



# Sitecore Publishing Service Installation and Configuration Guide

How to install and configure the Sitecore Publishing Service

April 4, 2023  
Sitecore Publishing Service 6.0.0



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# 1. Introduction

This document describes how to install and configure the Sitecore Publishing Service.

The document contains the following chapters:

- Chapter 1 - An introduction to the Sitecore Publishing Service module.
- Chapter 2 - Step-by-step instructions for installing the Sitecore Publishing Service manually or with a script.
- Chapter 3 - The various command line arguments and startup modes supported by the Sitecore Publishing Service.
- Chapter 4 - Step-by-step instructions for configuring the Sitecore Publishing Service.
- Chapter 5 - Description on how you can support high availability requirements.
- Chapter 6 - Information about the Sitecore Publishing Service API.
- Chapter 7 - Step-by-step instructions for updating the Sitecore Publishing Service.
- Chapter 8 - The Sitecore Publishing Service Support Matrix.
- Chapter 9 - Publishing Server Options

## 1.1. About the Publishing Service module

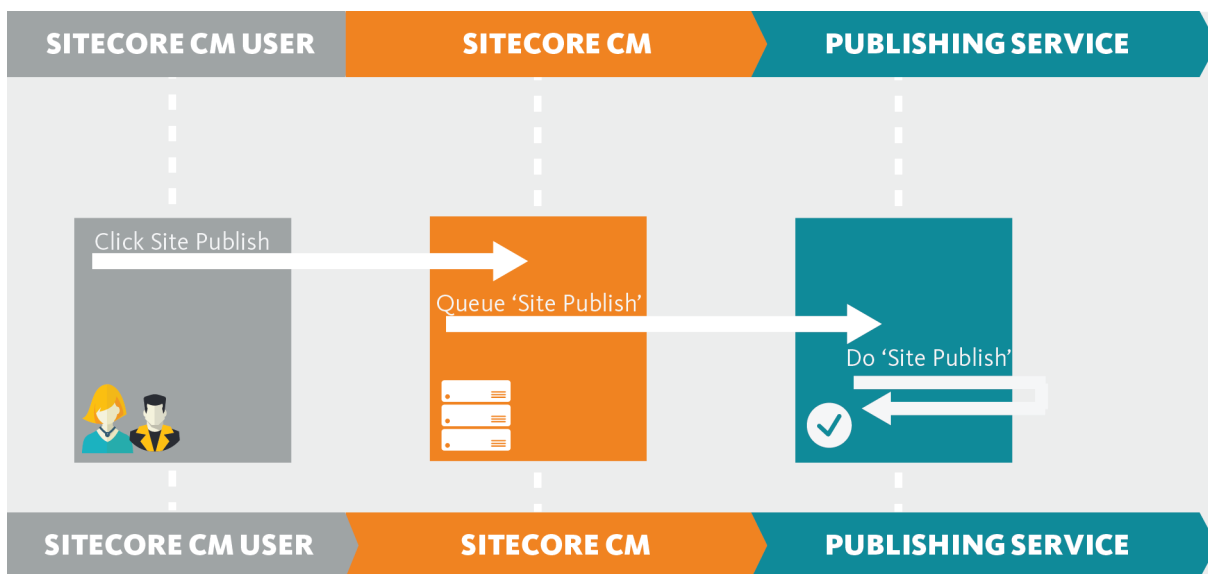
The Publishing Service module is an optional replacement for the existing Sitecore publishing methods. This module increases publishing throughput, reduces the amount of time spent publishing large volumes of items, and offers greater data consistency and reliability. The module also improves the user experience and provides better visual feedback to the user on the state of the publishing system.

The Publishing Service does not use any of the features, pipelines, and settings in the current publishing system. It is an entirely new way of publishing Sitecore items and media.

The Publishing Service runs a separate process to the Sitecore CM instance.

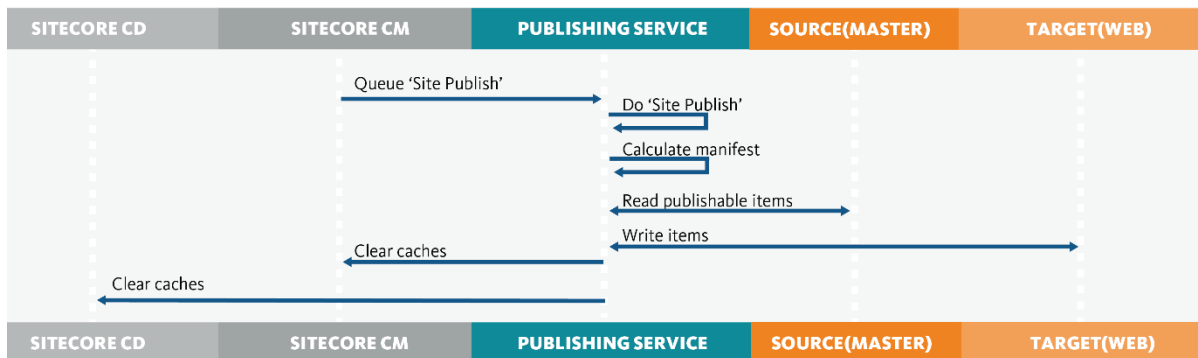
Installation involves:

1. Installation and configuration of the Publishing Service.
2. Installation of the integration module package on your Sitecore instance. The integration module ensures that every publishing action, such as triggering a site publish, is handed on to the publishing service.



When you have installed the Publishing Service, it manages the whole publishing process:

1. It queues and executes publishing jobs.
2. It connects to the Source and Target (SQL) databases directly – reading and writing items in bulk.
3. It issues events, such as cache clearing events, on Content Delivery servers.
4. It reports status information back to UI features, such as the Publishing Dashboard application.



### 1.1.1. Publishing Service concepts

The following Publishing Service concepts relate to the different stages of the publishing work that are being handled:

- **Publishing jobs**

Previously, when a user chose to publish something, the publishing dialog box remained open for the duration of the publish process. This was awkward if the user needed to reboot or if their session ended because they could not see the status of the publishing job.

The publishing service places all publishing jobs in a queue. When you request a publishing job of any kind, it is queued and then processed as soon as possible. You can see all the active, queued, and completed jobs in the **Publishing Dashboard** application.

- **Manifests**

This is the collective name for all the tasks that a publishing job performs. The Publishing Service calculates the manifest at the beginning of the publishing job, before it moves any data.

The Publishing Service looks at the items to see if there are any restrictions that would prevent them from being published:

- Valid dates/workflow states, and so on.
- Evaluating whether the item might need to be deleted.
- If it is a media file.
- If extra data needs to be moved along with the item.

Valid items are added to the manifest as a 'Manifest Step'. Each publishing target gets its own manifest. A publishing job can therefore consist of one or more manifests. The completed manifest is a list of all the items that will be used in the next stage of the process - the Promotion.

- **Promotion**

This term describes the process of moving the items and data from the source, most often the *Master* database, to one or more publishing targets, such as the *Web* database.

The Publishing Service creates a manifest and then moves it to one or more publishing targets.

- **Manifest results**

A list of the changes that were made during the promotion of the manifest. This includes things like item name changes and template updates.

At the end of the publishing job, the results are passed to the `publishEndResultBatch` pipeline in Sitecore. Developers can hook into this pipeline to work with these results and update any third-party systems or features that may need to know about the changes to items.

If there is no work to do, that is, if an item is unchanged even though it was in the manifest, a manifest result is not generated.

## 2. Installing the Sitecore Publishing Service

You can install the Sitecore Publishing Service manually or by using the utility scripts that come with the package.

This chapter describes:

- Prerequisites
- Manual Installation
- Scripted Installation
- Scales Environment considerations

### 2.1. Prerequisites

#### 2.1.1. Sitecore Publishing Service requirements

The Sitecore Publishing Service comes in a single ZIP archive:

- Sitecore Publishing Service 6.0.0-netcoreapp3.1 zip file (.NET Core application)

The .NET Core application of the Publishing Service 6.0.0 requires the .NET Core Runtime to be installed on the host machine. When running this version on Windows, we recommend to run the service under IIS, because this gives greater configurability of, for example, host addresses and port binding.

Another way to execute the service, using the command:

```
dotnet Sitecore.Framework.Publishing.Host.dll
```

The prerequisites for the Sitecore Publishing Service 6.0.0 release are:

- .NET Core 3.1.17 Runtime
- Windows Server Hosting (.NET Core)

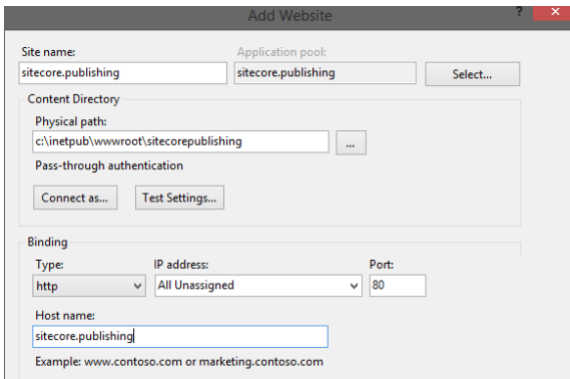
To enable the service to run under IIS, you must install the Windows Server Hosting package from the [.NET core hosting bundle 3.1.17 download page](#).

### 2.2. Manual installation

Before you install the Sitecore Publishing Service, make sure you have all the [prerequisites](#) in place.

To install the Sitecore Publishing Service manually:

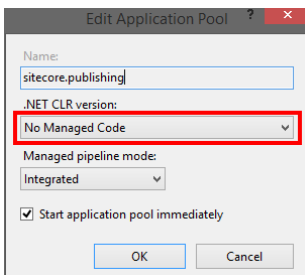
1. Download the Sitecore Publishing Service package from the [Sitecore Downloads](#) page.
2. Extract the content of the archive to a folder of your choice. For example:  
C:\inetpub\wwwroot\sitecorepublishing.
3. Create a new `sitecoreruntime` folder in the installation folder. For example:  
C:\inetpub\wwwroot\sitecorepublishing\sitecoreruntime
4. Copy the Sitecore license file to the `sitecoreruntime` folder.
5. Copy the item resource files from the CM Sitecore instance (for Sitecore 10.1 and higher). Copy dat-files for all databases except the Core preserving the folder structure. For example, from C:\inetpub\wwwroot\sitecore\App\_Data\items to C:\inetpub\wwwroot\sitecorepublishing\items\sitecore and C:\inetpub\wwwroot\sitecore\sitecore modules\items to C:\inetpub\wwwroot\sitecorepublishing\items\modules
6. In IIS, create a new site pointing to the installation folder.
7. Start the IIS Manager and in the **Connections** panel, expand **Sites**. Right-click **Sites** and then click **Add Website**.
8. In the **Add Website** dialog, fill in the required fields.



## NOTE

If you add a custom host name, you must update your hosts file (C:\Windows\System32\drivers\etc\).

9. In the IIS Manager, right-click the application pool for the website that you created, and then click **Basic Settings**.
10. In the **Edit Application Pool** dialog, in the **.NET CLR version** field, select **>No Managed Code**.

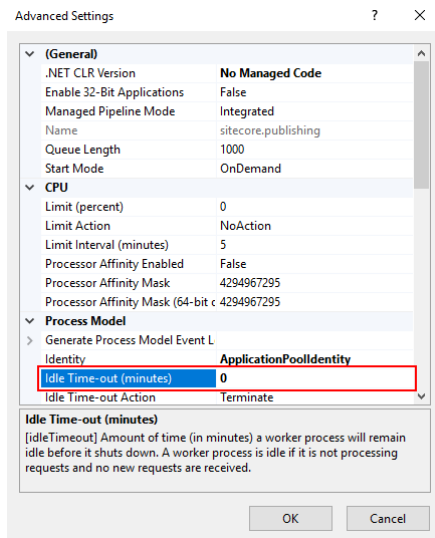




**NOTE**

The Application Pool user must have *Read*, *Execute*, and *Write* permissions to the site's physical path.

- In the IIS Manager, right-click the application pool for the website that you created, and then click **Advanced Settings**.
- In the **Advanced Settings** dialog, in the **IdleTime-out (minutes)** field, enter *0*.



- Configure the *core*, *master*, *web*, and *service* connection strings for the service along with any additional configuration values.  
For more information about the configuration command, see [SetConnectionString Command](#).

**NOTE**

Depending on which Sitecore version you are using, you might want to consider disabling the multiple link database mode as described in the Sitecore Publishing Service Module installation guide available on the [Sitecore download page](#).

- To upgrade the database schema, run the schema upgrade command from the extracted folder:

```
Sitecore.Framework.Publishing.Host.exe schema upgrade --force
```

For more information about the schema upgrade command, see [Upgrade](#).

- To access your website, enter `http://<sitename>/api/publishing/operations/status` in your browser.  
If you receive a value of `{ "status" : 0, "statusType": "Ok" }`, the application is installed correctly. If you receive any other value, check the application logs for further details.

## 2.3. Scripted installation

The Sitecore Publishing Service can be installed using commands built into the application.

To perform a scripted installation:

1. Extract the contents of the archive to a folder of your choice. For example:  
`c:\inetpub\wwwroot\publishingservice`  
This will be the location where IIS points to the service.
2. Create a new `sitecoreruntime` folder in the installation folder. For example:  
`C:\inetpub\wwwroot\publishingservice\sitecoreruntime`.
3. Copy the Sitecore license file to the `sitecoreruntime` folder.
4. Copy item resource files from the CM Sitecore instance (for Sitecore 10.1 and above). Copy dat-files for all databases except the Core preserving the folder structure. For example, from `C:\inetpub\wwwroot\sitecore\App_Data\items` to `C:\inetpub\wwwroot\sitecorepublishing\items\sitecore` and `C:\inetpub\wwwroot\sitecore\sitecore modules\items` to `C:\inetpub\wwwroot\sitecorepublishing\items\modules`.
5. To enable the execution of multiple batches on a single connection, configure the database connection strings that support Multiple Active Result Sets.

