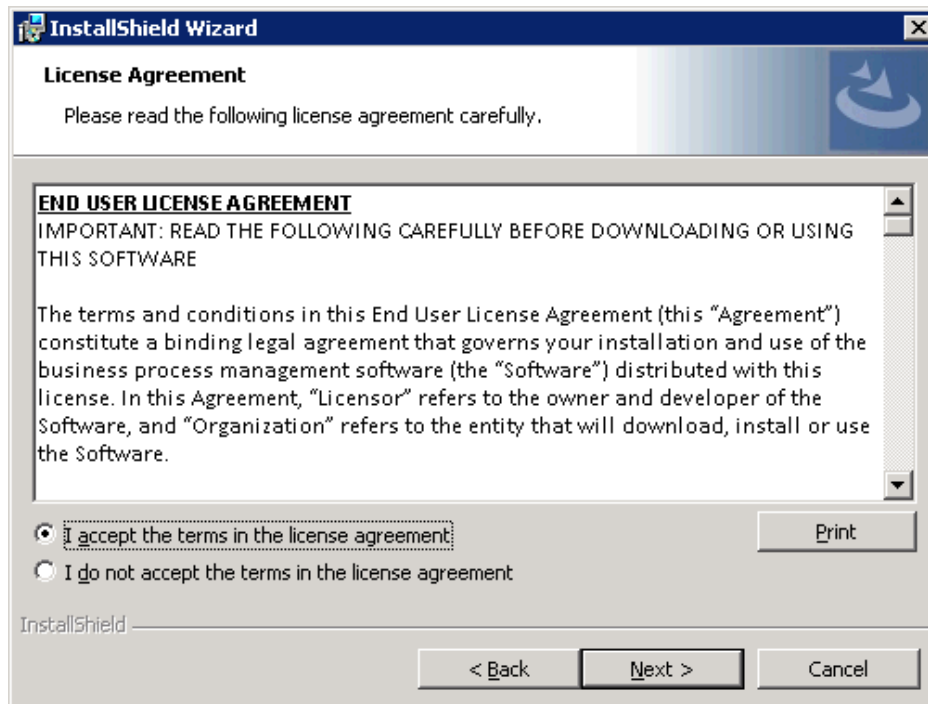
Note: The *Sequence Database* needs to be installed once. It can be done during the installation on the *Application server*. There is no need to run the installer on the *Database server*. If multiple application/web servers need to be installed, then the *Database component* should be enabled only during the first installation. The proceeding installations can have the *Database component* deselected (or select the skip option when prompted to create the *Database*).

The Sequence Installation Wizard opens.



Sequence Setup Welcome Page

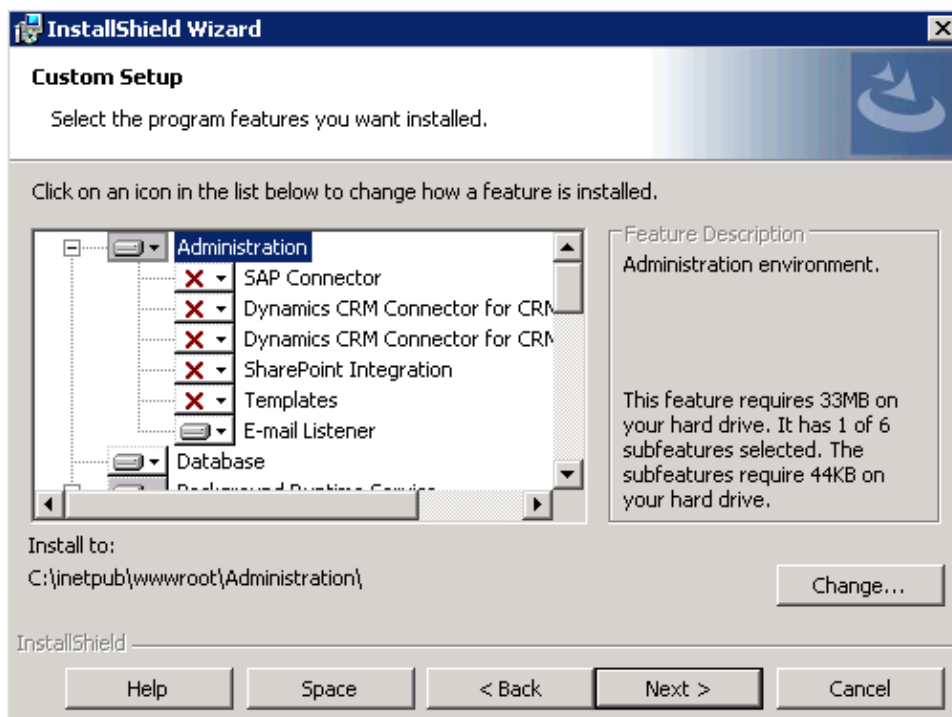
2. Click **Next** to continue. The End-User License Agreement screen opens.



End-User License Agreement

3. Select **I accept...**
4. Click **Next** to continue. The *Custom Setup* screen opens.

Choosing the Components to Install on this Server



InstallShield Wizard - Custom Setup

By default, the following components are selected and will be installed (to change a selection, click drop-down list beside each component):

- **Administration site:** On this site you will be able to create new workflows, define users and organization structure and much more.
- **Database:** Select this option to install a new Sequence database. If you are using a distributed topology, run the database installation separately on the Database server.

Note: If you cannot run the executable to configure the database, use the database scripts in the installation package. (See the section:

Manually Installing the Sequence Database with Scripts below.)

- **Background Runtime Windows Service:** This component is used for back office operations such as, e-mail sending, timer calculations, asynchronous redirect and more.
- **Active Directory Synchronization Service:** This component is used to synch Sequence organization structure with users from the domain Active directory.
- **SharePoint Flowtime Portal:** This component is the runtime UI which is hosted under the SharePoint site.
- **SharePoint Service:** This component is used for integration with SharePoint, i.e. SharePoint Listener Activity.
- **E-mail Listener:** Enables you to kick off workflows when an email arrives in an inbox.
- **Jobs Host Service:** A service that manages Sequence jobs, such as Email Listener.

Select the following additional components (recommended):

- **SharePoint Integration:** Applicable where SharePoint actions are used within workflows. This enables SharePoint activities (such as upload file, create list item, etc.).
- **Templates:** Installs Sequence workflow templates and samples. These can be downloaded separately from the PNMSoft Knowledge Centre.

The following additional components should be selected only if you have a license for them:

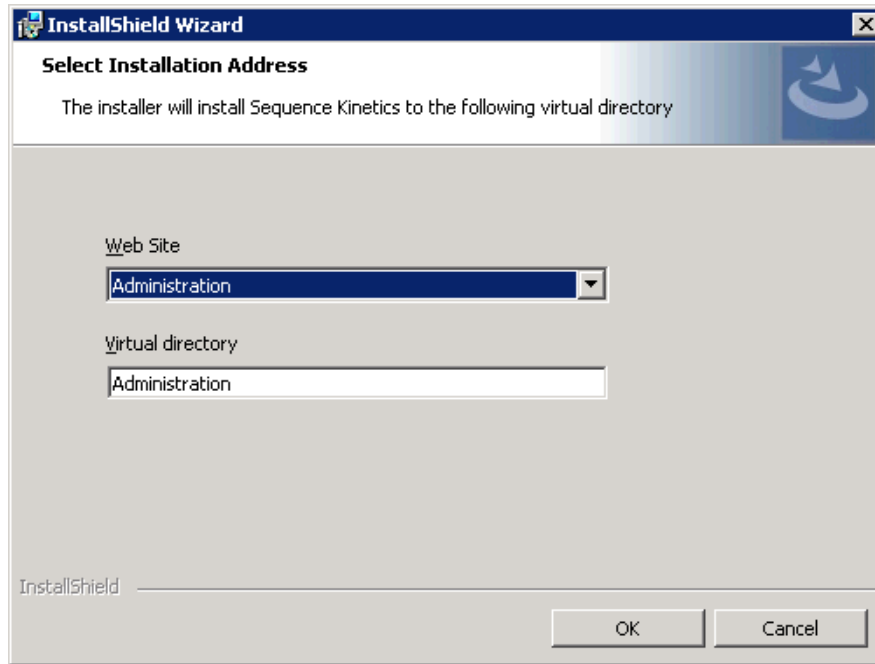
- **Process^{TO GO}:** This is Sequence's Mobile BPM runtime environment (this component appears under each of the other components).
- **SAP Connector:** This is Sequence SAPProcess™, enabling BPM process integration with SAP (this component appears under each of the other components).
- **Dynamics CRM Connector:** This is Sequence CRM Edition (SCE)™ enabling BPM process integration with Microsoft Dynamics CRM. You can select the connector for CRM 4.0 or for CRM 2011 and later depending on your version of CRM.

Specifying the Component Installation Location

Each Sequence component can be configured for installation to your selected NTFS or IIS location as relevant.

Administration Site

5. Select **Administration Site** and click **Change**. The *Select Installation Address* screen opens.



Select Installation Address

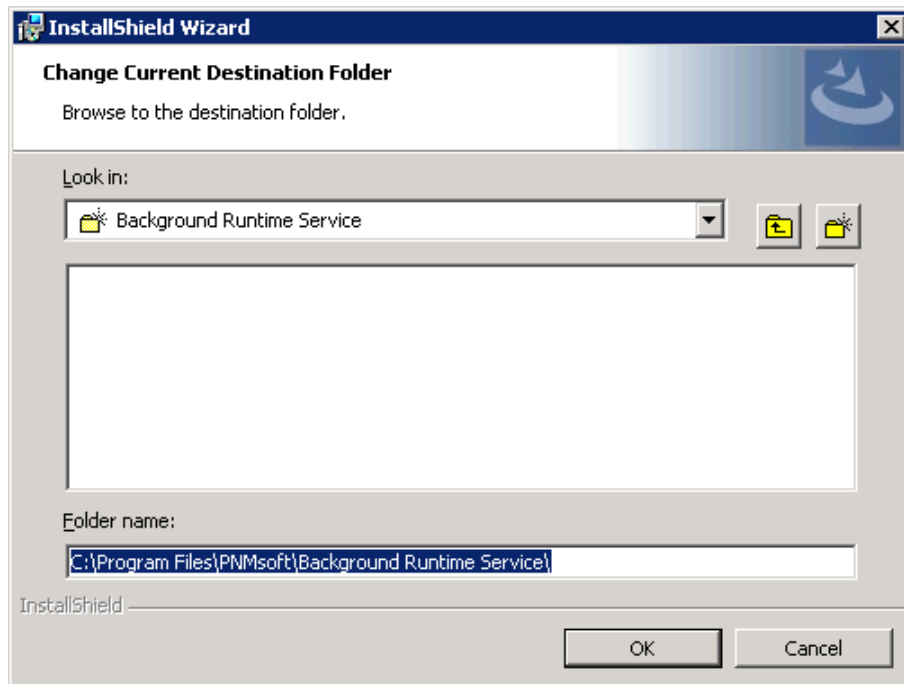
6. From the drop-down list, select a **Web Site** other than the sites on which SharePoint is installed. It is recommended to install the administration site on a dedicated web site. See the section “Create a new web site for the administration site (IIS 7.0 / 7.5)” on how to create a new web site for the administration site.
7. (Optional) change the virtual directory name to any selected name. We recommend not using spaces in the virtual directory name.
8. Click **OK**. You return to the *Custom Setup* screen.