### NOTE

If the connection string does not support Multiple Active Result Sets (), it will be changed when you invoke the configuration command.

6. If the provided connection string does not already exist, it will be added to the configuration when you invoke the configuration command. Otherwise, it replaces the connection string with the same key. For example, to configure the core, master and web connection strings for the "production" environment, run the following commands:
  - `$ Sitecore.Framework.Publishing.Host --environment production configuration setconnectionstring core 'value'`
  - `$ Sitecore.Framework.Publishing.Host --environment production configuration setconnectionstring master 'value'`
  - `$ Sitecore.Framework.Publishing.Host --environment production configuration setconnectionstring web 'value'`

For more details, see [SetConnectionString Command](#).

7. Set additional configuration values as needed. For example, to set the instance name for the "production" environment:
  - Create a `production` folder in the `c:\inetpub\wwwroot\publishingservice\sitecoreruntime` folder.
  - Create a `sc.publishing.xml` file in the `c:\inetpub\wwwroot\publishingservice\sitecoreruntime\production` folder.

- Add the instance name to the `Sitecore:Publishing:InstanceName` element in the newly created `sc.publishing.xml` file. For more details about `InstanceName`, go to [On premise](#).

### NOTE

Depending on which Sitecore version you are using, you might want to consider disabling the multiple link database mode as described in the Sitecore Publishing Service Module installation guide available on the [Sitecore download page](#).

8. Update the relevant schemas. For example, to upgrade the schemas to the latest versions, run the schema command:  

```
$ Sitecore.Framework.Publishing.Host schema upgrade --force
```
9. When the instance is configured and the schemas have been upgraded, you can install it into IIS using the following command: `$ Sitecore.Framework.Publishing.Host iis install --hosts --force`  
 For more details, see [IIS Command](#).

## 2.4. Scaled environment considerations

By default Sitecore Publishing Service stores Links Data in the `Core` database.

### NOTE

The following information is only relevant if you have disabled multiple link databases on your installation.

For more information on enabling or disabling multiple link databases, see the Sitecore Publishing Service Module installation guide which is available on the [Sitecore download page](#).

If you are running the Publishing Service in a scaled environment and if your Links Data is stored in a different database than the `Core` database, you must update the Publishing Service configuration accordingly.

For example, if the Links Data is stored in the `Web` database, then the Publishing Service configuration needs the following override:

```
<?xml version="1.0" encoding="utf-8"?>
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <DefaultConnectionFactory>
            <Options>
              <Connections>
                <Links>
                  <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
```

```

        <Options>
          <ConnectionString>Web</ConnectionString>
        </Options>
      </Links>
    </Connections>
  </Options>
</DefaultConnectionFactory>
</Add>
</Services>
</Web>
<Schema>
  <Services>
    <Add>
      <DefaultConnectionFactory>
        <Options>
          <Connections>
            <Links>
              <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
            </Links>
            <Options>
              <ConnectionString>Web</ConnectionString>
            </Options>
          </Connections>
        </Options>
      </DefaultConnectionFactory>
    </Add>
  </Services>
</Schema>
<ItemRevision>
  <Services>
    <Add>
      <DefaultConnectionFactory>
        <Options>
          <Connections>
            <Links>
              <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
            </Links>
            <Options>
              <ConnectionString>Web</ConnectionString>
            </Options>
          </Connections>
        </Options>
      </DefaultConnectionFactory>
    </Add>
  </Services>
</ItemRevision>
</Commands>
</Settings>

```

**NOTE**

The `ConnectionString` nodes in the `Commands`, `Schema`, and `Services` nodes must all be set to the same value.

You must also update the database schema.

To upgrade the database schema, run the following command:

```
Sitecore.Framework.Publishing.Host.exe schema upgrade --force
```

## 3. Sitecore Publishing Service commands

This chapter covers the commands that you can use to configure or execute the Sitecore Publishing Service.

This chapter describes:

- Introduction
- Web command
- IIS command
- Configuration command
- Schema command
- ItemRevision command

### 3.1. Introduction

The Sitecore Publishing Service supports various command line arguments and startup modes. You can call the application directly to run the default command and optionally pass arguments to modify the execution.

The Web command is the default command for the application. For more details, see [Web Command](#).

#### 3.1.1. General execution format

When you execute the commands, the following applies:

- Executing the .exe will run the default command.
- Options are named, for example, `-h`, `--help`. Some of the options may require passing values.
- Arguments are passed separated with a space immediately after the command and before any options.
- Child commands are passed as named arguments immediately after the parent command.

#### 3.1.2. Logs

Any output from a command is added to a `Publishing-{data}.log` file in the `Logs` folder in the root of the Publishing Service application.

## 3.2. Web command

The Web command is the default command for the application. When the Sitecore Publishing Service starts, it loads the configuration values from the following sources:

- The Sitecore configuration files.
- The ASP.NET CORE environment variables.
- The Sitecore environment variables.
- The command line.

### NOTE

The configuration values are loaded in the above order, where the values at the command line supersede the others.

The command does not support any specific options or arguments, except from `help` and `version`. However, it does allow the passing of key-value pairs to allow starting the application with different configurations.

You can pass the following options:

Option	Template	Type	Details	Default value
Help	-?   --help	Switch	Displays help information.	

### 3.2.1. Host configuration options

To change the startup behavior of the application, you can use the following host configuration options through the command line or as environment variables:

Option	Sitecore Environment	Command line	Type	Details
Environment	SITECORE_ENVIRONMENT	--environment	Single - String	Starts the service in the specified environment.

### 3.2.2. Custom configuration values

Custom configuration values can be passed at the command line or defined through the environment. The values can be set using the following types:

Type	Example
Configuration key	<code>Publishing:InstanceName</code>
Sitecore environment variable	<code>SITECORE_Publishing__InstanceName = sps_dev</code>
Command line	<code>-- --Publishing:InstanceName "sps_dev"</code>

When you set the custom configuration values, use the following formats:

- To set the value as an environment, replace the colon ':' with a double underscore '\_\_'.
- The environment prefix consists of a type (`ASPNETCORE` or `SITECORE`) and a single underscore.
- The command line arguments must have the prefix '--'.

### 3.3. IIS command

You can install the Publishing Service into the IIS. When you run the command, the site is configured in IIS under the specified site name and port. The command creates two bindings based on the specified site name and the machine name and, if requested, it can update the `hosts` file.

When you run the commands, you may receive the following exception:

Exception	Information	Resolution
Cannot read configuration file due to insufficient permissions	One or more IIS configuration files cannot be read by the current user.	Execute the command as a user with the correct permissions.

#### 3.3.1. Install options

Use the following when you install the Publishing Service on IIS:

Option	Template	Type	Details	Default Value
Help	-?   --help	Switch	Displays help information.	
Version	--version	Switch	Displays version information.	
Verbosity	--verbosity	Single - LogLevel	Specify the level where the information is logged to the screen.	Information
Site Name	-s   --sitename	Single - String	Specify the site that must be installed.	'sitecore.publishing'
App Pool Name	-a   --apppool	Single - String	Specify the application pool for the site.	The site name
Port Number	-p   --port	Single - Int	Specify the port that must be assigned to the default binding. Must be an integer.	80
Force	--force	Switch	If the site already exists, this switch overwrites the current configuration. Without this, the command fails.	
Hosts	--hosts	Switch	Update the hosts file entry.	

For example:

- To install the service in IIS using the default values:

```
$ Sitecore.Framework.Publishing.Host iis install
```

- To install the service in IIS using specific site and app pool names:

```
$ Sitecore.Framework.Publishing.Host iis install -site publishing.service -app publishing.service
```

- To install the service in IIS using specific site and app pool names, a custom port, and update the machines hosts file (the use of force ensures that any existing site with the same name is updated):

```
$ Sitecore.Framework.Publishing.Host iis install -site publishing.service -app publishing.service --port 5001 --force -hosts
```

## 3.4. Configuration command

The configuration command allows configuration values to be persisted in the configuration files for the global or the specific environments.

When you run the commands, you might receive the following exception:

Exception	Information	Resolution
Access to the path '...' is denied	The users do not have access to change the configuration files.	Execute the command as a user with the correct permissions.

### 3.4.1. SetConnectionString command

To set or change a connection in a configuration file, use the *SetConnectionString* command.

The required arguments are:

Argument	Example	Details
Name	Core	Specify the name of the connection string that you want to configure.
Value	Data Source=.\SQLSERVER17;Initial Catalog=511108sc823_core;Integrated Security=False;User ID=***;Password=***;MultipleActiveResultSets=True; ConnectRetryCount=15;ConnectRetryInterval=1	Specify the value of the connection string. If the value does not support MARS, it will be updated.

The command options are listed below.

Option	Template	Type	Details	Default value
Help	-?   --help	Switch	Displays help information	
File Name	-f   --file	Single - String	The name of the file where changes will be persisted	sc.publishing.xml

For example:

- To set a connection string value for the Core database:



```
$ Sitecore.Framework.Publishing.Host configuration setconnectionstring core Data
Source=.\SQLSERVER17;Initial Catalog=511108sc823_core;Integrated Security=False;User
ID=***;Password=***;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1
```

- To set the Core database connection string to point to the Master connection string configuration:

```
$ Sitecore.Framework.Publishing.Host configuration setconnectionstring core
{Sitecore:Publishing:ConnectionStrings:Master}
```

## 3.5. Schema command

With the schema commands, you can install, update, and reset publishing schemas in the databases.

### NOTE

Like the [Web](#) command, all the commands allow for the configuration values to be overridden.

When you run the commands, you might receive the following exception:

Exception	Information	Resolution
Create table permission denied in database	The user connecting to the database does not have the required permissions.	Provide a connection string with the correct permissions.

### 3.5.1. Upgrade

Use the following options to upgrade the connections to the specified schemas:

### NOTE

To apply changes, you must use the `--force` flag option.

Option	Template	Type	Details	Default Value
Help	-?   --help	Switch	Displays help information.	
Version	--version	Switch	Displays version information.	
Verbosity	--verbosity	Single - LogLevel	Specify the level at which information is logged to the screen.	Information
Environment	-e --environment	Single - String	Specify the environment folder to load the connection string configuration.	Production
Schema Version	-sv   --schema-version	Single - Int	Specify the schema version to downgrade to.	0
Force	--force	Switch	Provide this option for the changes to be persisted.	

For example:

- To upgrade the schemas to the latest version:

```
$ Sitecore.Framework.Publishing.Host schema upgrade --force
```

- To upgrade the schemas to version 3:

```
$ Sitecore.Framework.Publishing.Host schema upgrade -sv 3 --force
```

### 3.5.2. Downgrade

Use the following options to downgrade schemas for connections.

#### NOTE

To apply changes, you must use the `--force` flag option.

Option	Template	Type	Details	Default Value
Help	-?   --help	Switch	Displays help information.	
Version	--version	Switch	Displays version information.	
Verbosity	--verbosity	Single - LogLevel	Specify the level at which information is logged to the screen.	Information
Environment	-e --environment	Single - String	Specify the environment folder to load the connection string configuration.	Production
Schema Version	-sv   --schema-version	Single - Int	Specify the schema version to downgrade to.	0
Force	--force	Switch	Provide this option for the changes to be persisted.	

For example:

- To downgrade the schemas to version 0:

```
$ Sitecore.Framework.Publishing.Host schema downgrade --force
```

- To downgrade the schemas to version 3:

```
$ Sitecore.Framework.Publishing.Host schema downgrade -sv 3 --force
```

### 3.5.3. Reset

Use the following options to reset the connections to use the specified schema:

#### NOTE

To apply changes, you must use the `--force` flag option.

Option	Template	Type	Details	Default Value
Help	-?   --help	Switch	Displays help information.	

Option	Template	Type	Details	Default Value
Version	--version	Switch	Displays version information.	
Verbosity	--verbosity	Single - LogLevel	The level at which information is logged to the screen.	Information
Environment	-e --environment	Single - String	Specify the environment folder to load the connection string configuration.	Production
Schema Version	-sv   --schema-version	Single - Int	Specify the schema version to downgrade to.	0
Force	--force	Switch	Provide this option for the changes to be persisted.	

For example:

- To reset the schemas to the latest version:

```
$ Sitecore.Framework.Publishing.Host schema reset --force
```

- To reset the schemas to version 3:

```
$ Sitecore.Framework.Publishing.Host schema reset -sv 3 --force
```

### 3.5.4. List

Use the following options to display information for each schema/connection:

Option	Template	Type	Details	Default Value
Help	-?   --help	Switch	Displays help information.	
Version	--version	Switch	Displays version information.	
Verbosity	--verbosity	Single - LogLevel	Specify the level at which information is logged to the screen.	Information
Details	-d   --details	Switch	Display more information for each schema.	
Environment	-e --environment	Single - String	Specify the environment folder to load the connection string configuration.	Production

For example:

- To list detailed information for all schemas:

```
$ Sitecore.Framework.Publishing.Host schema list -d
```

- To list basic information for all schemas in the 'Development' environment:

```
$ Sitecore.Framework.Publishing.Host schema list -e Development
```

## 3.6. ItemRevision command

With the `itemrevision` command, you can query and repair the item data stored in the Sitecore databases that relate to publishing.

### 3.6.1. List

Use the following options to check the format of the revision ID of each item in the Source and Target databases.

Option	Template	Type	Details
Help	-?   --help	Switch	Displays help information.
Detailed	-d   --details	Switch	Displays details of each item with an invalid revision ID.

For example:

- To list a summary of the number of invalid revision IDs in each database:  

```
$ Sitecore.Framework.Publishing.Host.exe itemrevision list
```
- To list each item with an invalid revision ID:  

```
Sitecore.Framework.Publishing.Host.exe itemrevision list -d
```

### 3.6.2. Fix

Use the `fix` command to repair the format of the revision ID of each item in the Source and Target databases.

Option	Template	Type	Details
Fix	fix	Switch	Changes each incorrect revision ID to a correct value.

For example:

- To correct each invalid revision ID for items in each database:  

```
$ Sitecore.Framework.Publishing.Host.exe itemrevision fix
```

## 4. Configuring the Sitecore Publishing Service

The Sitecore Publishing Service supports custom configurations.

This chapter contains the following sections:

- [Publishing Targets](#)
- [Configuration sources](#)
- [Configuring options](#)
- [Database configuration](#)
- [Schema configuration](#)
- [Task scheduling](#)
- [Content availability](#)
- [Transient error tolerance for SQL Azure](#)
- [Reporting field changes](#)
- [Logging configuration](#)
- [Excluding items from automatic deletion from the target databases](#)
- [Configuring the Publishing Service to use Azure Application Insights](#)
- [Troubleshooting](#)

### 4.1. Publishing targets

The Publishing Service is configured to use a single publishing target by default, - the Internet.

If you want to publish to another publishing target, you must configure it.

#### NOTE

We recommend that you create a patch file to edit the configuration files.

To configure a publishing target:

1. Add the connection string for the new publishing target database to the `ConnectionStrings` section of the configuration

```
<?xml version="1.0" encoding="utf-8"?>
<Settings>
  <Publishing>
    <ConnectionStrings>
      <stage> Data Source=.;Initial Catalog=Preview;Integrated
Security=True;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1</
stage>
    </ConnectionStrings>
  </Publishing>
</Settings>
```

```
</Publishing>
</Settings>
```

2. Add the new publishing target and resource file connections to the `DefaultConnectionFactory` configuration section.

The name of the XML element in the `DefaultConnectionFactory` section must be the same as the name of the publishing target in Sitecore.

```
<?xml version="1.0" encoding="UTF-8"?>
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
<DefaultConnectionFactory>
  <Options>
    <Connections>
      <Stage> <!--This should be the name of the target in Sitecore -->
        <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
        <LifeTime>Transient</LifeTime>
        <Options>
          <ConnectionString>Stage</ConnectionString>
          <DefaultCommandTimeout>120</DefaultCommandTimeout>
          <Behaviours>
            <backend>sql-backend-default</backend>
            <api>sql-api-default</api>
          </Behaviours>
        </Options>
      </Stage>
<StageResources>
  <Type>Sitecore.Framework.Publishing.Data.ResourceItems.ResourceConnection,
Sitecore.Framework.Publishing.Data.ResourceItems</Type>
  <LifeTime>Transient</LifeTime>
  <Options>
    <Paths>
      <Sitecore>items/sitecore/stage</Sitecore>
      <Modules>items/modules/stage</Modules>
    </Paths>
  </Options>
</StageResources>
</Connections>
</Options>
</DefaultConnectionFactory>
</Add>
</Services>
</Web>
</Commands>
</Settings>
```

### IMPORTANT

Schema and ItemRevision Command Services must be configured with the same settings. Change the `<Web>` node to `<Schema>` and `<ItemRevision>` accordingly.

3. Add the new publishing target to the `StoreFactory` configuration section.

```
<?xml version="1.0" encoding="UTF-8"?>
<Settings>
<Commands>
<Web>
```

```

<Services>
<Add>
  <StoreFactory>
    <Options>
      <Stores>
        <Targets>
          <Stage>
            <Type>Sitecore.Framework.Publishing.Data.TargetStore,
Sitecore.Framework.Publishing.Data</Type>
            <ConnectionNames>
              <stageDatabase>Stage</stageDatabase>
              <stageResources>StageResources</stageResources>
            </ConnectionNames>
            <FeaturesListName>TargetStoreFeatures</FeaturesListName>
            <Id> GUID FROM SITECORE </Id>
            <ScDatabase>stage</ScDatabase>
          </Stage>
        </Targets>
      </Stores>
    </Options>
  </StoreFactory>
</Add>
</Services>
</Web>
</Commands>
</Settings>

```

The `Id` element in the configuration file must be the same as the Sitecore GUID of the publishing target in Sitecore.

The `ScDatabase` element in the configuration file must be the same as the name of the publishing target item in Sitecore.

### IMPORTANT

Schema and ItemRevision Command Services must be configured with the same settings. Change the `<Web>` node to `<Schema>` and `<ItemRevision>` accordingly. In configuration of the TargetStore, it is important the database connection name goes first before the resource files one. Since the configuration factory can reorder elements based on their names, please make sure elements in the `<ConnectionNames>` section have names which would preserve the positional order.

4. Add a patch file to the Sitecore instance (10.2 and higher) that edits the `resourcesFiles` setting in:

`App_Config\Modules\PublishingService\Sitecore.Publishing.Service.Config`

```

<resourceFiles>
  <locations type="Sitecore.Publishing.Service.ResourceFiles.ResourceFilesLocations,
Sitecore.Publishing.Service" singleInstance="true">
    <targets hint="list:AddTargetLocation">
      <stage>$(dataFolder)/items/stage</stage>
      <modules.stage>/sitecore modules/items/stage</modules.stage>
    </targets>
  </locations>
</resourceFiles>

```

5. Copy the item resource files from the CM Sitecore instance (10.1 and higher). Copy dat-files for the Stage database preserving the folder structure. For example:

```
from
C:\inetpub\wwwroot\sitecore\App_Data\items\stage
to
C:\inetpub\wwwroot\sitecorepublishing\items\sitecore\stage
and
C:\inetpub\wwwroot\sitecore\sitecore modules\items\stage
to
C:\inetpub\wwwroot\sitecorepublishing\items\modules\stage
```

## 4.2. Configuration sources

When the Publishing Service starts up it will attempt to load configuration values from various locations:

- Configuration files on disk
- Configuration contained within environment variables set on the local machine
- Configuration passed in via command line arguments

Configuration values are loaded in strict order of precedence: File, Environment Variable, Command Line.

Configuration values set by a file on disk can be overridden by the same configuration values set as environment variables which, in turn, can be overridden by the same configuration values passed in via the command line.

### NOTE

If you apply any changes to any configuration files, you must restart the application for the changes to be re-loaded.

### 4.2.1. Configuration stored on disk

There are three locations where configuration files are loaded from:

- `<installationPath>\sitecore\Sitecore.Framework.Plugin.Publishing\config\`  
This is where the default configuration for the Publishing Service is located. These files should be considered read-only, and any changes should be made by creating your own configuration file in the user area as these files may be overridden during an upgrade.
- `<installationPath>\sitecoreruntime\_shared\config`  
You can store user configuration files in the `sitecoreruntime` folder. These normally involve overriding or patching values found in the default configuration area listed above. The configuration written to the `_shared` location will be loaded by all environments.
- `<installationPath>\sitecoreruntime\<environment>\config`  
The environment specific contains configuration for a single environment. Configuration stored here will override all previously loaded configuration.



### IMPORTANT

Do not modify the default files in the default config folder. These files are automatically overwritten during the upgrade process. Instead, create your own configuration files in an environment specific folder under `sitecoreruntime`, using the configuration patching mechanisms described in this section to make the changes you require.

## Runtime Environments

Configuration files on disk are collected into what is known as Environments. Environments are simple directories that contain a collection of configuration files that are loaded at runtime from within the `sitecoreruntime` directory.

When the Publishing Service starts up it will try and load files it finds in a single environment folder.

If an environment is not supplied, the Publishing Service will use `Production` as its default environment and try and load configuration from the `Production` folder (`<installationPath>\sitecoreruntime\production\config`) You can specify which environment is used by passing the environment name through the `--environment` command line parameter.

### 4.2.2. Configuration through environment variables

Configuration values can be set as environment variables on the local machine if required. This is useful for having machine-specific values that are stored in memory and not stored on disk (in case of security). These values will potentially overwrite the same values defined in configuration files.

### 4.2.3. Configuration through command line arguments

Configuration values can be passed in via the command line. These values will overwrite the same values defined on configuration files or in environment variables.

## 4.3. Configuration tasks

This section describes how to configure logging, how to set the connection strings, and how to override a service.

### 4.3.1. Configure logging

The Publishing Service runs on top of a Sitecore Host. Due to this, the configuration of logging is contained within a separate file called: `sitecorehost.xml`.

The default location of the `sitecorehost.xml` is in the root of the installation folder. This file should be considered read-only and any overrides should be placed in an environment-specific version of the `sitecorehost.xml` file:

`<installationPath>\sitecoreruntime\<environment>\sitecorehost.xml` For example, to set the Serilog default logging level to `Information` in the production environment:

- Create a "production" folder in the `<installationPath>\sitecoreruntime` folder.
- Create a `sitecorehost.xml` in the new production folder.

- Set the `<Sitecore><Logging><Serilog><MinimumLevel><Default>` element value to *Information* in the `<installationPath>\sitecoreruntime\production\sitecorehost.xml` file:

```
<Sitecore>
  <Logging>
    <Serilog>
      <MinimumLevel>
        <Default>Information</Default>
      </MinimumLevel>
    </Serilog>
  </Logging>
</Sitecore>
```

### 4.3.2. Set the connection strings

The connections for the Sitecore databases must be provided by the user when installing the Publishing Service. There are two methods to set the connection strings for an environment:

- Use the `configuration setconnectionstring` command.
- Edit the `<Settings><Publishing><ConnectionString>` element in the `<installationPath>\sitecoreruntime <environment>\config\sc.publishing.xml` file.

### 4.3.3. Override or add a service

You configure the Sitecore Publishing Service by registering object types per command, so that the service can replace default implementations with custom alternatives. To add a new service or replace an existing service registered with a command, create a command specific configuration file within the `\sitecoreruntime\<environment>\config` folder. Include the command name in the configuration file name. For example, to change the services registered for the `schema` command in the *development* environment, create a file named `sc.publishing.schema.command.services.xml` in the `\sitecoreruntime\development\config` folder using the structure in the sample below, then add and/or replace the services available to the command:

```
<Settings>
  <Commands>
    <Schema>
      <Services>
        <Add>
          <Type>MyCustom.Service, MyCustom</Type>
          <As>MyCustom.IService, MyCustom.Abstractions</As>
        </Add>
        <Replace>
          <Type>MyCustom.Service, MyCustom</Type>
          <As>Sitecore.Namespace.ExistingInterface, Sitecore.Namespace</As>
        </Replace>
      </Services>
    </Schema>
  </Commands>
</Settings>
```

### 4.3.4. Set options on a service

Many of the service types that are registered with a command support an optional configuration section called *Options*. When an object type supports *Options*, you can provide additional configuration values to change the behavior of the application.

To override a default option value for a service registered for a command, you must patch the service registration through configuration. For example, if the default configuration contains an element called:

```
<Settings><Command><Web><Services><Add><TreePublishHandler>:
```

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <TreePublishHandler>
            <Type>Sitecore.Framework.Publishing.PublishJobQueue.Handlers.TreePublishHandler,
Sitecore.Framework.Publishing</Type>
            <As>Sitecore.Framework.Publishing.PublishJobQueue.IPublishJobHandler,
Sitecore.Framework.Publishing.Service.Abstractions</As>
            <Options>
              <ContentAvailability>False</ContentAvailability>
            ...
```

Then, you can set the content availability to true when running in Development, by saving the following:

```
<installationPath>\sitecoreruntime\development\config\contentavailability.xml
```

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <TreePublishHandler>
            <Options>
              <ContentAvailability>True</ContentAvailability>
            ...
```

Now, when the Publishing Service starts in a development environment, content availability will be enabled.

### 4.3.5. Configuration file naming

When you create a configuration file, it must be an `.xml` file in order to be loaded. All other files are ignored. For publishing related configuration files, we recommend prefixing the file names with `sc.publishing`. For example: `sc.publishing.overrides.xml`

### 4.3.6. Reference configuration values

If you have a configuration value that needs to be referenced elsewhere, you can reference it using the syntax:

- `${ a:b:c }`

This enables you to overwrite the value in a single location, and at the same time the configuration supports its use in multiple configuration files.

For example, the default configuration file contains a connection string entry for the service that is configured to point to the *Master* connection string by default.

If you add a configuration file that contains a value for `Settings:Publishing:ConnectionStrings:Master`, the connection string is then used for both the Master database and the Service database.

```
<Settings>
  <Publishing>
    <ConnectionStrings>
      <!-- The Service connection is registered to map to the same connection string as the
master database by default. -->
      <Service>${Publishing:ConnectionStrings:Master}</Service>
    </ConnectionStrings>
  </Publishing>
</Settings>
```

Alternatively, the value at `<Settings><Publishing><ConnectionStrings><Service>` could be overwritten in another configuration file that provides an explicit connection string that should be used.

## 4.4. Database configuration

Database configuration details can be seen in the `sc.publishing.xml` configuration file.

For SQL database connections, the user defined in the connection string must have the following permissions:

- Delete
- Execute
- Insert
- Select
- Update

### NOTE

In addition, for executing the schema commands, the user must also have the `Alter` permission.

### 4.4.1. Connection strings

The connection strings are configured under `<Settings><Publishing><ConnectionStrings>`

Sitecore expects three default connection strings to be configured – `core`, `web`, and `master`, and these are referenced elsewhere in the configuration.

```
<Settings>
  <Publishing>
    <ConnectionStrings>
      <Master>Data Source=.\SQLSERVER17;Initial
Catalog=511108sc823_master;Integrated Security=False;User
ID=***;Password=***;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1</
Master>
      <Web>Data Source=.\SQLSERVER17;Initial
Catalog=511108sc823_web;Integrated Security=False;User
ID=***;Password=***;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1</Web>
      <Core>Data Source=.\SQLSERVER17;Initial
Catalog=511108sc823_core;Integrated Security=False;User
ID=***;Password=***;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1</
```

```
Core>
  </ConnectionStrings>
</Publishing>
</Settings>
```

Currently, SQL connection strings require that they support Multiple Active Result Sets (MARS), so when configuring a connection string, you must set `MultipleActiveResultSets` to true.