Database

It is not applicable to change this component’s location settings.

Background Runtime Windows Service

9. Select **Background Runtime Windows Service** and click **Change**. The *Change Current Destination Folder* screen opens.

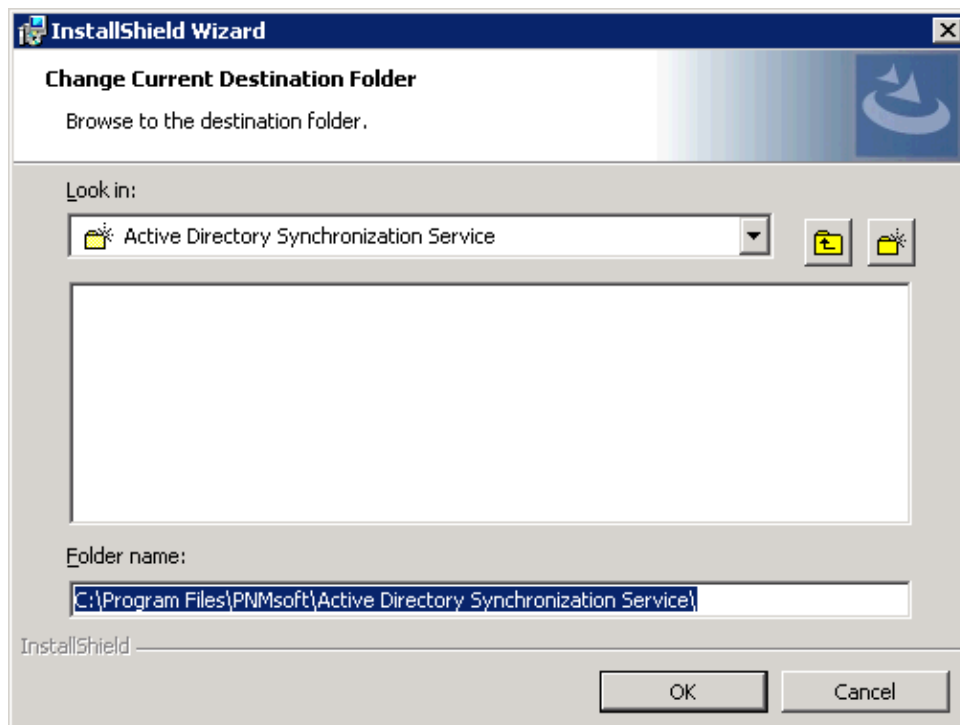


Change Current Destination Folder

10. Specify the NTFS location for the service installation folder (or you can leave the default location as is).
11. Click **OK**. You return to the *Custom Setup* screen.

Active Directory Synchronization Service

12. Select **Active Directory Synchronization Service** and click **Change**. The *Change Current Destination Folder* screen opens.

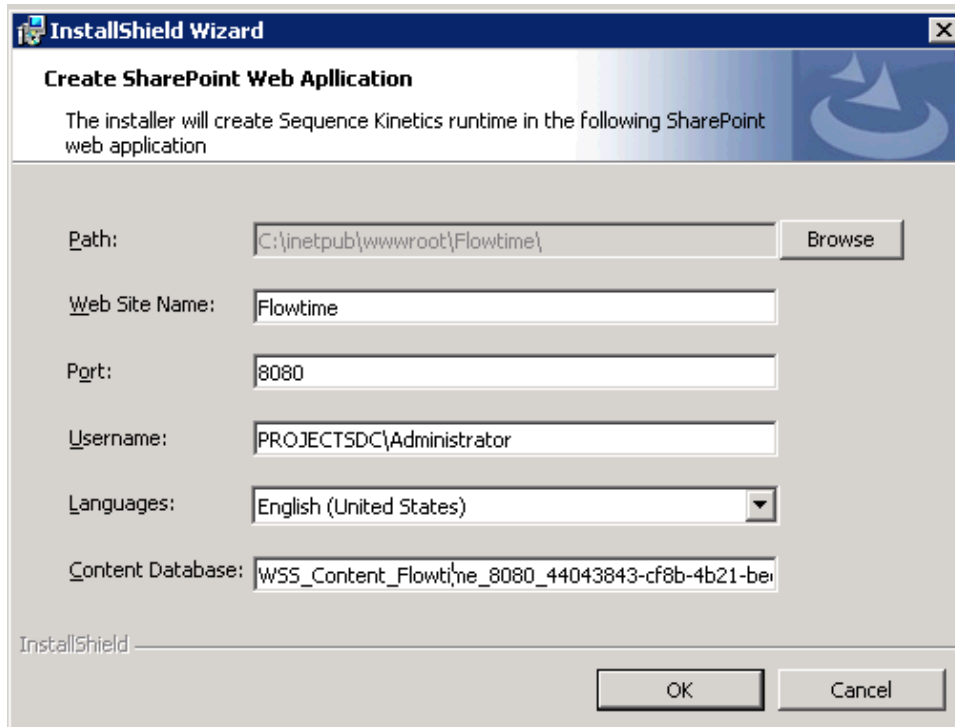


Change Destination Folder

- Specify the NTFS location for the service installation folder (or you can leave the default location as is).
- Click **OK**. You return to the *Custom Setup* screen.

SharePoint Flowtime Portal

- Select **SharePoint Flowtime Portal** and click **Change**. The *Create SharePoint Web Application* screen opens.

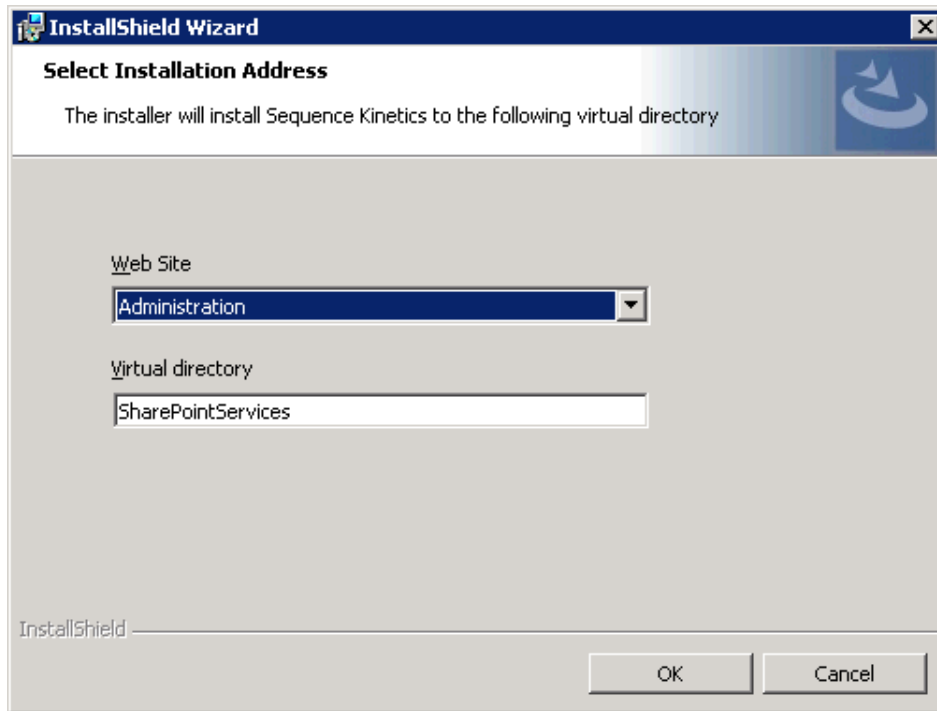


Create SharePoint Web Application

- (Optional) To change the default **Path** to Flowtime, click **Browse**.
- Enter the **Web Site Name** and **Port** where you would like to install the Flowtime application.
Note: Make sure the port is not in use by another web site.
- Enter the **Username** that will be used as the site collection creator and owner.
Note: Make sure you enter a valid user.
- Select the **Language** that will be used in Flowtime from the drop-down list. The available languages depend on your server's Operating System and installed Language Packs.
- (Optional) You can edit the name of the Content Database if your implementation requires it, although it is recommended to leave the default name as is.
- Click **OK**. You return to the *Custom Setup* screen.

SharePoint Services Site

22. Select **SharePoint Services** and click **Change**. The *Create SharePoint Web Application* screen opens.



SharePoint Installation Address

23. Select a web site which is different than the sites on which SharePoint is installed. It is recommended that you install the SharePoint Service under the same site in which the Administration site is configured.

Note: See section: *“Create a new web site for the administration site (IIS 7.0 / 7.5)” on how to create a new web site for the Management Console / Administration site.*

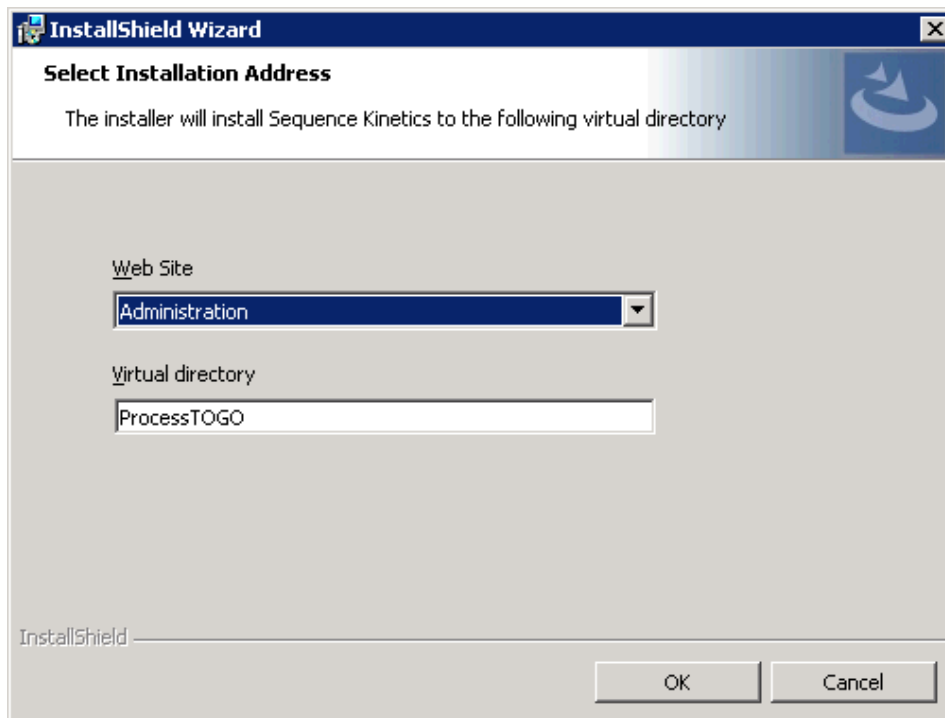
24. (Optional) Change the virtual directory name to the name of your choice.