Use the following format or similar for connection strings:

```
Data Source=.\SQLSERVER17;Initial Catalog=511108sc823_core;Integrated Security=False;User
ID=***;Password=***;MultipleActiveResultSets=True;ConnectRetryCount=15;ConnectRetryInterval=1
```

For more information, see <https://www.connectionstrings.com/sqlconnection/>.

#### 4.4.2. DefaultConnectionFactory

In the `DefaultConnectionFactory` configuration, the connections are defined. Each connection defines its type, configuration options, and name.

The following example defines a connection called Internet that uses the `web` connection string:

```
<DefaultConnectionFactory>
  <As>Sitecore.Framework.Publishing.Data.IConnectionFactory,
Sitecore.Framework.Publishing.Service.Abstractions</As>
  <Type>Sitecore.Framework.Publishing.Data.DefaultConnectionFactory,
Sitecore.Framework.Publishing.Data</Type>
  <Options>
    <Connections>
      <Internet>
        <!-- Should match the name of the publishing target configured in SC. -->
        <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
        <LifeTime>Transient</LifeTime>
        <Options>
          <ConnectionString>Web</ConnectionString>
          <DefaultCommandTimeout>120</DefaultCommandTimeout>
          <Behaviours>
            <backend>sql-backend-default</backend>
            <api>sql-api-default</api>
          </Behaviours>
        </Options>
      </Internet>
    </Connections>
  </Options>
</DefaultConnectionFactory>
```

The following connections are configured by default:

Connections	Type	Points to
Links	SQL	Core connection string
Service	SQL	Service connection string
Master	SQL	Master connection string
Internet	SQL	Web connection string

#### 4.4.3. StoreFactory

The `StoreFactory` configuration configures stores in the application that bind one or more connections to a collection of features.

The configuration of Stores is divided into the following sections:

Store Type	Connections	Details
Service	Service	The store containing service data.
Sources	Master	The store(s) for source data. Each source can register multiple connections.
Targets	Internet	The store(s) for target data. Each entry is a possible publish target.
ItemsRelationship	Links	The store for relationship information.
Custom	User defined	Optional custom data stores can be configured.

The following example defines the Sources and Targets sections:

```
<StoreFactory>
  <As>Sitecore.Framework.Publishing.Data.IStoreFactory,
Sitecore.Framework.Publishing.Service.Abstractions</As>
  <Type>Sitecore.Framework.Publishing.Data.DefaultStoreFactory,
Sitecore.Framework.Publishing.Data</Type>
  <Options>
    <Stores>
      <Sources>
        <Master>
          <Type>Sitecore.Framework.Publishing.Data.SourceStore,
Sitecore.Framework.Publishing.Data</Type>
          <ConnectionNames>
            <master>Master</master>
            <resources>MasterResources</resources>
          </ConnectionNames>
          <FeaturesListName>SourceStoreFeatures</FeaturesListName>
          <!-- The name of the Database entity in Sitecore. -->
          <ScDatabase>master</ScDatabase>
        </Master>
      </Sources>
      <Targets>
        <!--Additional targets can be configured here-->
        <Internet>
          <Type>Sitecore.Framework.Publishing.Data.TargetStore,
Sitecore.Framework.Publishing.Data</Type>
          <ConnectionNames>
            <internet>Internet</internet>
            <resources>WebResources</resources>
          </ConnectionNames>
          <FeaturesListName>TargetStoreFeatures</FeaturesListName>
          <!-- The id of the target item definition in Sitecore. -->
          <Id>8E080626-DDC3-4EF4-A1D1-F0BE4A200254</Id>
          <!-- The name of the Database entity in Sitecore. -->
          <ScDatabase>web</ScDatabase>
        </Internet>
      </Targets>
    </Stores>
  </Options>
</StoreFactory>
```

## NOTE

The Sources and Targets must set the `ScDatabase` property. Targets must also set the `Id` property.

#### 4.4.4. StoreFeatureLists

The `StoreFeatureLists` configuration specifies the list of features that are available on a specific store.

In the following example, the features that are available to the source store are several repositories. A store feature list is linked back to a store through its name that is stored in the `FeatureListName` element.

```
<StoreFeaturesLists>
  <Options>
    <FeatureLists>
      <!--Source Store Features-->
      <SourceStoreFeatures>
        <ItemReadRepositoryFeature>
          <Type>Sitecore.Framework.Publishing.Data.CompositeItemReadRepository,
Sitecore.Framework.Publishing.Data</Type>
        </ItemReadRepositoryFeature>
        <TestableContentRepositoryFeature>
          <Type>Sitecore.Framework.Publishing.Data.CompositeTestableContentRepository,
Sitecore.Framework.Publishing.Data</Type>
        </TestableContentRepositoryFeature>
        <WorkflowStateRepositoryFeature>
          <Type>Sitecore.Framework.Publishing.Data.CompositeWorkflowStateRepository,
Sitecore.Framework.Publishing.Data</Type>
        </WorkflowStateRepositoryFeature>
        <EventQueueRepositoryFeature>
          <Type>Sitecore.Framework.Publishing.Data.CompositeEventQueueRepository,
Sitecore.Framework.Publishing.Data</Type>
        <options>
          <ConnectionName>master</ConnectionName>
        </options>
        </EventQueueRepositoryFeature>
      </SourceStoreFeatures>
    </FeatureLists>
  </Options>
</StoreFeaturesLists>
```

#### 4.4.5. Custom data providers

To support multiple providers of data for a source store, you can add custom data providers to the system.

To add custom data providers to the system:

1. Create a class that implements the `IIndexableItemReadRepository` interface. The following three methods are contained with the type:
  - `GetItemNodeDescriptors` – this method must be implemented to return all the items contained within the custom data provider. The `IItemNodeDescriptor` interface only contains a small number of properties to represent each item.
  - `GetItemNodes` – this method returns `IEnumerable<IItemNode>` when a list of item GUIDs is supplied. The `IItemNode` represents an item including its field data.
  - `GetVariants` – this method returns `IEnumerable<ItemVariant>` when supplied with a list of `IDataLocators`. The `ItemVariant` represents an item variant (language and version) and its corresponding fields.

2. Create a connection class. You can inherit from `IConnection`, or use an existing type (for example, `SQLDatabaseConnection`).
3. Create a repository builder by implementing `DefaultRepositoryBuilder<IItemReadRepository, TRepo, TConnection>`, where:
  - `TRepo` is what you entered in step 1
  - `TConnection` is what you entered in step 2.
4. Update the configuration:

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <!-- Register the custom repository builder -->
          <MyCustomItemReadRepositoryBuilder>
            <Type>My.Custom.ItemReadRepositoryBuilder, My.Custom</Type>

<As>Sitecore.Framework.Publishing.Repository.IRepositoryBuilder`1[[Sitecore.Framework.Pu
blishing.Item.IIndexableItemReadRepository,
Sitecore.Framework.Publishing.Service.Abstractions]],
Sitecore.Framework.Publishing.Service.Abstractions</As>
            </MyCustomItemReadRepositoryBuilder>

        <DefaultConnectionFactory>
          <Options>
            <Connections>
              <!-- Register the custom connection -->
              <Custom>
                <Type>My.Custom.FileSystemProvider.FileSystemConnection, My.Custom</Type>
                <Lifetime>Transient</Lifetime>
                <Options>
                  <IdTablePrefix>pubExample</IdTablePrefix>
                  <IdTableConnection>Master</IdTableConnection>
                  <RootFolder>C:\sitecoredata\Data\CustomItems</RootFolder>
                </Options>
              </Custom>
            </Connections>
          </Options>
        </DefaultConnectionFactory>
      <StoreFactory>
        <Options>
          <Stores>
            <Sources>
              <Master>
                <!-- add the connection to the master source -->
                <ConnectionNames>
                  <custom>Custom</custom>
                </ConnectionNames>
              </Master>
            </Sources>
          </Stores>
        </Options>
      </StoreFactory>
        </Add>
      </Services>
    </Web>
  </Commands>
</Settings>
```



**NOTE**

Currently, the publishing service supports reading from a custom data provider, for example, reading from a customized source and then publishing that data as Sitecore items to the target database.

## 4.5. Schema configuration

During startup, the Sitecore Publishing Service checks whether the latest version of the schema is installed. If the schema needs to be updated, the service shuts down.

You can use the [schema command](#) to update and install schemas in the registered connections.

A schema is defined as a DLL that contains a set of resources for preparing a connection for its role in the service. The resources are organized into versions to support incremental schema upgrade and downgrade. This means that, in the example of an SQL schema, the DLL contains multiple scripts for dropping and recreating tables, stored procedures, and other requirements for accessing SQL data.

Schemas can be split, based on their feature set and/or their connection type and they are configured under:

```
<Settings><Commands><Web><Services><SchemaInstaller><Options>
```

and

```
<Settings><Commands><Schema><Services><SchemaInstaller><Options>
```

The following code sample is the default schema configuration that defines the suite of schemas that are installed by the schema update tool:

```
<Settings>
<Commands>
<Web>
<Services>
<Add>
  <SchemaInstaller>
    <Options>
      <!--
      The DeploymentMap defines which schemas are loaded into which connection
      -->
      <DeploymentMap>
        <Custom>
          <Links>
            <Common>Common</Common>
            <Data-Common>Data-Common</Data-Common>
            <Data-Links>Data-Links</Data-Links>
          </Links>
        </Custom>
        <Service>
          <Common>Common</Common>
          <Service>Service</Service>
        </Service>
        <Source>
          <Common>Common</Common>
          <Data-Common>Data-Common</Data-Common>
```

```

        <Data-Source>Data-Source</Data-Source>
    </Source>
    <Target>
        <Common>Common</Common>
        <Data-Common>Data-Common</Data-Common>
        <Data-Target>Data-Target</Data-Target>
    </Target>
</DeploymentMap>
<!--
    The schemas bind names from the DeploymentMap to a Type/Assembly containing sql
schemas to be loaded
-->
<Schemas>
    <Common>Sitecore.Framework.Publishing.Common.Sql.Schema,
Sitecore.Framework.Publishing.Common.Sql.Schema</Common>
    <Data-Common>Sitecore.Framework.Publishing.Data.Common.Sql.Schema,
Sitecore.Framework.Publishing.Data.Common.Sql.Schema</Data-Common>
    <Data-Links>Sitecore.Framework.Publishing.Data.Links.Sql.Schema,
Sitecore.Framework.Publishing.Data.Links.Sql.Schema</Data-Links>
    <Data-Source>Sitecore.Framework.Publishing.Data.Source.Sql.Schema,
Sitecore.Framework.Publishing.Data.Source.Sql.Schema</Data-Source>
    <Data-Target>Sitecore.Framework.Publishing.Data.Target.Sql.Schema,
Sitecore.Framework.Publishing.Data.Target.Sql.Schema</Data-Target>
    <Service>Sitecore.Framework.Publishing.Service.Sql.Schema,
Sitecore.Framework.Publishing.Service.Sql.Schema</Service>
</Schemas>
</Options>
</SchemaInstaller>
</Add>
</Services>
</Web>
</Commands>
</Settings>

```

### 4.5.1. The Deployment Map

The `DeploymentMap` section maps the schemas to connection types.

The following code sample binds the `Common`, `Data-Common`, and `Data-Links` schemas that must be installed on the custom `Links` connection. The `Common` and `Service` schemas are installed on the `Service` connection.

```

<DeploymentMap>
  <Custom>
    <Links>
      <Common>Common</Common>
      <Data-Common>Data-Common</Data-Common>
      <Data-Links>Data-Links</Data-Links>
    </Links>
  </Custom>
  <Service>
    <Common>Common</Common>
    <Service>Service</Service>
  </Service>

```

### 4.5.2. Schemas

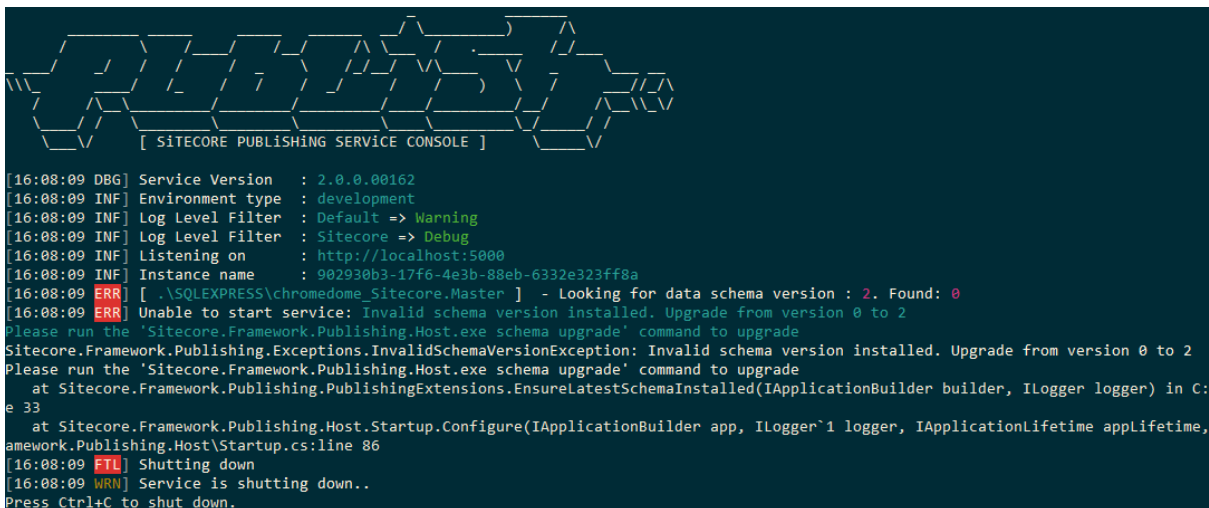
The `Schemas` section names all the schemas that are installed.

Each configuration value should point to a type in an assembly where the schemas can be discovered. The following code sample names the `Sitecore.Framework.Publishing.Common.Sql.Schema` assembly as `Common` and the `Sitecore.Framework.Publishing.Data.Common.Sql.Schema` assembly as `Data-Common`:

```
<Schemas>
  <Common>Sitecore.Framework.Publishing.Common.Sql.Schema,
Sitecore.Framework.Publishing.Common.Sql.Schema</Common>
  <Data-Common>Sitecore.Framework.Publishing.Data.Common.Sql.Schema,
Sitecore.Framework.Publishing.Data.Common.Sql.Schema</Data-Common>
```

### 4.5.3. Validating schemas

When the publishing service starts, it checks whether the latest schema is installed. The version of the installed schemas retrieved from the `PublishingSchema` table is compared to the schema version in the resource file. If a schema upgrade is needed, the service will shut down and log an error message telling you to upgrade the schema.



```
[ SITECORE PUBLISHING SERVICE CONSOLE ]

[16:08:09 DBG] Service Version      : 2.0.0.00162
[16:08:09 INF] Environment type   : development
[16:08:09 INF] Log Level Filter  : Default => Warning
[16:08:09 INF] Log Level Filter  : Sitecore => Debug
[16:08:09 INF] Listening on      : http://localhost:5000
[16:08:09 INF] Instance name    : 902930b3-17f6-4e3b-88eb-6332e323ff8a
[16:08:09 ERR] [ .\SQLEXPRESS\chromedome_Sitecore.Master ] - Looking for data schema version : 2. Found: 0
[16:08:09 ERR] Unable to start service: Invalid schema version installed. Upgrade from version 0 to 2
Please run the 'Sitecore.Framework.Publishing.Host.exe schema upgrade' command to upgrade
Sitecore.Framework.Publishing.Exceptions.InvalidSchemaVersionException: Invalid schema version installed. Upgrade from version 0 to 2
Please run the 'Sitecore.Framework.Publishing.Host.exe schema upgrade' command to upgrade
   at Sitecore.Framework.Publishing.PublishingExtensions.EnsureLatestSchemaInstalled(IApplicationBuilder builder, ILogger logger) in C:\
e 33
   at Sitecore.Framework.Publishing.Host.Startup.Configure(IApplicationBuilder app, ILogger`1 logger, IApplicationLifetime appLifetime,
amework.Publishing.Host\Startup.cs:line 86
[16:08:09 FTL] Shutting down
[16:08:09 WRN] Service is shutting down..
Press Ctrl+C to shut down.
```

## 4.6. Task scheduling

The task scheduler is a service that manages the creation of tasks at start up as well as enabling the addition and execution of tasks at runtime.

### 4.6.1. Configure tasks

The Publishing Service enables you to configure independent tasks in the system. It contains four task definitions by default:

- `PublishTask` – the task that handles requests to publish items from sources to targets.
- `PublishJobCleanUpTask` – the task that handles the periodic clean-up of historical publishing jobs.
- `PublishOperationCleanUpTask` – the task that removes publishing operations that have been processed.

- `PublishOperationAgeBasedCleanUpTask` - the task that handles periodic clean-up of historical publishing operations.

To update the task configurations:

1. Navigate to the  
`<installationPath>\sitecore\Sitecore.Framework.Plugin.Publishing\config\` folder.

#### NOTE

Do not edit files directly in this folder. Instead, create a patch file.

2. To create a patch file for task configuration, copy the `sc.publishing.web.command.services.xml` file to one of the following folders:
  - `<installationPath>\sitecoreruntime\_shared\config`
  - `<installationPath>\sitecoreruntime<environment>\config`
3. Open the patch file for editing. In the `Scheduler` node, update the task definitions. Save the file.

## Publishing Service task definitions

By default, the Publishing Service includes four task definitions you can [configure](#). This topic explains the triggers and options for these tasks.

### PublishTask

The `PublishTask` task definition is configured with two triggers:

- `Interval` - the interval trigger runs every few seconds to check for publishing jobs that were requested while the previous publishing job was running.
- `Event` - the event-based trigger causes a publishing job to start immediately after it is requested. If a publishing job is already being processed, the job is delayed until the next interval.

### PublishJobCleanUpTask

The `PublishJobCleanUpTask` task definition removes old publishing jobs from the database to prevent the buildup of data over time. It has a single trigger raising on an infrequent schedule to remove jobs over a week old.

You can configure the task by changing its options:

- `JobAge` - the time that must have passed since a publishing job's `Stopped` time. The default value is 7 days. If a publishing job's `Stopped` time is older than the `JobAge`, it is eligible for clean-up.
- `BatchSize` - this is the number of items in the batch that can be deleted together. The default value is 50.

### PublishOperationCleanUpTask

The `PublishOperationCleanUpTask` task definition removes any publishing operations that have been processed and are no longer required.

You can configure the task by changing this option:

- `Interval` – the interval trigger determines how often Sitecore runs this task. The default value is 1 day.

### PublishOperationAgeBasedCleanupTask

The `PublishOperationAgeBasedCleanupTask` task definition removes old publishing operations.

You can configure the task by changing its options:

- `PublisherOperationAge` – the task removes any publishing operations older than the value specified here. The default value is 30 days.
- `Interval` – the interval trigger determines how often the task runs. The default value is 1 day.

## 4.6.2. Defining a task

When you have implemented a task, it must be added to the configuration so that it can be created at startup:

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <Scheduler>
            <Options>
              <Tasks>
                <CustomTask>
                  <TaskDefinition Type="Custom.Task, Custom" BindOptions="property">
                    <Options>
                      <Id>Custom Task</Id>
                      <Categories>
                        <Custom>Custom</Custom>
                        <Other>Other</Other>
                      </Categories>
                    </Options>
                  </TaskDefinition>
                </CustomTask>
              </Tasks>
            </Options>
          </Scheduler>
        </Add>
      </Services>
    </Web>
  </Commands>
</Settings>
```

A task can expose additional parameters, such as `ID` and `Categories`, to help identify the task when the system is running.

## 4.6.3. Defining a trigger

A task cannot run if there are no triggers associated with it. Each trigger is a unique instance, so you can register multiple triggers of the same type. For example, two interval triggers could be registered that trigger a task at different polling intervals:

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <Scheduler>
            <Options>
```

```

<Tasks>
  <CustomTask>
    <TaskDefinition Type="Custom.Task, Custom" BindOptions="property">
      <Options>
        <Id>Custom Task</Id>
        <Categories>
          <Custom>Custom</Custom>
          <Other>Other</Other>
        </Categories>
      </Options>
    </TaskDefinition>
    <TriggerDefinitions>
      <Interval1
Type="Sitecore.Framework.Scheduling.Triggers.IntervalTriggerDefinition,
Sitecore.Framework.Scheduling" BindOptions="property">
        <Options Interval="00:10:00" /> <!-- Raise every ten minutes -->
      </Interval1>
      <Interval2
Type="Sitecore.Framework.Scheduling.Triggers.IntervalTriggerDefinition,
Sitecore.Framework.Scheduling" BindOptions="property">
        <Options Interval="00:00:10" /> <!-- Raise every ten seconds -->
      </Interval2>
    </TriggerDefinitions>
  </CustomTask>
</Tasks>
</Options>
</Scheduler>
</Add>
</Services>
</Web>
</Commands>
</Settings>

```

## 4.7. Content availability

The content availability feature ensures that the valid version of an item is always available in the target database at the time of publishing. In this way, you do not have to perform a publishing operation every time an item version expires, and the next version should be displayed.

You must enable content availability on the Content Delivery (CD) server and on the Content Management (CM) server.

### NOTE

Content availability is not compatible with [content testing for experience optimization](#). If you want to use content testing, you must first disable content availability.

When you enable content availability and publish an item, the currently valid item version and all the versions that are valid for future publishing are moved from the source database to the target database. A new pipeline that is enabled in the content availability configuration file automatically clears the Sitecore item cache when an item version expires and then, when a contact accesses the item, the next valid version is displayed.

**IMPORTANT**

If you are using HTML caching on a rendering, the Sitecore item cache does not automatically clear. In addition, if you use a data source inside a rendering, and if the data source item switches to display a new version, the hosting rendering is not updated because there is nothing that indicates that an update of a dependent data source has been triggered.

**4.7.1. Configure content availability on the CD server and on the CM server**

You must enable content availability on the Content Delivery (CD) server and on the Content Management (CM) server.

To configure content availability on the CD server and on the CM server:

1. Place the `Sitecore.Publishing.Service.Delivery.dll` in the bin directory of the server.
2. Copy the `Sitecore.Publishing.Service.ContentAvailability.config` file to the server and enable it.
3. If you use Solr for content search, enable the `Sitecore.Publishing.Service.ContentAvailability.solr.config` file.
4. Restart your instance.

When an item is indexed the computed fields below stores the valid inception and expiry dates for each version. When a query is issued to content search then the `isAvailable` flag is checked to ensure the hiding and display of the valid versions in a search context that matches the behavior of the Item API.

The content availability functionality adds the following fields:

- Computed fields:
  - `versionsunrisedate`
  - `versionsunsetdate`
  - `publishablefrom`
  - `publishableto`
- Virtual field:
  - `isAvailable`

**Publishing service setup**

To enable content availability in the Publishing Service:

1. Copy `sitecore\Sitecore.Framework.Plugin.Publishing\config\sc.publishing.contentavailability.xml.disabled` to the `sitecoreruntime\<environment>\config` directory of the Publishing Service, then enable the file by removing the `.disabled` extension.
2. Restart the Publishing Service.
3. With DEBUG logging enabled, ensure that the Content Availability status is set to ON.

When the content availability is enabled, the:

- Filter items pipeline enables publication checks on items as they come out of the database.
- `GetLinqFilter` processor and `VirtualField` amend a publication check to each LINQ query going out so that non-published data does not show.

### IMPORTANT

It is possible to misconfigure an items validity period so that it becomes invalid and disappears. For example, if you set the **PublishFrom** field to *02nd January 2017* and the **PublishTo** field to *1st January 2017*, the item does not have a valid date range that allows the item to be displayed. In Content Editor, in the Publishing Viewer, you can see a visual representation of the date range of an item or item version and diagnose these sorts of errors.

## 4.8. Transient error tolerance for SQL Azure

If you host any application databases in SQL Azure, Microsoft recommends that you implement a retry strategy for all the database requests to overcome any transient errors that might occur due to the nature of a shared cloud infrastructure.

### NOTE

For more information about transient errors in SQL Azure, see: [http://social.technet.microsoft.com/wiki/contents/articles/18665.cloud-service-fundamentals-data-access-layer-transient-fault-handling.aspx#Timeouts\\_amp\\_Connection\\_Management](http://social.technet.microsoft.com/wiki/contents/articles/18665.cloud-service-fundamentals-data-access-layer-transient-fault-handling.aspx#Timeouts_amp_Connection_Management).

The Publishing Service provides an implementation of this retry behavior for ADO.NET database requests, however, you must explicitly enable the behavior via configuration according to which databases are hosted on SQL Azure:

- The retry behavior is defined in:  
`\sitecore\Sitecore.Framework.Plugin.Publishing\config\sc.publishing.sqlazure.xml.example`  
Copy the file to the required environment folders under `sitecoreruntime`, then enable the file by removing the `.example` extension.
- A typical configuration setup is provided with the Publishing Service in:  
`\sitecore\Sitecore.Framework.Plugin.Publishing\config\sc.publishing.sqlazure.connections.xml.example`  
Copy the file to the required environment folders under `sitecoreruntime`, then edit the file accordingly and enable it by removing the `.example` extension.

For more information about editing this file, see [SQL Azure Configuration](#). To run these files in an “azure” environment, copy them to `\sitecoreruntime\azure\config`. You can move these files into a different environment folder to achieve a different behavior.



### 4.8.1. Connection behaviors

By default, the Publishing Service comes with the concept of connection behaviors that provide the opportunity for transient errors to be mitigated seamlessly in the application for ADO.NET connections.

When submitting a request to the database in the Publishing Service with ADO.NET, a connection behavior is chosen according to the connection used and the context in which the request is made.

The context is a Data Access Context, which is either `api` or `backend`, depending on the type of work that is performed in each part of the system:

- `api` – when the data is being processed to serve a request for information from an out-of-process component (for example, the publishing service API).
- `backend` – when data is being processed as part of a background operation (for example, a publishing job).

#### NOTE

Microsoft recommends that you configure the `api` and `backend` contexts differently with regards to transient error handling.

A connection behavior is essentially a component that can wrap each command sent to the database, and thereby catch any exceptions that get returned, and repeat the command any number of times if necessary.

By default, the Publishing Service is configured with a `no_retry` connection behavior for all connections and contexts, which is essentially a `null` behavior that does not provide any additional logic.

### 4.8.2. Default Configuration

The connection behaviors are configured for the `web`, `schema` and `itemrevision` commands in the following sections of the configuration:

- `\Settings\Commands\Web\Add\Services\DbConnectionBehaviours`
- `\Settings\Commands\Schema\Add\Services\DbConnectionBehaviours`
- `\Settings\Commands\ItemRevision\Add\Services\DbConnectionBehaviours`

The connection behavior used when a request is made to a database is chosen according to the current Data Access Context, and the name of the connection behavior configured for the current connection.

The following sample is an extract from the default configuration for the Service connection, where you can see that the Service connection is configured to use the `sql-backend-default` and `sql-api-default` behaviors for the `api` and `backend` contexts respectively.

```
<Service>
  <Type>Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection,
Sitecore.Framework.Publishing.Data</Type>
  <LifeTime>Transient</LifeTime>
  <Options>
    <ConnectionString>${Publishing:ConnectionStrings:Service}</ConnectionString>
    <DefaultCommandTimeout>120</DefaultCommandTimeout>
    <Behaviours>
      <backend>sql-backend-default</backend>
```

```

    <api>sql-api-default</api>
  </Behaviours>
</Options>
</Service>

```

The following sample is an extract from the default configuration of the two connection behaviors. This configuration defines the command time and a retryer (by name) that are used for the connection behavior.

The `retryers` section within the `sc.publishing.services.xml` defines the configuration of the available retryers.