Note: *We recommend not using spaces in the virtual directory name.*

25. Click **OK**. You return to the *Custom Setup* screen.

Process^{TO GO} (by subscription only)

26. Select **Process TOGO** and click **Change**. The *Select Installation Address* screen opens.



Process^{TO GO} Installation Address

27. Select a web site which is different than the sites on which SharePoint is installed. It is recommended that you install Process^{TO GO} under the same site in which the Administration site is configured.

Note: See section: “Create a new web site for the administration site (IIS 7.0 / 7.5)” on how to create a new web site for the Management Console / Administration site).

28. (Optional) Change the virtual directory name to the name of your choice.

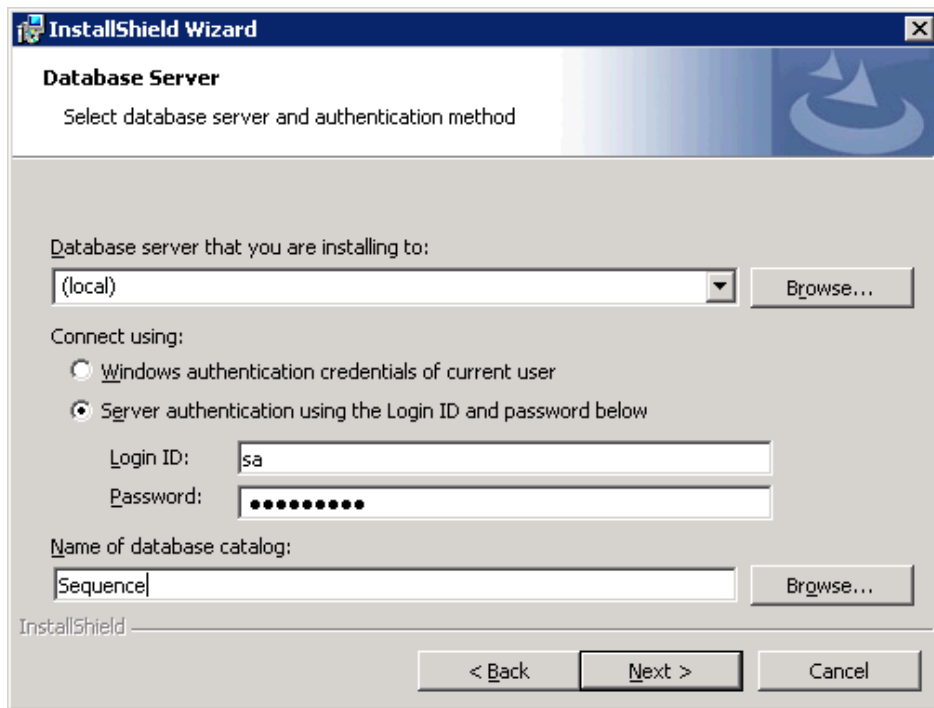
Note: We recommend not using spaces in the virtual directory name.

29. Click **OK**. You return to the *Custom Setup* screen.

30. Click **Next**. The *Database Server* screen opens.

Choosing Database Options

Choose the Server and Database Name



Database Server

31. Enter the details of the SQL Database server, its authentication, and database catalog. The name of the database catalog (by default Sequence) is the one that will be created or overwritten in SQL.

Note: For the duration of the installation the SQL Login ID user must be a member of the system administrators group.

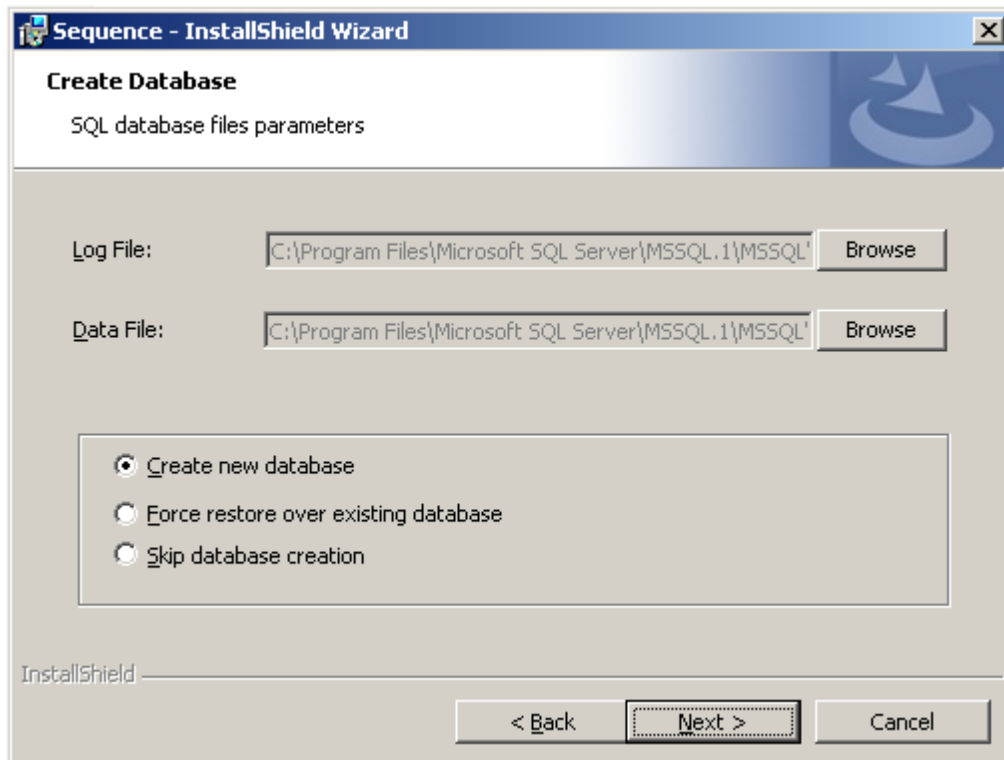
Note: The authentication must be set to Server authentication.

32. Click **Next**. The *Create Database* screen opens.

Define New / Existing Database and Choose Physical File Locations

In this step you define whether to create a new Sequence database, overwrite an existing Sequence database, or skip the database creation step.

The data and log files are placed in the default SQL data folder. You can choose a different location for one or both files.



Create Database

33. Use the supplied default SQL data folders or enter a different location for the **Log File** and/or **Data File**.

Important Note: In MS SQL the Sequence default folder path does not exist, therefore you should manually choose the file destination.

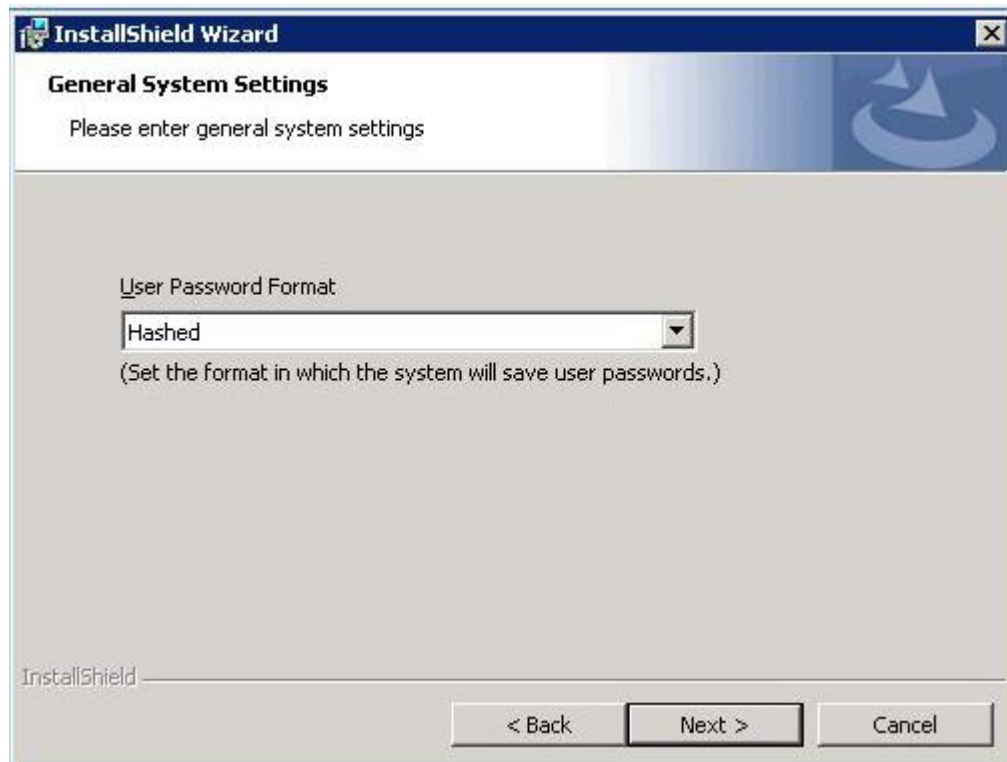
34. Select one of the following database creation options:

- Create new database
- Force restore over existing database
- Skip database creation

35. Click **Next**. The *Password Format* screen opens.

Password Format

In this step, you select in which format user passwords will be saved.



Select Password Format

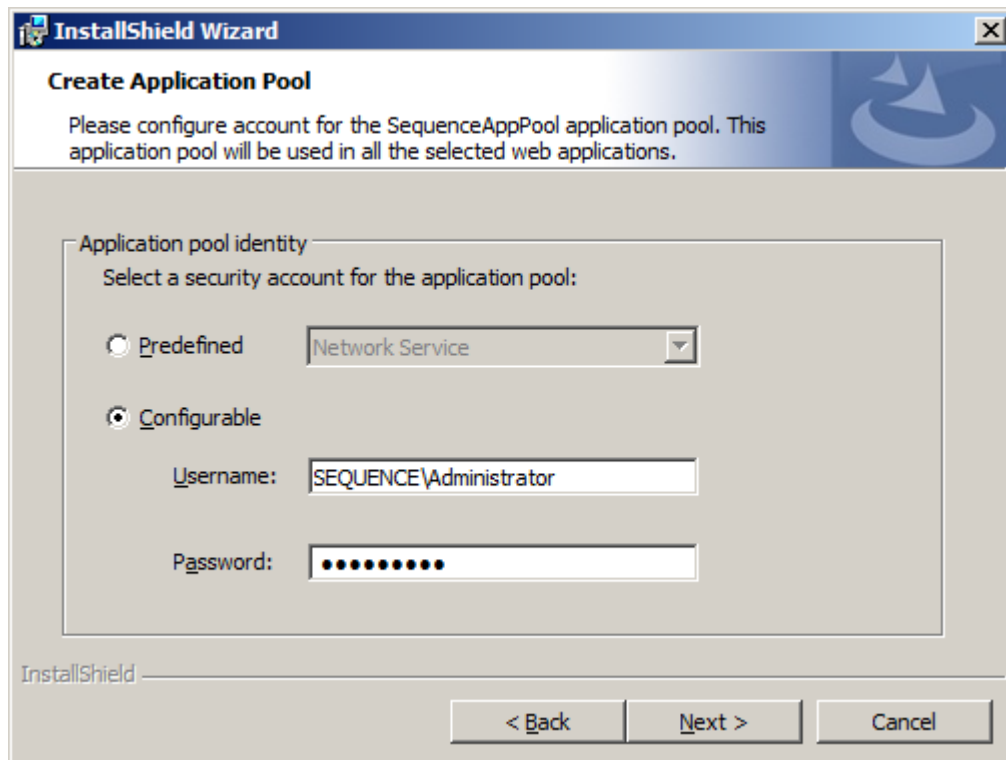
36. Select the Password Format from the dropdown list. The following options are available:

- Clear
- Encrypted
- Hashed (most secure – recommended)

37. Click **Next**. The *Create Application Pool* screen opens.

Choosing Users

Choose the Sequence Application Pool User



Create Application Pool

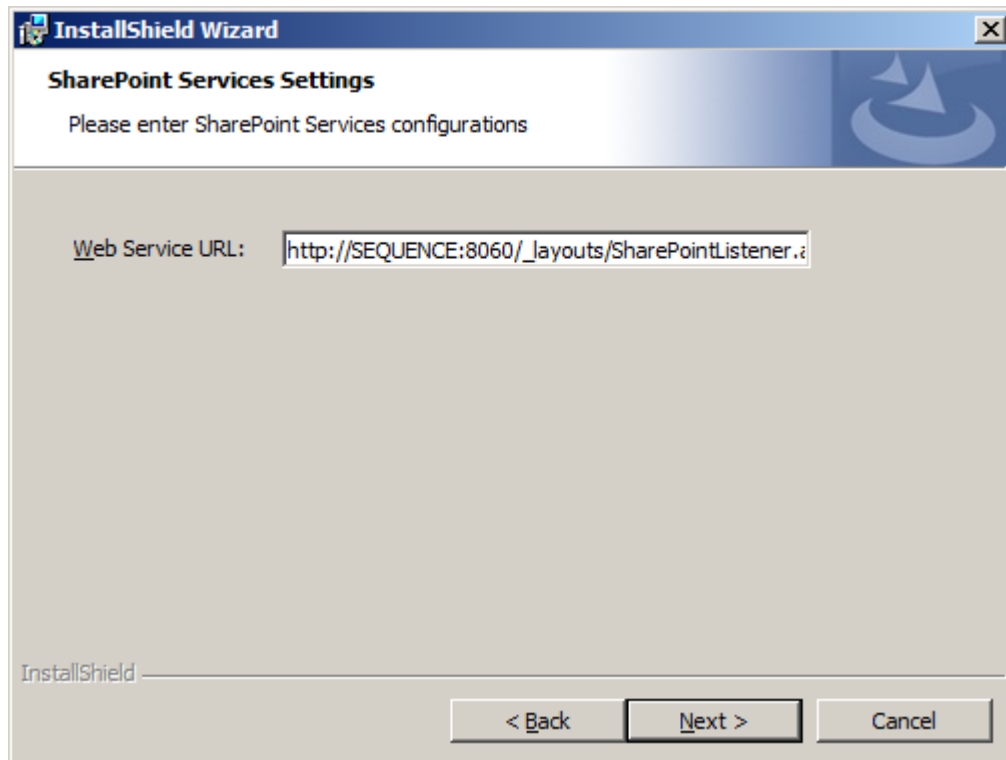
38. Select a security account for the application pool.

The user that runs the IIS application pool can be either a predefined user, or a configurable user of your choice.

Note: The user must be a member of the IIS_WPG group on the server and must be able to read the server's hardware configuration using Windows Management Instrumentation Commands. For more details, please see: [http://msdn.microsoft.com/en-us/library/aa394531\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/aa394531(VS.85).aspx)

39. Click **Next**. The *SharePoint Services Settings* screen opens.

SharePoint Services Settings



SharePoint Services Settings

40. Enter the **Web Service URL** to be used for Sequence SharePoint Listener activities. The port should be the same as the Flowtime port.

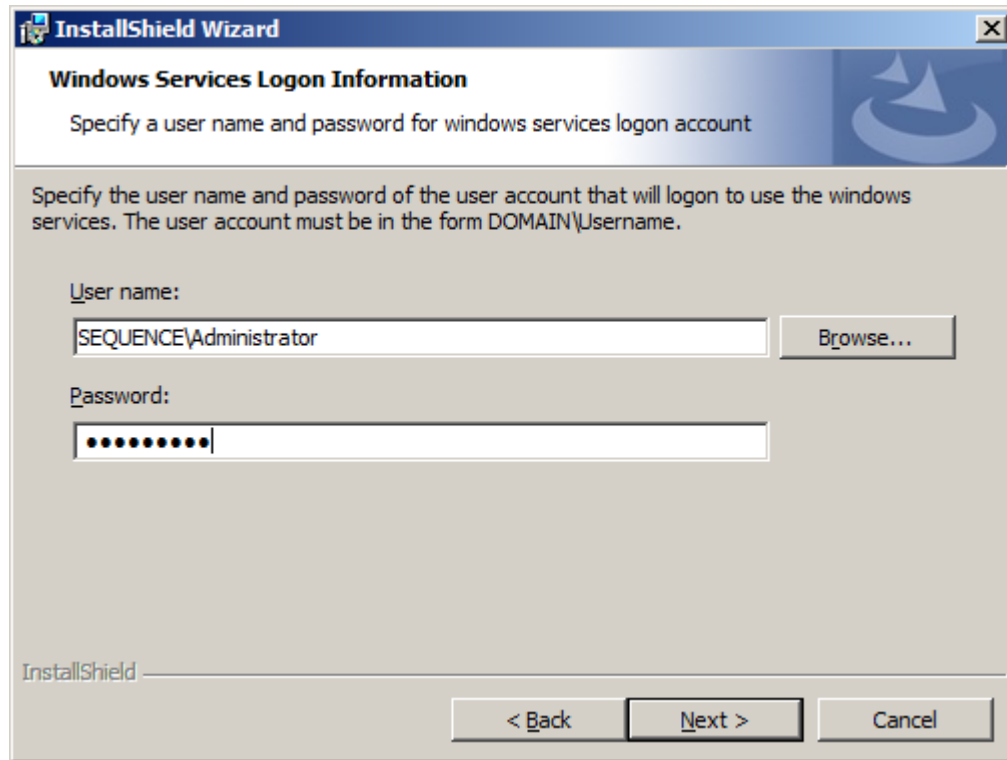
Note: it is not advisable to change the default URL unless you are an advanced Sequence user.

41. Click **Next**. The *Windows Service Logon Information* screen opens.

Choose the Background Runtime Windows Service User

42. Enter the username and password of the user account that will logon to use the windows services. The user account must be in the form DOMAIN\Username.

If Sequence is configured to use SSPI (NT authentication for accessing the database) then the user that runs the Background Runtime Windows Service must have access to the Sequence database.



Windows Services Logon Information

Note: This user is the one that will be the creator of all workflows initiated by asynchronous events and must be granted Read & Write access to the relevant workflows accordingly.

43. Click **Next**. The *Background Runtime Windows Service Settings* screen opens.

Background Services Settings

Choose Background Runtime Windows Service Settings

The screenshot shows a window titled "InstallShield Wizard" with a sub-header "Background Runtime Service Settings". Below the sub-header is a message: "Please enter intervals and timeouts for Background Runtime Service's functions." There are six rows of settings, each with a label, a text input field, and the unit "minutes":

- Redirector Interval: 10 minutes
- Email Sender Interval: 10 minutes
- Database Listener Interval: 10 minutes
- Statistics Calculator Interval: 10 minutes
- Subscriber Timeout: 20 minutes
- Reminder Message Creator Interval: 10 minutes

At the bottom, there are three buttons: "< Back", "Next >" (which is highlighted with a dashed border), and "Cancel". The "InstallShield" logo is visible in the bottom left corner.

Background Runtime Windows Service Settings

44. Select the intervals and timeouts for the Background Runtime Windows Service's functions:

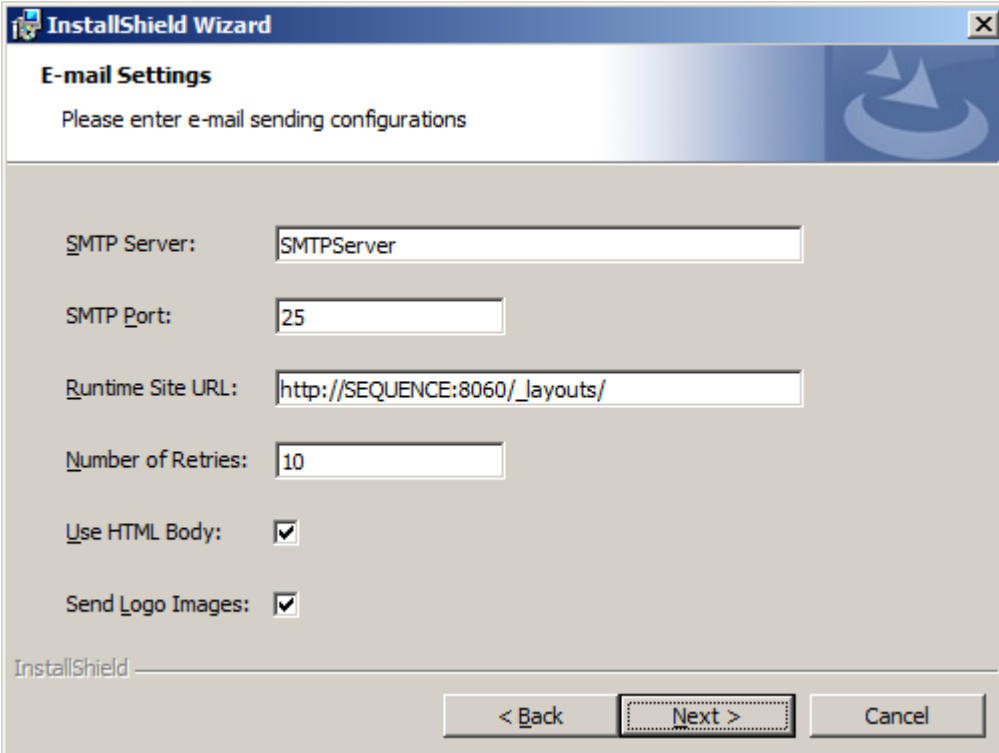
- **Redirector Interval:** The idle time between cycles of the workflow redirection thread. The time is measured from the completion of work to the beginning of the next cycle.
- **Email Sender Interval:** The idle time between cycles of the message and email sending thread.
- **Database Listener Interval:** The idle time between cycles of the database listener thread.
- **Statistics Calculator Interval:** The interval at which Sequence recalculates workflow statistics expressions and stores the results in the database.
- **Subscriber Timeout:** The interval at which the participating servers are sampled as OK when running the windows service load balanced.
- **Reminder Message Creator Interval:** The interval at which Sequence checks if there are reminder messages that need to be sent.