```

<DbConnectionBehaviours>
  <Options>
    <Entries>
      <!-- Used for all DatabaseConnections created in backend contexts (typically
publishing jobs). -->
      <sql-backend-default>
        <Type>Sitecore.Framework.Publishing.Data.AdoNet.NoRetryConnectionBehaviour,
Sitecore.Framework.Publishing.Data</Type>
        <Options>
          <Name>Default Backend No Retry behaviour</Name>
          <CommandTimeout>120</CommandTimeout>
          <Retryer>NoRetryer</Retryer>
        </Options>
      </sql-backend-default>

      <!-- Used for all DatabaseConnections created in API contexts. -->
      <sql-api-default>
        <Type>Sitecore.Framework.Publishing.Data.AdoNet.NoRetryConnectionBehaviour,
Sitecore.Framework.Publishing.Data</Type>
        <Options>
          <Name>Default Api No Retry behaviour</Name>
          <CommandTimeout>10</CommandTimeout>
          <Retryer><NoRetryer/Retryer>
        </Options>
      </sql-api-default>

    </Entries>
  </Options>
</DbConnectionBehaviours>

```

### 4.8.3. SQL Azure configuration

The connection behaviors in the Publishing Service are aligned with the recommendations from Microsoft on mitigating transient errors in SQL Azure.

They are specified in the `\sitecore\Sitecore.Framework.Plugin.Publishing\config\sc.publishing.sqlazure.xml.example` file. If you are running the Publishing Service in Azure, the `sc.publishing.sqlazure.xml` file should be applied as a configuration patch. For more information, see [Configuration Sources](#). In this file, the following two connection behaviors are added:

```

<sql-backend-azure>
  <Type>Sitecore.Framework.Publishing.Data.AdoNet.ConnectionRetryBehaviour,
Sitecore.Framework.Publishing.Data</Type>
  <Options>
    <Name>SQL Azure Backend Exponential Backoff</Name>
    <CommandTimeout>120</CommandTimeout>
    <Retryer>DefaultExponentialRetry</Retryer>
  </Options>
</sql-backend-azure>
<sql-api-azure>

  <Type>Sitecore.Framework.Publishing.Data.AdoNet.ConnectionRetryBehaviour,

```

```

Sitecore.Framework.Publishing.Data</Type>
  <Options>
    <Name>SQL Azure API Fixed Backoff</Name>
    <CommandTimeout>10</CommandTimeout>
    <Retryer>DefaultFixedIntervalRetry</Retryer>>
  </Options>
</sql-api-azure>

```

The two connection behaviors use the Transient Fault Handling Application Block from Microsoft to perform the retrying, and to identify a failure as being a transient failure.

For more information, see <http://topaz.codeplex.com/>.

To use these connection behaviors, the ADO.NET connections that represent databases hosted on SQL Azure must be configured to use them. In the `\sitecore\Sitecore.Framework.Plugin.Publishing\config\sc.publishing.sqlazure.connections.xml.example` file, you can see an example of how this configuration should be specified for the web command. It specifies the configuration to set all connections to use the SQL Azure connection behaviors and must be edited according to the deployment:

```

<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <DefaultConnectionFactory>
            <Options>
              <Connections>
                <Links>
                  <Options>
                    <Behaviours>
                      <backend>sql-backend-azure</backend>
                      <api>sql-api-azure</api>
                    </Behaviours>
                  </Options>
                </Links>
              <Service>
                <Options>
                  <Behaviours>
                    <backend>sql-backend-azure</backend>
                    <api>sql-api-azure</api>
                  </Behaviours>
                </Options>
              </Service>
            </Options>
          </Master>
        </Add>
      </Services>
    </Web>
  </Commands>
  <Internet>
    <Options>
      <Behaviours>
        <backend>sql-backend-azure</backend>
        <api>sql-api-azure</api>
      </Behaviours>
    </Options>
  </Internet>
</Connections>
</Options>

```

```
</DefaultConnectionFactory>
  </Add>
</Services>
</Web>
</Commands>
</Settings>
```

## 4.9. Reporting field changes

By default, the Publishing Service reports on field changes that occur on a number of standard fields. The field changes are available in the `publishEndResultBatch` pipeline that has a processor with args of `Sitecore.PublishEndResultBatchArgs` in the `Sitecore.PublishEndResultBatchArgs` processor. The `ReportPublishFieldsResolver` service in the `sc.publishing.web.command.services.xml` configuration file specifies the fields in which changes will be reported. You can add additional fields into the `ReportPublishFieldResolver` service, for example:

```
<ReportPublishFieldsResolver>
<options>
  <AdditionalInvariantItemFieldsIds>
    <f1>Field Guid Here</f1>
    <f2>Field Guid Here</f2>
  </AdditionalInvariantItemFieldsIds>
  <AdditionalLanguageVariantFieldsIds>
    <f1>Field Guid Here</f1>
    <f2>Field Guid Here</f2>
  </AdditionalLanguageVariantFieldsIds>
  <AdditionalVariantFieldsIds>
    <f1>Field Guid Here</f1>
    <f2>Field Guid Here</f2>
  </AdditionalVariantFieldsIds>
</options>
</ReportPublishFieldsResolver>
```

## 4.10. Logging configuration

The Microsoft Extensions Logging framework is used throughout the system to emit log messages. For more information, see: <https://github.com/aspnet/Logging>.

Serilog is the default logging provider configured in the Host. This comes with a large number of sinks that can be configured for many use cases. For more information, see: <https://github.com/serilog/serilog/wiki/Provided-Sinks>.

### NOTE

By default, a single file sink is configured.

The Microsoft Extensions Logging framework is based on the concept of logging levels, which are defined below in the order of significance:

- Trace
- Debug
- Information
- Warning
- Error
- Critical
- None

Each component that emits log messages in the system, by convention, does this through a logger object named with the fully qualified class name of the owning component. Therefore, there are many named loggers across the system that each emit log messages on any of the above levels.

#### 4.10.1. Log configuration location

You can find the default logging configuration in the `sitecorehost.xml` file of the publishing service installation.

You can see an example of a logging override configuration in the `sitecorehost.development.xml` file of the publishing service installation.

Both of these files are stored in the root folder of the Publishing Service.

#### 4.10.2. Configuring Logger Levels (Filters)

The level of messages that each named logger is permitted to emit can be specified in the configuration.

The `Filters` section in the example below, specifies the minimum logging level for all loggers that have a name with a matching prefix.

For example, `<Sitecore>Information</Sitecore>` specifies that only log messages at the *Information* level or above will be emitted by loggers created in the Sitecore namespace.

- To enable logging at other levels throughout the system, add additional entries, for example:

```
<Sitecore.Framework.Publishing.DataPromotion>Debug>/  
Sitecore.Framework.Publishing.DataPromotion>
```

If no matched filter is found, the `Default` log level filter is used:

```
<Sitecore>  
  <Logging>  
    <Filters>  
      <Sitecore>Information</Sitecore>  
      <Default>Warning</Default>  
    </Filters>  
  </Logging>  
</Sitecore>
```

- To customize the log levels, you override or add additional log filters. The following example adds a configuration for types in the `My.Custom.Code` namespace to log at the `Debug` level. It also changes loggers in the `Sitecore.Framework.Scheduling` namespace to log at the `Debug` level:

```
<Sitecore>  
  <Logging>
```

```
<My.Custom.Code>Debug</My.Custom.Code>
<Sitecore.Framework.Scheduling>Debug</Sitecore.Framework.Scheduling>
</Logging>
</Sitecore>
```

### 4.10.3. Configuring Serilog

To configure Serilog the `ConfigureLogging` element must specify the Serilog configure logging type as shown below.

The Serilog provider can be configured with many sinks. This configuration is for the default logging configuration for Serilog:

```
<Sitecore>
  <Logging>
    <ConfigureLogging>Sitecore.Framework.Logging.Serilog.ConfigureSitecoreLogging,
      Sitecore.Framework.Logging.Serilog</ConfigureLogging>
    <Serilog>
      <WriteTo>
        <DefaultLogger>
          <Name>RollingFile</Name>
          <Args>
            <pathFormat>logs\Publishing-{Date}.log</pathFormat>
          </Args>
        </DefaultLogger>
      </WriteTo>
    </Serilog>
  </Logging>
</Sitecore>
</Sitecore>
```

### 4.10.4. Console and File Sinks

Serilog supports many different sinks, each sink type is delivered in its own NuGet package. The Publishing Service comes with the console and file sinks included. The default configuration above tells Serilog to put all logs produced by the service into a logs folder stored at the application install path, and log messages are persisted to a log file called `Publishing-<date>log`, where `<date>` is the current date.

Logs files are treated as rolling files, where logging information is added to the file with the current date. If the log file does not exist, it is created.

You can add in more sinks with other configuration files or replace the default one. For example:

```
<Sitecore>
  <Logging>
<ConfigureLogging>Sitecore.Framework.Logging.Serilog.ConfigureSitecoreLogging,
Sitecore.Framework.Logging.Serilog</ConfigureLogging>

    <Serilog>
      <WriteTo>
        <DevLogger>
          <Name>LiterateConsole</Name>
        </DevLogger>
      </WriteTo>
    </Serilog>

  </Logging>
</Sitecore>
```

For more information on how to provide the arguments to define the parameters for these sinks, see <https://github.com/serilog/serilog-settings-configuration>.

For more information on the console and file logging sinks, see <https://github.com/serilog/serilog-sinks-literate> and <https://github.com/serilog/serilog-sinks-rollingfile>.

### 4.10.5. Other sinks

Serilog also supports other persistence stores for log messages: <https://github.com/serilog/serilog/wiki/Provided-Sinks>

To configure sinks other than `Console` and `Rolling File` for the Publishing Service:

1. Copy all the DLLs required by the sink into the `Publishing Service Host` directory that contains all the Service DLLs.
2. Specify the DLL name in a `using` element in the Serilog configuration.
3. Configure the sink in the `WriteTo` section in the same way as `Console` and `Rolling File`.

Here is an example of how the Azure DocumentDB can be used to store log messages:

```
<Serilog>
  <Using>
    <DocumentDb>Serilog.Sinks.AzureDocumentDB</DocumentDb>
  </Using>
  <WriteTo>
    <AzureLogger>
      <Name>AzureDocumentDB</Name>
      <Args>
        <endpointUri>...azure document db endpoint...</endpointUri>
        <authorizationKey>...authorization key...</authorizationKey>
        <timeToLive>3600</timeToLive>
      </Args>
    </AzureLogger>
  </WriteTo>
  <WriteTo>
    <DevLogger>
      <Name>LiterateConsole</Name>
    </DevLogger>
  </WriteTo>
</Serilog>
```

One advantage of persisting logs to a document-based database like the Azure DocumentDB, is that each log message is persisted as an object, with properties that describe the context in which the log message was emitted. Log messages can then be queried dynamically.

## 4.11. Excluding items from automatic deletion from the target databases

When you publish all items, the Publishing Service deletes any items in the target databases that do not appear in the source database.

If there are sections of your content tree or items based on a specific template, for example, user generated content or content added from other sources, that you do not want removed automatically from the target databases, you can create a configuration file that contains the relevant item IDs of the sections and templates.

You create the configuration file using the patching mechanism.

- Under the `IgnoreChildrenOfItemIds` node, add the item IDs of sections that you want to keep in the target databases.
- Under the `IgnoredTemplateIds` node, add the item IDs of the templates that you want to keep in the target databases. In this way, the items based on the specified templates will not be removed from the target databases.

For example:

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <TreeChangesPublishHandler>
            <Options>
              <IgnoreChildrenOfItemIds>
                <UserGeneratedContent>{b00accaf-ce86-408e-b606-4120356fb8cf}</UserGeneratedContent>
                <OtherContentSection>{a9173544-5664-4549-ad02-06d5586cb855}</OtherContentSection>
              </IgnoreChildrenOfItemIds>
              <IgnoredTemplateIds>
                <UserGeneratedContent>{a9173544-5664-4549-ad02-06d5586cb855}</UserGeneratedContent>
              </IgnoredTemplateIds>
            </Options>
          </TreeChangesPublishHandler>

          <TreePublishHandler>
            <Options>
              <IgnoreChildrenOfItemIds>
                <UserGeneratedContent>{b00accaf-ce86-408e-b606-4120356fb8cf}</UserGeneratedContent>
                <OtherContentSection>{a9173544-5664-4549-ad02-06d5586cb855}</OtherContentSection>
              </IgnoreChildrenOfItemIds>
              <IgnoredTemplateIds>
                <UserGeneratedContent>{a9173544-5664-4549-ad02-06d5586cb855}</UserGeneratedContent>
              </IgnoredTemplateIds>
            </Options>
          </TreePublishHandler>
        </Add>
      </Services>
    </Web>
  </Commands>
</Settings>
```

## 4.12. Configure the Publishing Service to use Application Insights

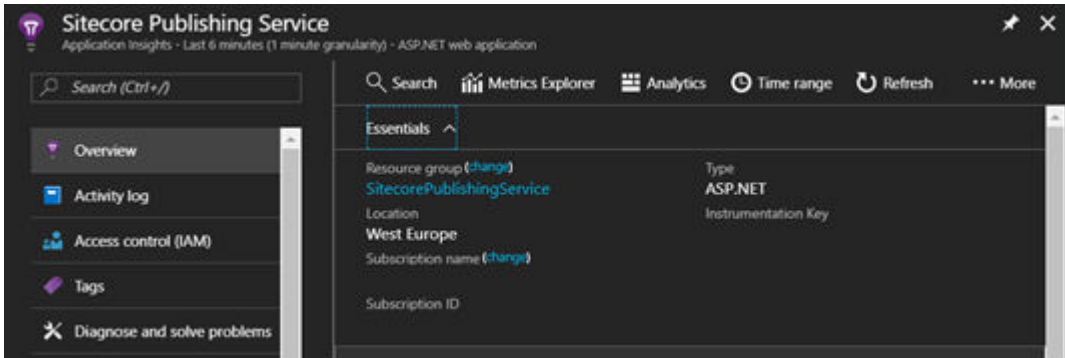
The Publishing Service supports integration with Azure Application Insights. Application Insights provides a lot of information about your instances of the Sitecore Publishing Service. To get the most out of the data that you are capturing with Application Insights, review the [Microsoft Azure Application Insights documentation](#).