Note: the default settings are the recommended settings. The lower the value selected, the greater the load but the faster the response time.

Note: a setting of zero disables the thread.

45. Click **Next**. The *Background Runtime Email Settings* screen opens.

Choose Background Service Email Settings



The screenshot shows the 'E-mail Settings' dialog box within the 'InstallShield Wizard'. The dialog has a title bar with the text 'InstallShield Wizard' and a close button. Below the title bar, the text 'E-mail Settings' is displayed, followed by the instruction 'Please enter e-mail sending configurations'. The dialog contains several input fields and checkboxes:

- SMTP Server:** A text box containing 'SMTPServer'.
- SMTP Port:** A text box containing '25'.
- Runtime Site URL:** A text box containing 'http://SEQUENCE:8060/_layouts/'.
- Number of Retries:** A text box containing '10'.
- Use HTML Body:** A checked checkbox.
- Send Logo Images:** A checked checkbox.

At the bottom of the dialog, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a dashed border. The 'InstallShield' logo is visible in the bottom left corner of the dialog area.

E-mail Settings

46. Select the email sending configuration options:

- **SMTP Server:** The name or IP of the SMTP server to which to direct outgoing messages.
- **SMTP Port:** The SMTP port number.
- **Flowtime Site URL:** The URL to be used as the base for return links in outgoing messages.
- **Number of Retries:** The number of rejects to allow from the SMTP server before ceasing to send emails to a specific user.
- **Use HTML Body:** Allow HTML in message body.
- **Send Logo Images:** Send images in outgoing messages.

47. Click **Next**. The *Active Directory Synchronization Service Settings* screen opens.

Choose Active Directory Service Settings

The screenshot shows a dialog box titled "InstallShield Wizard" with a sub-title "Active Directory Synchronization Service Settings". The main text says "Please enter active directory synchronization configuration". There are four input fields: "Domain:" with the value "YourDomain", "Synchronization Key:" with the value "YourDomainController", "Synchronization Interval:" with the value "10" and the unit "minutes", and "Active Directory Unique Key:" with two radio button options: "objectGuid" (selected) and "DOMAIN\username". At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

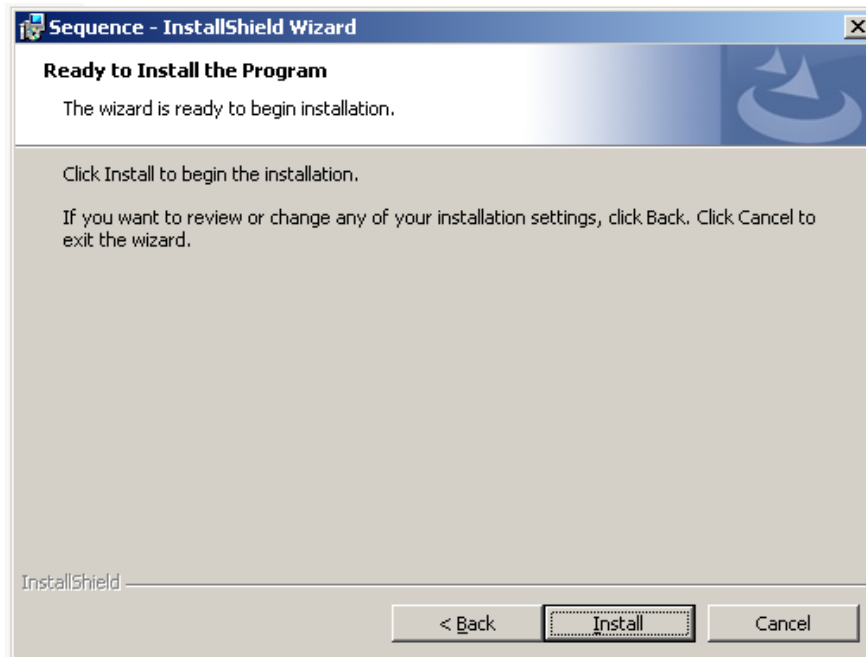
Active Directory Synchronization Service Settings

48. Enter the active directory synchronization configuration:

- **Domain:** Should be your Domain.
- **Synchronization Key:** Should be your Domain Controller.
- **Synchronization Interval:** A higher value is recommended, e.g. 1440 (once per day).
- **Active Directory Unique Key:** the comparison key for importing users from Active Directory to the Sequence.

49. Click **Next**. The *Ready to Install the Program* screen opens.

Ready to Install Sequence

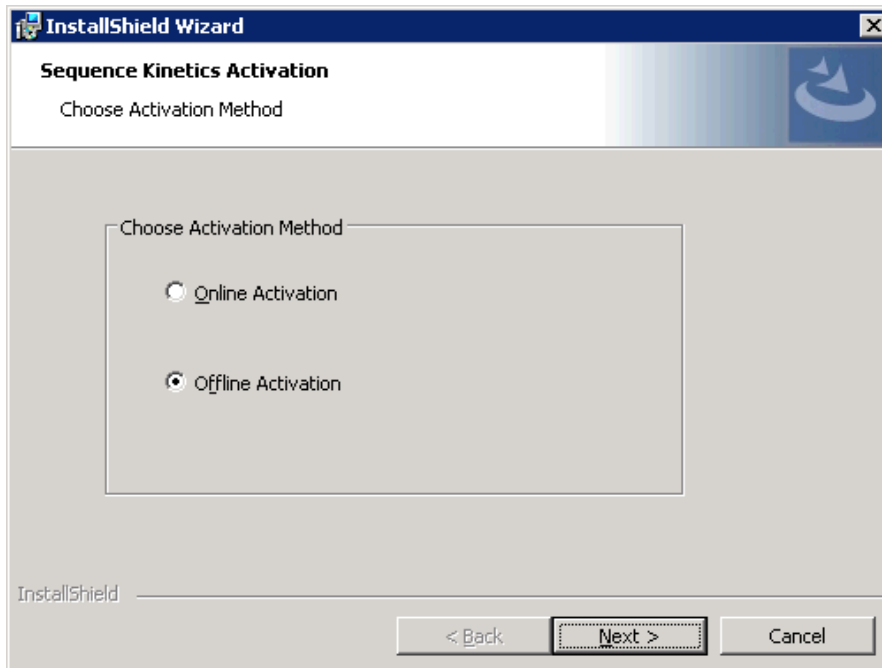


Ready to Install the Program

50. Click **Install**. The installation begins. It may take several minutes.

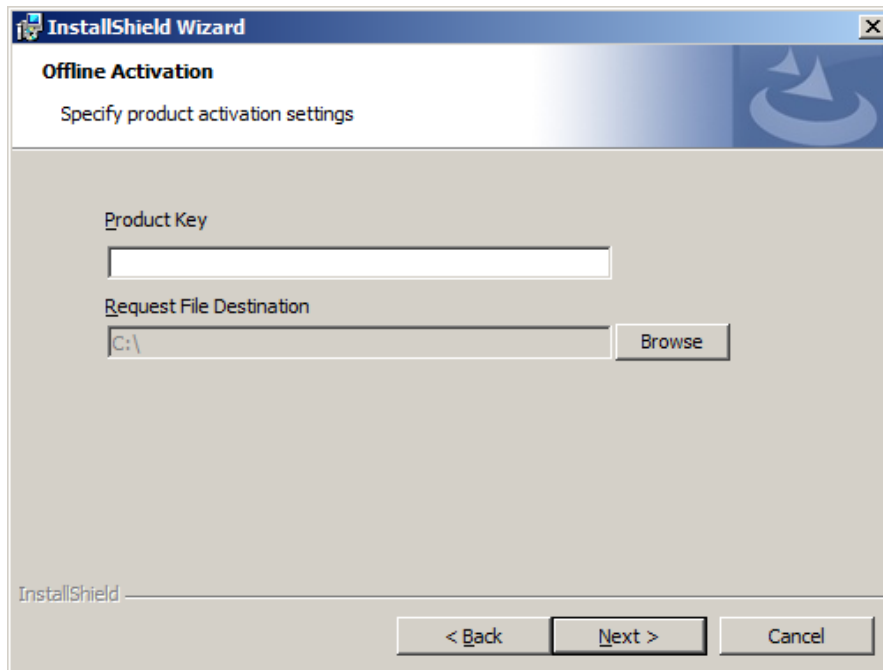
Licensing

Towards the end of the installation, you will be prompted to choose an activation method.



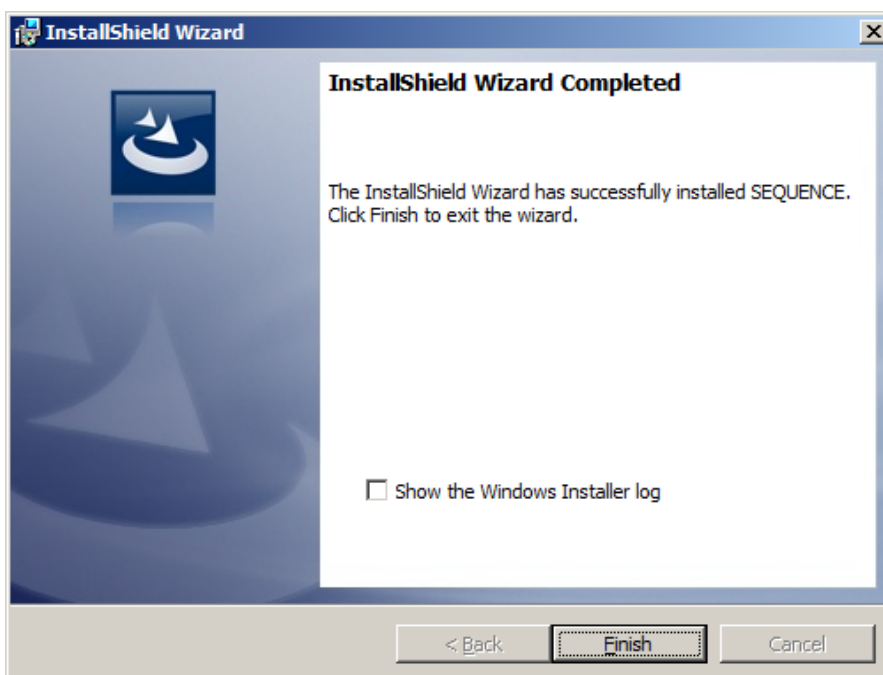
Sequence Activation Method

51. Select **Offline Activation** and click **Next**. The *Product Key* screen opens.



Product Key

52. Enter your **Product Key** as supplied with your Sequence product (request it from your account manager). To retrieve a missing Product Key, please contact PNMsoft Support (support@pnmsoft.com).
53. Click **Browse** to select the XML license request file destination on your hard disk.
Note: As this file represents the Sequence server's hardware configuration for the license, it is recommended to save a copy of it.
54. Click **Next**. The *Installation Complete* screen appears.