### 4.12.1. Prerequisites

To configure the Publishing Service to use Azure Application Insights, you must have a Microsoft Azure subscription and at least one Application Insights instrumentation key from an active Application Insights service.



To create an Application Insights service, review the [Microsoft Azure Application Insights documentation](#). When you have a running Application Insights service, you can find the instrumentation key in the Overview panel.



#### 4.12.2. Configure Publishing Service to use Application Insights

To configure the Publishing Service to use Application Insights, supply the instrumentation key in the logging section of each environment specific `sitecorehost.xml`:

```
<Sitecore>
  <Logging>
    <ApplicationInsights>
      <InstrumentationKey>120c6019-64da-49b9-8a4d-47916c46a46f</InstrumentationKey>
    </ApplicationInsights>
  </Logging>
</Sitecore>
```

Because the `sitecorehost.xml` file at the root of the installation folder should be treated as read-only. You must supply the instrumentation key separately for all the environments that should use Application Insights. This allows for having different instrumentation keys for different environments. For example, if you want to set the instrumentation key for a development environment, then you can create a `sitecorehost.xml` file in the `sitecoreruntime/development` directory of the Publishing Service and use the new file to set the value for the `InstrumentationKey` property.

#### NOTE

The name of the environment folder that you use should match the environment that is configured for the Publishing Service. For more information, see the section about Host Configuration Options.

To complete the Application Insights configuration for the Publishing Service, Serilog must also be configured to send logging information to Application Insights.

#### 4.12.3. Adding Serilog.Sinks.ApplicationInsights

The Sitecore Publishing Service uses the Serilog logging framework to generate log information at runtime. Microsoft Application Insights can also be configured to log information on the Azure platform. Serilog also provides the ability to communicate with Microsoft Application Insights. By combining the two, the Publishing Service can publish structured logs to Application Insights, enabling management of logs within the Azure platform.

When Application Insights is configured, you must configure Serilog to send logging formation to Application Insights.

To configure Serilog to send logging formation to Application Insights:

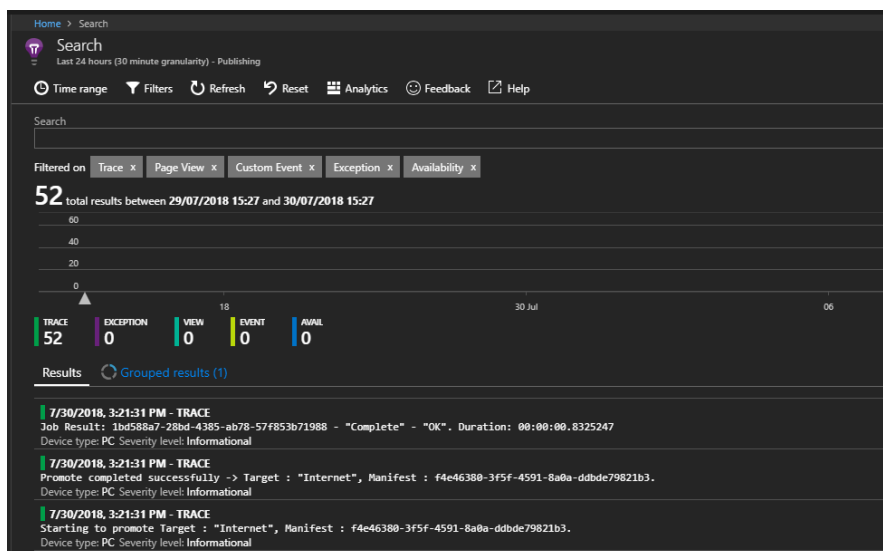
1. Set the `ConfigureLogging` element of the logging section to the Serilog Application Insights configure logging type: `Sitecore.Framework.Logging.Serilog.ApplicationInsights.ConfigureSitecoreLoggingTraces, Sitecore.Framework.Logging.Serilog.ApplicationInsights`
2. Add the instrumentation key to the `ApplicationInsights` section.

```
<Sitecore>
  <Logging>
    <ConfigureLogging>Sitecore.Framework.Logging.Serilog.ApplicationInsights.
ConfigureSitecoreLoggingTraces, Sitecore.Framework.Logging.Serilog.ApplicationInsights</
ConfigureLogging>

    <ApplicationInsights>
      <InstrumentationKey>120c6019-45da-56b9-8a4d-47916c46a46f</InstrumentationKey>
    </ApplicationInsights>

  </Logging>
</Sitecore>
```

Perform a few publishes and within a few minutes you'll be able to see the trace entries that are logged.



#### 4.12.4. Custom configuration of ApplicationInsights

When running the Publishing Host as a web service (using the web command) it will always use the standard Telemetry services and configuration from Asp .Net Core. It is possible to configure Telemetry Modules and Processors for the other commands by adding these to the *ApplicationInsights* configuration section in your configuration files. This can be useful in diagnosing issues when running the commands in Azure.

For example, the following configuration will register the 'QuickPulse' telemetry module and processor with the commands available in the Publishing Host:

```
<Sitecore>
  <Logging>
    <ApplicationInsights>
      <InstrumentationKey>120c6019-64da-49b9-8a4d-47916c46a46f</InstrumentationKey>
    </ApplicationInsights>

  <TelemetryModules>
```

```
<Add
Type="Microsoft.ApplicationInsights.Extensibility.PerfCounterCollector.QuickPulse.QuickPulseTelemetryModule, Microsoft.AI.PerfCounterCollector" />
</TelemetryModules>

<TelemetryProcessors>
<Add Type="
Microsoft.ApplicationInsights.Extensibility.PerfCounterCollector.QuickPulse.QuickPulseTelemetryProcessor, Microsoft.AI.PerfCounterCollector" />
</ TelemetryProcessors >

</Logging>
</Sitecore>
```

This configuration will allow you to view the Live Metrics for a command as it is running.

## 4.13. Troubleshooting

If you receive an error where the Internet Information Services (IIS) cannot read the application configuration, ensure you have installed all the prerequisites.

- If you receive a 502 - Bad Gateway error when you visit your site, check the logs for details.
- After fixing any errors, restart your application pool and try again.

## 5. High Availability Configuration of the Sitecore Publishing Service

This chapter describes how you can support high availability requirements by deploying multiple instances of the Publishing Service to use the same database.

- Introduction
- On premise
- Azure
- Configuration (Advanced)
- Supported Deployment Models

### 5.1. Introduction

When multiple Publishing Service instances are running, all of them can receive web-API calls. However, only one instance will have the job system active and therefore perform the actual publishing jobs. If the active instance fails, another instance will become active. This happens automatically because of a heartbeat protocol that is implemented via the service database.

Each service instance will request ownership of a logical lock, stored in the database, on a given schedule. Only one instance at a time can own this lock. Ownership is obtained if either there is no lock existing already, or if the current owner has not renewed the lock within a configured lifetime threshold. With the default settings, the maximum time taken to failover to a new active instance is 15 seconds, the minimum is 10 seconds.

#### 5.1.1. Workflow

The following steps describe the workflow of when more than one Publishing Service is running against the same set of databases:

1. The service instance gets assigned a random unique name at start up, or the name can be specified explicitly in the configuration. The algorithm for generating the service name can be replaced by providing another implementation of the `IServiceInformation` interface. For more information about assigning a specific name to a server instance, see [On premise](#).
2. When the service is started, the heartbeat protocol will kick off and the first instance that can access the `Publishing_ActivationLock` table will be set as active to enable the job system.
3. All the other instances will remain inactive, they will be able to receive API calls, but the jobs will only run on the active instance. For example, if a job is enqueued using an inactive instance, the active instance will pick it up within 10 seconds.
4. If the active instance fails, it will stop renewing the activation lock in the database. After the lock lifetime has passed, another inactive instance will be able to acquire the lock, and hence set itself as an active instance. It will then enable its job system to start processing the jobs in the queue.

5. Any job that was running when the previously active instance crashed will be automatically started by the new active instance.

## 5.2. On premise

In a high-availability environment, multiple instances of the Publishing Service need to be running behind a load balancer.

No special configuration is needed. However, each instance can be configured with a unique name. The configuration element is:

```
<Settings>
  <Publishing>
    <InstanceName></InstanceName>
  </Publishing>
</Settings>
```

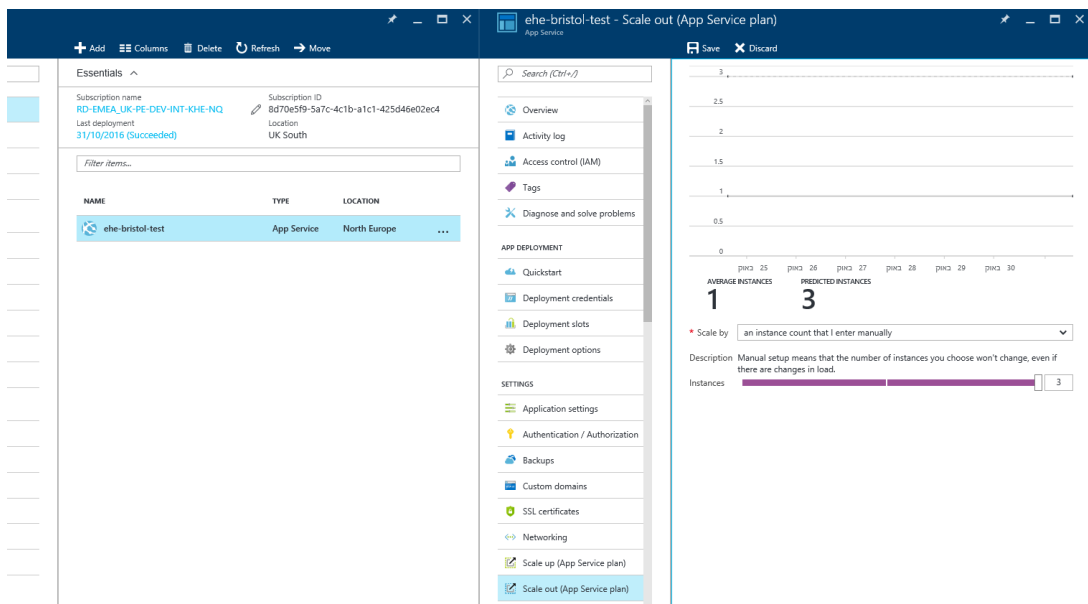
The instance name can be assigned through configuration, an environment variable, or a command line parameter. The instance name is used in logging and in the `Database Publishing_ActivationLock` table that shows the current active instance.

## 5.3. Azure

The Publishing Service can be installed as an Azure Application Service. There is no configuration needed in order to enable the high-availability functionality.

To install the Publishing Service as an Azure Application Service:

1. In the Azure portal, select a tier that allows you to use scaled-out configuration, for example, Tier B1 where you can have up to three instances.
2. Under **Settings**, click the **Scale out** option, and then drag the slider to specify the number of instances.



## 5.4. Configuration (Advanced)

The Publishing Service comes with defaults for the activation strategy. However, there are some parameters that can be configured if it is found that the active instance is being switched by mistake.

You can configure the following options:

- `LockAttemptIntervalInSeconds` – specify the interval in seconds that the service should use to obtain the activation lock.
- `LockRenewalIntervalInSeconds` – if the service already owns the lock, specify the interval in seconds that the service should use to renew the activation lock.
- `LockLifetimeInSeconds` – specify the interval in seconds after which the service should lose the activation lock if it hasn't renewed it, for example, in the situation where the service is inactive.

### IMPORTANT

Each instance must be configured with the same settings.

## 5.5. Supported deployment models

The high availability (HA) of the publishing service means that it can be used in the following configurations:

- Running on Azure as a scaled-out application service.
- Running multiple instances on multiple computers or VMs.
- Running multiple instances on the same machine. While this is not technically a high-availability setup, it can benefit testing.

## 6. Publishing Service API

Every interaction between the Sitecore Publishing Service module in Sitecore and the Sitecore Publishing Service is performed with web requests to the Publishing Service web API.

Consumers that want to interact directly with the Publishing Service can also use the Publishing Service web API.

This chapter contains the following section:

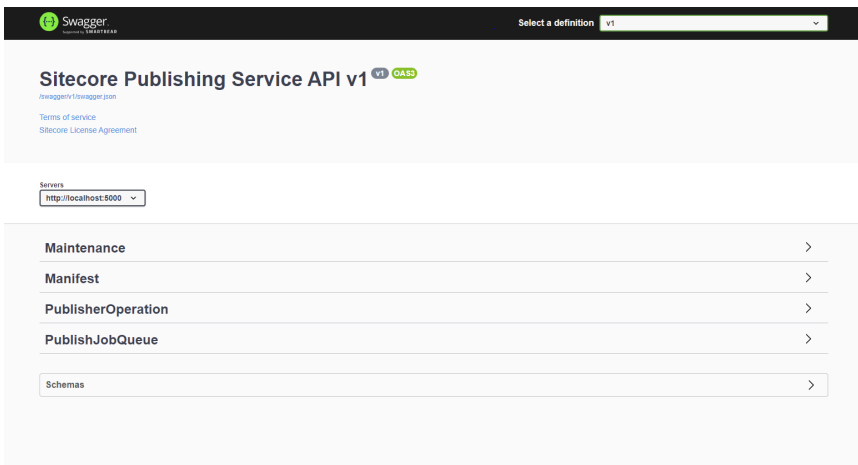
- [API documentation](#)

### 6.1. API documentation

Swagger libraries of all the API endpoints are available for the Publishing Service.