Installation Complete

55. Click **Finish**. The Installation is complete.
56. Upload the license request file (from step 53.) to the PNMsoft Activation Site at <http://licensing.pnmsoft.com/>. The site provides you with a license file.
57. Download the license file and place it in *C:\Program Files\PNMsoft\Licensing\Data* on all the Sequence servers.

Post Installation Tasks

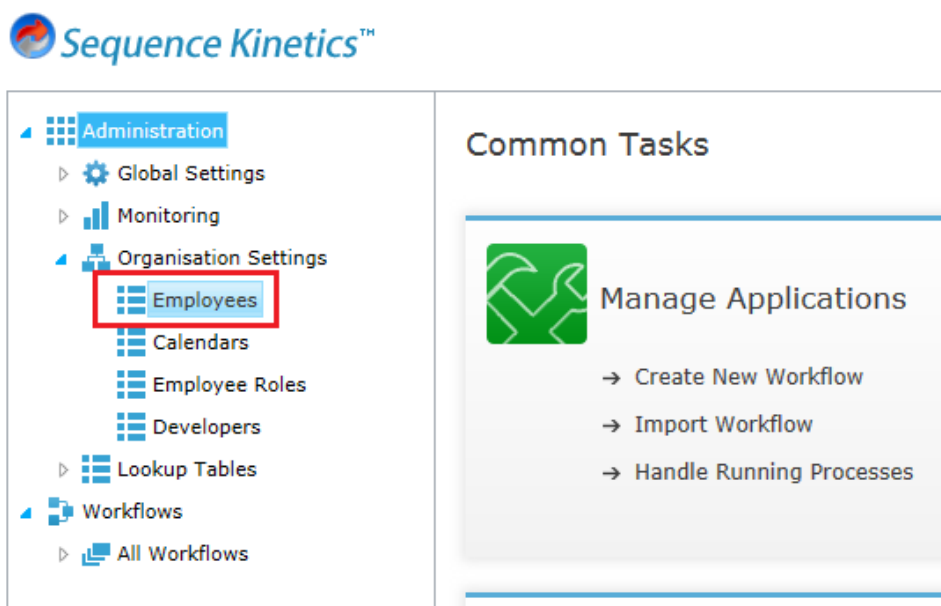
Logging in to the Administration Site

1. Browse to the default administration url:
http://<yourservername>:<youradminport>/administration
(The system default port is 8090.)
2. Login with the default credentials:
Username: Administrator
Password: e



Logging in to Administration Site

3. Select **Administration > Organisation Settings > Employees**.



Organization Tables > Employees

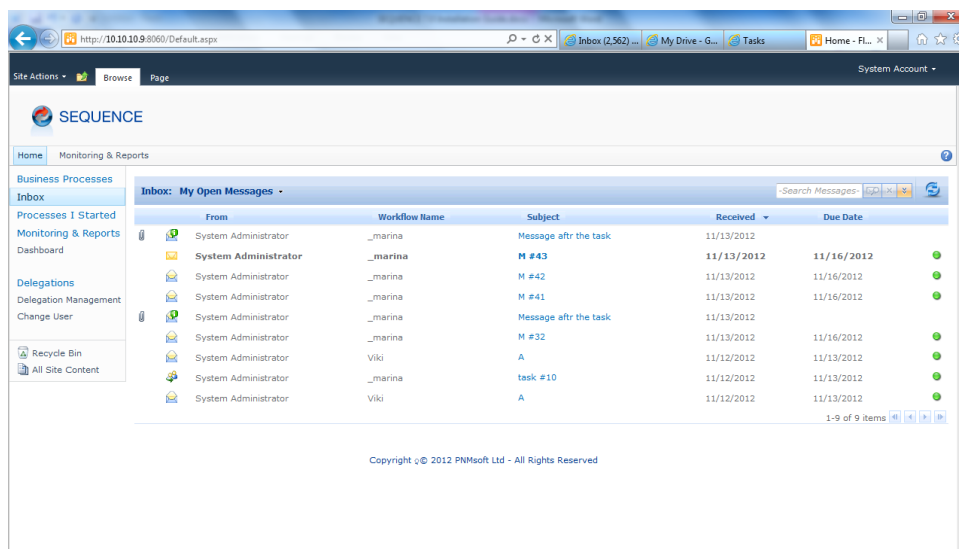
- From the Employee Table, open the System Administrator user.

System Administrator User

- In the Domain field, enter your user's Domain.
Note: If the server is not a member of a domain, substitute the server name.
- In the User Name field, enter your user name.
- Click **Update**.
- Logout from the Administration site.
- Test by logging in to `http://<yourservername>:8090/administration`. You should be logged to the Administration site directly without any authentication prompts.

Logging in to the Flowtime Site

- Go to the default url for the Flowtime Site: `http://<yourservername>:<yourflowtimeport>` (The system default port is 8080.)
- Assuming that you logged into the Administration site successfully (in the steps above), you should be logged in directly without any authentication prompts.



Flowtime Site

Add NT Authenticated Group to the SharePoint Visitor Group

Now that the Flowtime site is up, you can choose which group/s user/s to allow access via the SharePoint Authentication module.

Enable the SQL Service Broker

The Sequence installation process creates a new service broker. If it does not, follow these steps to enable SQL notification on the server:

To enable the New Service Broker:

1. On the **Start** menu, click **All Programs**, select **Microsoft SQL Server 2008 (or 2012)**, and then click **SQL Server Management Studio**.
2. Select the relevant server and click **Connect**.
3. Open a new query window.
4. Type the following command and then click Run:

```
ALTER DATABASE [Sequence] SET NEW_BROKER WITH ROLLBACK IMMEDIATE
```

Note: If you did not name your database Sequence, please replace the [Sequence] database name in the square brackets.

Demote SQL User

Once the installation is complete, demote the SQL user from being a system administrator.

(Optional) Active Directory Service

Note: for assistance with this step, please contact PNMsoft Support.

Note: Active Directory updates are one-way only: Active Directory updates the Sequence Database, but Sequence cannot update the Active Directory.

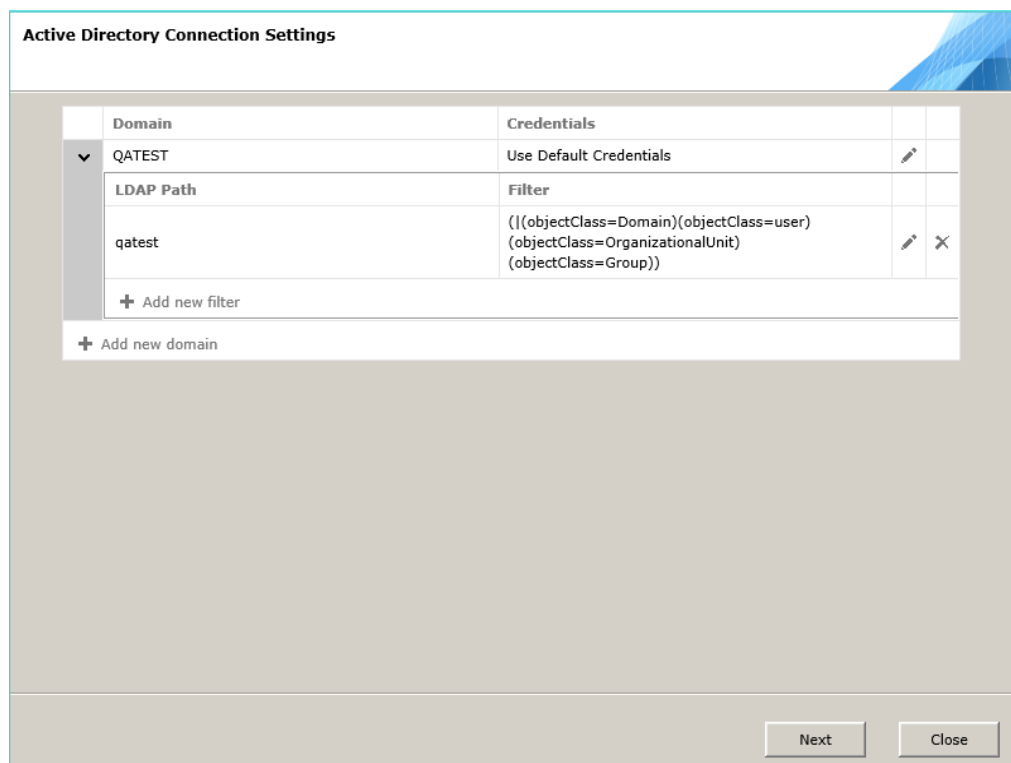
1. Open the Administration and select **Active Directory Settings**.

The screenshot displays the Sequence Kinetics Administration console. The top right corner shows a home icon and a 'Logout' link. The left sidebar contains a tree view under 'Administration' with sub-items: Global Settings, Monitoring, Organisation Settings (Employees, Calendars, Employee Roles, Developers), Lookup Tables, Workflows, and All Workflows. The main area is titled 'Common Tasks' and features six task cards:

- Manage Applications:** Create New Workflow, Import Workflow, Handle Running Processes.
- Monitoring and Reports:** Define New Chart, Import Dashboard, Create Dashboard Package.
- Environment Settings:** Manage Workflow Categories.
- Manage Organisation:** **Active Directory Settings** (highlighted), Edit Organisation.
- Getting Started:** View Orientation Video, Getting Started walk-through, Visit Online Help, Process Creation Video.
- Installation Details:** Server Name: 10.10.10.19, Assembly Version: 7.2.0.0, Database Version: 7.2.0.0, Database Name: Shp2013, License Expiration Date: NA, Number of Active Users: 7452.

Sequence Administration

The *Active Directory Connection Settings* page opens.



Active Directory Connection Settings

2. Edit the settings to match your LDAP and server configuration, editing the default LDAP query as needed. See the [Active Directory guide](#) for more details.
3. Open the server's services list. Verify that the service Active Directory Synchronization service is *Started*.
4. Restart the service.
5. After a few minutes, check that new users were added to the Sequence Database. Open the Management Console, right-click on the organization structure, and select **Edit**.

(Optional) Sequence Analytics Setup

To enable the Sequence Analytics feature (from v7.7 and above), please complete the steps in [this guide](#). This feature enables the creation of rich visual dashboards for Flowtime users.

(Optional) SharePoint Services Configuration

1. Open the *Workflow Editor*.
2. Add a SharePoint Listener Activity.
3. Enter a List's details, and verify GUIDs are retrieved from SharePoint.
4. Set workflow permissions.
5. Instantiate the defined event in the SharePoint Site utilizing a user who has permissions to the workflow.
6. Verify that a new instance was created.
7. The Administration configuration file section should look as follows:

```
<activities>
  <sharepoint>
    <sharepoint2007>
      <webservicepath>
        <add path="http://[servername + port]/SharePointService/ws/asmx">
        </add>
      </webservicepath>
    </sharepoint2007>
  </sharepoint>
</activities>
```

(Optional) SAP License

To enable Sequence SAP integration, obtain the SAP serial number from PNMsoft Support, and insert this serial number into the Flowtime and Administration config files, in the SAP key:

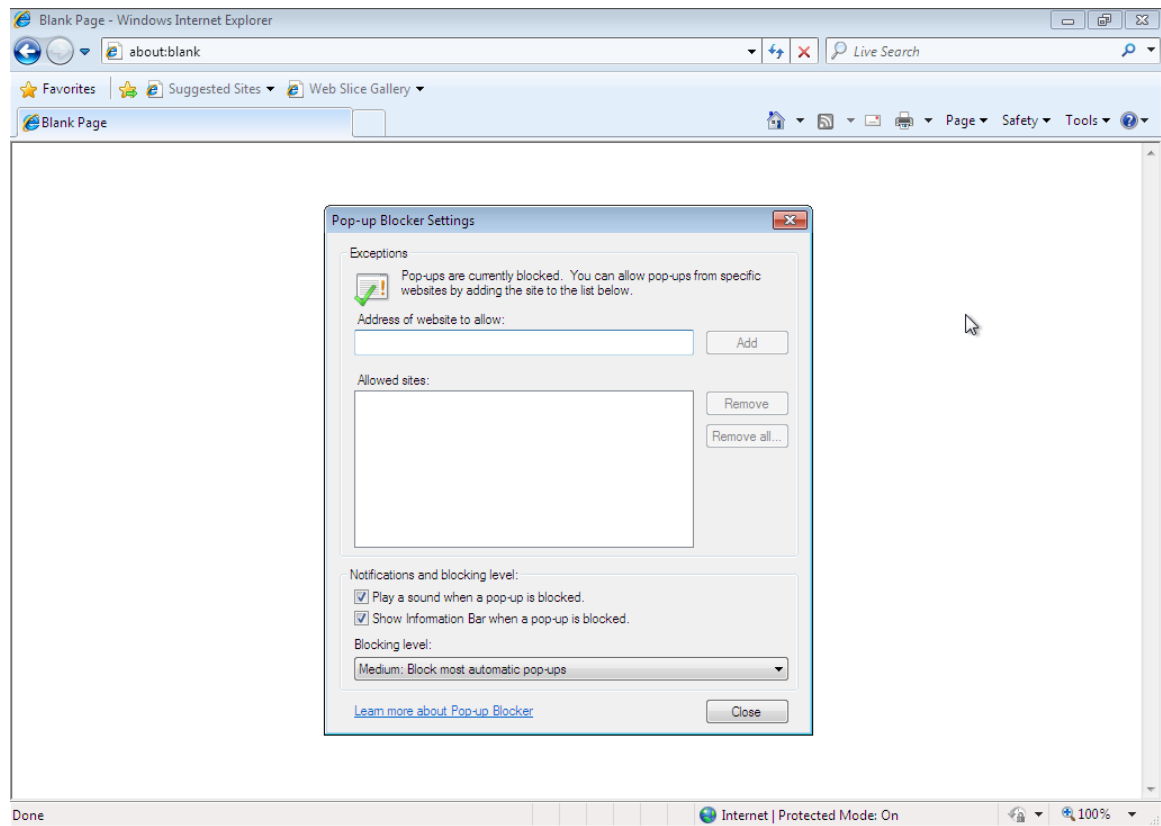
```
<dependentAssembly>
  <assemblyIdentity name="PNMsoft.Sequence.SAPConnector"
publicKeyToken="[enter the SAP serial number here]"/>
  <bindingRedirect oldVersion="5.5.0.0-7.0.0.0" newVersion="7.0.0.0"/>
</dependentAssembly>
```

Enabling Pop-ups on Sequence Clients

Sequence Developers access Sequence Administration from their machines. Enable pop-ups from Sequence on client machines to facilitate Sequence functionality as follows:

To add Sequence to the Pop-up Blocker Exceptions List:

1. From the client's browser, select **Tools > Pop-up Blocker > Pop-up Blocker Settings**.
2. Add Sequence to the list of websites from which pop-ups are allowed.



Pop-Up Blocker Settings

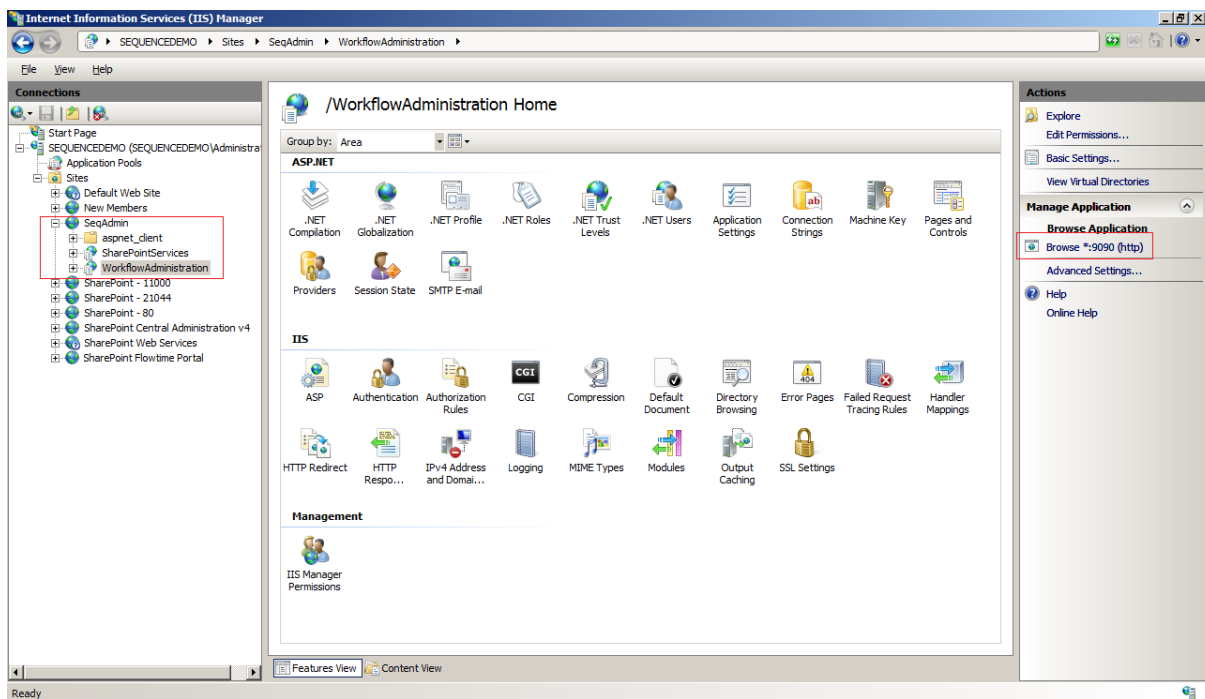
Installation Tests

Perform the following sanity tests to ensure all sites and applications are installed and active.

Sequence Administration Site

These steps should be performed from a client machine, and not directly on the Sequence server.

You can retrieve the URL of the Sequence Administration site from the IIS Manager as displayed in the figure below.



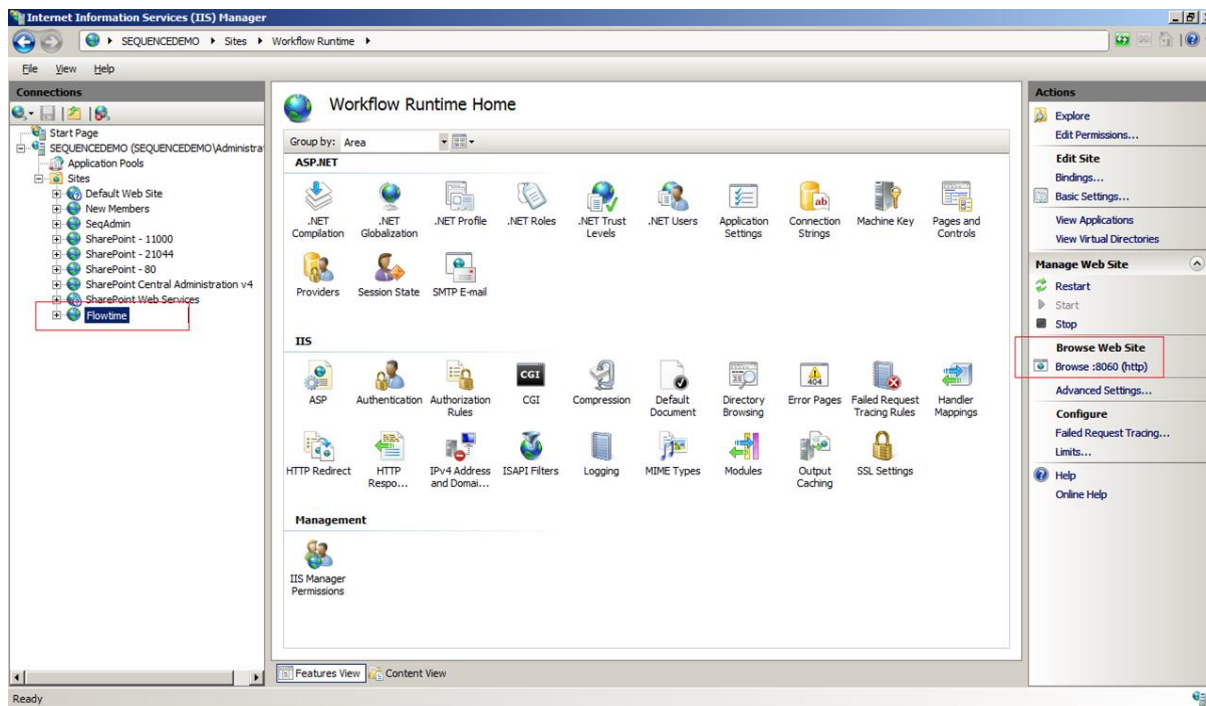
IIS Manager

1. Login as an administrative user.
2. Take an overall look at the system, and check for unexpected occurrences such as missing pictures, icons etc.
3. Open the *Administration* module and test the mouse right-click options.
4. Create a new sample process; make sure you see to the workflow diagram.
 - Create a form activity
 - Create a message activity where the message mode is “Send link”.
 - Give permissions at the workflow and activity level.
5. Logout.

Flowtime Site

These steps should be performed from a client machine, and not directly on the Sequence server.

You can retrieve the URL of the Flowtime site from the IIS Manager as displayed in the figure below.



IIS Manager

1. Log in with a SharePoint site Authenticated user to the Flowtime Site.
2. Take an overall look at the system, and watch for unexpected occurrences such as missing pictures, incorrect fonts, etc.
3. Click the *Business Processes* link.
4. Verify that the process you created in the previous section appears.
5. Start a new instance of the process and update its form.
6. Open the *Monitoring and Reports* site, and verify that three charts are displayed.
7. Click **Delegation Management** from the *Quick Launch* menu, and verify that the delegation management loads.

Background Runtime Windows Service

1. Open the server's services list. Verify that the *Background Runtime Windows Service* is *started*.
2. If it's started, restart the service. If it's not started, start it.
3. Verify that there are no errors in the event log.

Server Farm Installation

Follow the same installation procedure to install Sequence on a server farm. Install Sequence on each server in the farm. When you install Sequence on the second server (and all subsequent servers), the installation identifies the site and puts all relevant items in place.

Since version 7.5, encryption has been added to the view state based on server mac. To avoid any view state issues when working with load-balancing, you must add an explicit <machineKey> element to the application's web.config file. See Appendix C for instructions on how to generate a <machineKey> element.

Troubleshooting

If the installation fails, please contact PNMsoft Support. You will be asked to send the Sequence log file.

To find the Sequence log file:

1. Select **Start > Run** and enter: %temp%.
2. In the folder that opens, you will find the file: Sequence.log.

For additional installation troubleshooting issues, please visit the [Knowledge Centre](#).

Appendix A: Special Configurations

Many of the parameters set during installation are editable in the Sequence configuration files. In this section, you will find a list of editable keys and their functions.

Note: Please be sure to back up your files before editing them.

Sequence Active Directory Service

The default location for the file is C:\Program Files\PNMsoft\Active Directory Synchronization Service\Sequence Active Directory Synchronization Service.exe.config:

Key Name	Key Value	Remarks
DBParams	The Sequence connection string, without user id and password.	The Provider should not be specified.
Credentials	Encrypted user Id and password for the connection string.	In order to encrypt the username and password use the encrypt.exe application located in the Installation folder of the Sequence server.
timerActive Directory. Interval	The interval in which the Sequence Active Directory Synchronization Service will synchronize the organizational structure. The interval is stored in milliseconds.	By default the interval is set to 600000 (10 minutes).
Computer NameAD	The Active Directory server.	This key should be the same as the value that is specified in the Computer Name setting of the Active Directory Wizard in the Sequence Management Console.
PageSize	The number of Active directory objects that will be retrieved per query (an integer).	This key can be set to values between 1 and 1000. The recommended value is 100. The value 0 is valid and means that no paging will take place and all the Active Directory objects will be copied at once. It is strongly not recommended to set this key to 0 in large organizations because it can place a heavy work load on the Active Directory server.
ServerPageTimeLimit	The maximum time limit (in seconds) that the service will wait for the Active Directory page to be fully retrieved (an integer).	When the time limit is reached, the server stops searching and returns the result obtained up to that point, along with a cookie containing the information about where to resume searching. In the next iteration the search will be started from this point. Allowed values: 1-120 Recommended values: 80-120

Sequence Background Runtime Windows Services

BackgroundRuntimeService.exe.config:

Key Name	Key Value	Remarks
DBParams	The Sequence connection string, without user id and password in .Net format.	The Provider should not be specified.
ADOParams	The Sequence connection string, without user id and password in ADO format.	The Provider should be specified.
Credentials	Encrypted user Id and password for the connection string.	In order to encrypt the username and password use the encrypt.exe application located on the Installation folder of the Sequence server.
SMTPServer	The SMTP server name or IP.	
SiteUrl	Flowtime URL (used in emails containing links back to Sequence).	
timerRedirect.Interval	The amount of time in milliseconds between the completion of workflow redirection and the beginning of a new cycle.	Default value = 60000 ms.
timerEmail.Interval	The amount of time in milliseconds between the completion of email sending and the beginning of a new cycle.	Default value = 60000 ms.
timerUpdateStatus.Interval	The amount of time in milliseconds between the completion of workflow status updates and the beginning of a new cycle.	Default value = 60000 ms.
timerDBListener.Interval	The amount of time in milliseconds between the completion of database listener queries and the beginning of a new cycle.	Default value = 120000 ms.
timerEmbeddedEmail.Interval	The amount of time in milliseconds between the completion of embedded email sending and the beginning of a new cycle.	Default value = 600000 ms.
XSLTDirectory	The NTFS location of the XSL file used in email message formatting	

Manually Installing the Sequence Database with Scripts

The installation package runs scripts on your SQL Server remotely, to install the Sequence Database. If it is not possible to run these scripts remotely through the Installation Wizard, you can install the Sequence Database using scripts, and then run the Installation Wizard.

For detailed instructions on installing the Sequence Database using scripts, see [this guide](#).

Setting Up SSL for Sequence Sites

Please see [this guide](#) for how to set up SSL for Sequence sites.

Appendix B: Hardware and Software Requirements for SharePoint 2013 Installation

This section includes specific Hardware and Software Requirements which are different for SharePoint 2013 Installations.

Hardware Requirements

Single server with a built-in database or single server that uses SQL Server

Component	Minimum Requirement
Processor	64-bit, 4 cores 3.3Ghtz
RAM	16 GB
Hard disk	80 GB for system drive

Web server or application server in a three-tier environment

Component	Minimum Requirement
Processor	64-bit, 4 cores 3.3Ghtz
RAM	16 GB
Hard disk	80 GB for system drive

Database server

Component	Minimum Requirement
Processor	<ul style="list-style-type: none"> 64-bit, 4 cores for small deployments (fewer than 1,000 users) 64-bit, 8 cores for medium deployments (between 1,000 to 10,000 users)
RAM	<ul style="list-style-type: none"> 8 GB for small deployments (fewer than 1,000 users) 16 GB for medium deployments (between 1,000 to 10,000 users)
Hard disk	80 GB for system drive Hard disk space depends on how much content that you have in your deployment.

Software Requirements

This section provides minimum software requirements for each server in the farm.

Minimum requirements for a database server in a farm:

- One of the following:
 - The 64-bit edition of Microsoft SQL Server 2012.
 - The 64-bit edition of SQL Server 2008 R2 Service Pack 1.
- The 64-bit edition of Windows Server 2008 R2 Service Pack 1 (SP1) Standard, Enterprise, or the 64-bit edition of Windows Server 2012 Standard.
- Microsoft .NET Framework version 4.5.

Minimum requirements for front-end web servers and application servers in a farm:

- The 64-bit edition of Windows Server 2008 R2 Service Pack 1 (SP1) Standard, Enterprise, or the 64-bit edition of Windows Server 2012 Standard.

Appendix C: How to generate a <machineKey> element

Security Warning!

There are many web sites that will generate a <machineKey> element for you with the click of a button. Never use a <machineKey> element that you obtained from one of these sites. It is impossible to know whether these keys were created securely or if they are being recorded to a secret database. You should only ever use <machineKey> configuration elements that you created yourself.

To generate a <machineKey> element yourself, you can use the following [Windows PowerShell](http://technet.microsoft.com/en-us/library/hh847837.aspx) (<http://technet.microsoft.com/en-us/library/hh847837.aspx>) script:

```
# Generates a <machineKey> element that can be copied + pasted into a
Web.config file.
function Generate-MachineKey {
    [CmdletBinding()]
    param (
        [ValidateSet("AES", "DES", "3DES")]
        [string]$decryptionAlgorithm = 'AES',
        [ValidateSet("MD5", "SHA1", "HMACSHA256", "HMACSHA384",
"HMACSHA512")]
        [string]$validationAlgorithm = 'HMACSHA256'
    )
    process {
        function BinaryToHex {
            [CmdLetBinding()]
            param($bytes)
            process {
                $builder = new-object System.Text.StringBuilder
                foreach ($b in $bytes) {
                    $builder =
$builder.AppendFormat([System.Globalization.CultureInfo]::InvariantCultur
e, "{0:X2}", $b)
                }
                $builder
            }
        }
        switch ($decryptionAlgorithm) {
            "AES" { $decryptionObject = new-object
System.Security.Cryptography.AesCryptoServiceProvider }
            "DES" { $decryptionObject = new-object
System.Security.Cryptography.DESCryptoServiceProvider }
            "3DES" { $decryptionObject = new-object
System.Security.Cryptography.TripleDESCryptoServiceProvider }
        }
        $decryptionObject.GenerateKey()
        $decryptionKey = BinaryToHex($decryptionObject.Key)
```



```
$decryptionObject.Dispose ()
switch ($validationAlgorithm) {
    "MD5" { $validationObject = new-object
System.Security.Cryptography.HMACMD5 }
    "SHA1" { $validationObject = new-object
System.Security.Cryptography.HMACSHA1 }
    "HMACSHA256" { $validationObject = new-object
System.Security.Cryptography.HMACSHA256 }
    "HMACSHA385" { $validationObject = new-object
System.Security.Cryptography.HMACSHA384 }
    "HMACSHA512" { $validationObject = new-object
System.Security.Cryptography.HMACSHA512 }
}
$validationKey = BinaryToHex($validationObject.Key)
$validationObject.Dispose ()
[string]::Format ([System.Globalization.CultureInfo]::InvariantCulture
,
    "<machineKey decryption={`{0}`" decryptionKey={`{1}`"
validation={`{2}`" validationKey={`{3}`" />",
    $decryptionAlgorithm.ToUpperInvariant (), $decryptionKey,
    $validationAlgorithm.ToUpperInvariant (), $validationKey)
}
}
```

[ASP.NET](#) 2.0 and 3.5 applications do not support HMACSHA256. Instead, you can specify SHA1 to generate a compatible <machineKey> element as follows:

```
PS> Generate-MachineKey -validation sha1
<machineKey decryption="AES" decryptionKey="..." validation="SHA1"
validationKey="..." />
```

As soon as you have a <machineKey> element, you can put it in the web.config file. The <machineKey> element is only valid in the web.config file at the root of your application and is not valid at the subfolder level.

```
<configuration>
  <system.web>
    <machineKey ... />
  </system.web>
</configuration>
```

For a full list of supported algorithms, run **help Generate-MachineKey** from the Windows PowerShell prompt.