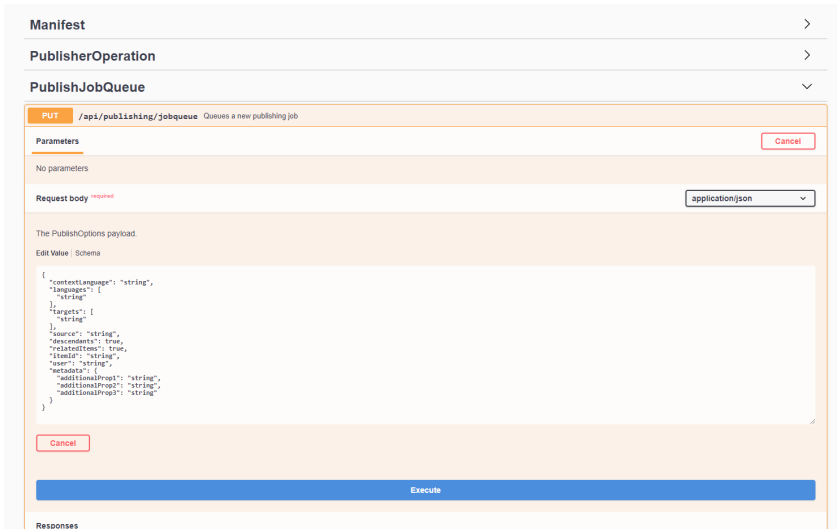
#### IMPORTANT

If the Publishing Service is running in a *development* environment, you can access the Swagger UI at <http://localhost:5000/swagger/index.html>



The main Swagger dashboard describes all the endpoints that the Publishing Service exposes. You can explore the different API versions and the endpoints from the dashboard as well as invoke and test the API methods.





**Manifest** >

**PublisherOperation** >

**PublishJobQueue** v

**PUT** /api/publishing/jobqueue Queues a new publishing job

Parameters Cancel

No parameters

Request body view application/json

The PublishOptions payload

Edit Value Schema

```
{
  "contextLanguage": "string",
  "language": {
    "string"
  },
  "targets": [
    "string"
  ],
  "source": "string",
  "descendants": true,
  "relationships": true,
  "itemId": "string",
  "user": "string",
  "payload": {
    "additionalProp1": "string",
    "additionalProp2": "string"
  }
}
```

Cancel

Execute

Responses

To generate Swagger specification files (`swagger.json`) for the Publishing Service APIs, use the `apigen` command:

```
$ Sitecore.Framework.Publishing.Host apigen [target-path]
```

In this example, `[target-path]` is the folder where the `apigen` command saves the specification files.

## 7. Upgrade the Publishing Service

You can upgrade to Sitecore Publishing Service 6.0.0 from versions 3.1.x or later.

Before you upgrade to a new version of the Publishing Service, make sure you create a backup of the existing Publishing Service directory.

To upgrade the Publishing Service:

1. Ensure that you meet the [prerequisites](#) for the Publishing Service.
2. Extract the content of the Sitecore Publishing Service 6.0.0.zip file to a new directory.
3. Set the name of the Publishing Service environment in the `SITECORE_ENVIRONMENT` environment variable.

### NOTE

This step is not required if the environment name is "Production" - the default environment assumed by the Publishing Host.

4. Create a new `sitocoreruntime` folder in the installation folder.
5. Copy the Sitecore license file to the `<installationPath>\sitocoreruntime` folder.
6. Create a directory for your environment under `<installationPath>\sitocoreruntime`. The directory name should match the environment name set in the previous step.
7. Copy item resource files from the CM Sitecore instance (for Sitecore 10.1 and above). Copy dat-files for all databases except the Core preserving the folder structure. For example, from `C:\inetpub\wwwroot\sitecore\App_Data\items` to `C:\inetpub\wwwroot\sitecorepublishing\items\sitecore` and `C:\inetpub\wwwroot\sitecore\sitecore modules\items` to `C:\inetpub\wwwroot\sitecorepublishing\items\modules`.
8. Use the `Sitecore.Framework.Publishing.Host` configuration `setconnectionstring` command to reconfigure your connection strings.
9. Create configuration override files in the `<installationPath>\sitocoreruntime\<environment>\config\` folder for the service registrations or options that have been overridden in the previous installation. Please refer to the "Configuration Tasks" section for more details about overriding services and options.

### NOTE

Depending on which Sitecore version you are using, you might want to consider disabling the multiple link database mode as described in the Sitecore Publishing Service Module installation guide available on the [Sitecore download page](#).

10. For the existing Publishing Service instance, stop the IIS application pool and then set the physical path for the IIS website to be the newly installed (v.6.0.0) Publishing Service directory path.

11. Start the IIS application pool again.

## 7.1. Configure a custom directory with item resource files

You can configure the Sitecore Publishing Service to use a custom folder for the item resource files.

To use a custom folder for the item resource files:

1. In the Publishing Service, in the `App_Config\Modules\PublishingService\Sitecore.Publishing.Service.Config` file, in the `DefaultConnectionFactory` section, register the custom folder, for example `sitecore modules/items/custom` folder, for each database. The paths should be relative to the `items` folder of the Publishing Service, for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <DefaultConnectionFactory>
            <Options>
              <Connections>
                <MasterResources>
                  <Options>
                    <Paths>
                      <Custom>items/modules/custom/master</Custom>
                    </Paths>
                  </Options>
                </MasterResources>
                <WebResources>
                  <Options>
                    <Paths>
                      <Custom>items/modules/custom/web</Custom>
                    </Paths>
                  </Options>
                </WebResources>
              </Connections>
            </Options>
          </DefaultConnectionFactory>
        </Add>
      </Services>
    </Web>
  </Commands>
</Settings>
```

### NOTE

You must also configure the `Schema` and `ItemRevision` command services with the same settings by changing the `<Web>` node to `<Schema>` and `<ItemRevision>`.

2. For the Sitecore XP 10.2 and later, add a patch file that edits the `resourceFiles` setting in the `App_Config\Modules\PublishingService\Sitecore.Publishing.Service.Config` file.

This configuration registers the custom folders for each database:

```
<?xml version="1.0" encoding="utf-8"?>
<configuration xmlns:patch="http://www.sitecore.net/xmlconfig/" xmlns:role="http://
www.sitecore.net/xmlconfig/role/">
  <sitecore role:require="Standalone or ContentManagement">
    <publishing.service>
      <resourceFiles>
        <locations>
          <sources>
            <custom.master>/sitecore modules/items/custom/master</custom.master>
          </sources>
          <targets>
            <custom.web>/sitecore modules/items/custom/web</custom.web>
          </targets>
        </locations>
        <pathTranslatorFactory>
          <replacements>
            <!-- if the item resource files are stored under a new root, it must
be registered here: -->
            <!-- replacement root="/custom_root/items" replaceWith="custom"
patch:before="replacement[@root='/']" id="custom" / -->
          </replacements>
        </pathTranslatorFactory>
      </resourceFiles>
    </publishing.service>
  </sitecore>
</configuration>
```

## 8. Publishing Service support matrix

Starting with Sitecore XP 9.2.0, the Sitecore Publishing Service Module uses the same version number as the Sitecore Platform and not the Publishing Service. The Publishing Service still uses its own version numbering.

We recommend updating to the latest version of the Publishing Service and Publishing Service Module at the earliest opportunity. The support matrix details which versions of the Sitecore Platform are supported:

Sitecore Platform	Publishing Service Module	Publishing Service
8.2 Initial Release – 8.2 Update 1	1.1 Initial Release	1.1 Initial Release
8.2 Update-2	2.0 Initial Release	2.0 Initial Release
8.2 Update-2 – 8.2 Update-3	2.0 Update-1	2.0 Update-1
8.2 Update-2 – 8.2 Update-5	2.1 Initial Release	2.1 Initial Release
8.2 Update-2 – 8.2 Update-7	2.2 Initial Release	2.2 Initial Release
8.2 Update-2 – 8.2 Update-7	2.2 Update-1	2.2 Update-1
9.0 Initial Release	3.0 Initial Release	3.0 Initial Release
9.0 Initial Release – 9.0 Update-1	3.1 Initial Release	3.1 Initial Release
9.0 Initial Release – 9.0 Update-2	3.1 Update-1	3.1 Update-1
9.0 Initial Release – 9.0 Update-2	3.1 Update-2	3.1 Update-2
9.0 Initial Release – 9.0 Update-2	3.1 Update-3	3.1 Update-3
9.1 Initial Release	9.1 Initial Release	4.1.0 – 4.3.0, 6.0.0
9.1 Update-1	9.1 Update-1	4.1.0 – 4.3.0, 6.0.0
9.2.0	9.2.0	4.1.0 – 4.3.0, 6.0.0
9.3.0	9.3.0	4.1.0 – 4.3.0, 6.0.0
10.0.0	10.0.0	4.1.0 – 4.3.0, 6.0.0
10.1.0	10.1.0	5.0.0, 6.0.0
10.2.0	10.2.0	6.0.0

## 9. Publishing Service Options

This section describes the service options available in the Publishing Service, including default values and override examples.

### 9.1. DatabaseConnectionOptions

You can use the `DatabaseConnectionOptions` class to specify the connection to a data source. The `DatabaseConnectionOptions` class is used by the type:

- `Sitecore.Framework.Publishing.Data.AdoNet.SqlDatabaseConnection`

```
namespace Sitecore.Framework.Publishing.Data.AdoNet
{
    public class DatabaseConnectionOptions
    {
        public string ConnectionString { get; set; }

        public int DefaultCommandTimeout { get; set; } = 120;

        public Dictionary<string, string> Behaviours { get; set; } = new Dictionary<string,
        string>(StringComparer.OrdinalIgnoreCase);
    }
}
```

The following example specifies an alternative value for the `DefaultCommandTimeout` setting of the Service connection for the Web command:

```
<Settings>
  <Commands>
    <Web>
      <Services>
        <Add>
          <DefaultConnectionFactory>
            <Options>
              <Connections>
                <Service>
                  <Options>
                    <DefaultCommandTimeout>30</DefaultCommandTimeout>
                  </Options>
                </Service>
              </Connections>
            </Options>
          </DefaultConnectionFactory>
        </Add>
      </Services>
    </Web>
  </Commands>
</Settings>
```

## 9.2. PublishJobHandlerOptions

You can use the `PublishJobHandlerOptions` class to configure various aspects of the Publish Job handler implementations to optimize performance. The `PublishJobHandlerOptions` class is used by the different publish handlers that are available:

- `Sitecore.Framework.Publishing.PublishJobQueue.Handlers.IncrementalPublishHandler`
- `Sitecore.Framework.Publishing.PublishJobQueue.Handlers.TreePublishHandler`
- `Sitecore.Framework.Publishing.PublishJobQueue.Handlers.TreeChangesPublishHandler`

```
namespace Sitecore.Framework.Publishing.PublishJobQueue
{
    public class PublishJobHandlerOptions
    {
        public int RelatedItemBatchSize { get; set; } = 2000;

        public int ManifestBuilderBatchSize { get; set; } = 5000;

        public int UnpublishedOperationsLoadingBatchSize { get; set; } = 2000;

        public int DeletedItemsBatchSize { get; set; } = 2000;

        public int MediaBatchSize { get; set; } = 2000;

        [Obsolete("Property is not used")]
        public int IndexReadBatchSize { get; set; } = 20000;

        public int TargetOperationsBatchSize { get; set; } = 2000;

        public int SourceTreeReaderBatchSize { get; set; } = 2000;

        public bool TransactionalPromote { get; set; } = false;

        public bool ParallelPromote { get; set; } = true;

        public bool ContentTesting { get; set; } = true;

        public bool ContentAvailability { get; set; } = false;

        public bool DeleteOrphanedItems { get; set; } = true;

        public bool PublishRelatedItemParents { get; set; } = false;

        public List<Guid> PublishRelatedItemDescendants { get; } = new List<Guid>();

        public IEnumerable<Guid> IgnoreChildrenOfItemIds { get; set; }

        public IEnumerable<Guid> IgnoredTemplateIds { get; set; }

        public string DefaultLanguage { get; set; } = "en";
    }
}
```

The following configuration example specifies an alternative value for the default configuration of the `TreePublishHandler` for the web command:

```
<Settings>
  <Commands>
```

```

<Web>
  <Services>
    <Add>
      <TreePublishHandler>
        <Options>
          <!--Enable this feature if content testing is required and has been enabled in the
Sitecore platform-->
          <ContentTesting>True</ContentTesting>

          <!--Specifies the batch size of items that are handled by the ManifestBuilder.
Increasing or decreasing this value will affect performance, depending on the environment. -->
          <ManifestBuilderBatchSize>5000</ManifestBuilderBatchSize>

          <!--Enables parallel promotion, this allows the promotion of item to multiple targets
in parallel. This will speed up promotion, but consume more resources.-->
          <ParallelPromote>False</ParallelPromote>

          <!--Specifies the batch size of related items that are handled by the
VariantsRelatedNodesTargetProducer. Increasing or decreasing this value will affect performance,
depending on the environment. -->
          <RelatedItemBatchSize>2000</RelatedItemBatchSize>

          <!--Specifies the batch size of items that are handled by the TreeNodeSourceProducer.
Increasing or decreasing this value will affect performance, depending on the environment. -->
          <SourceTreeReaderBatchSize>2000</SourceTreeReaderBatchSize>

          <!--Specifies the batch size of items that are handled by the
VariantsValidationTargetProducer. Increasing or decreasing this value will affect performance,
depending on the environment. -->
          <TargetOperationsBatchSize>2000</TargetOperationsBatchSize>

          <!--Enables transactional promotion, this performs the publish job as a transaction.
-->
          <TransactionalPromote>True</TransactionalPromote>

          <!--Specifies the batch size of items that are handled by the
UnpublishedNodeSourceProducer within IncrementalPublishHandler. Increasing or decreasing this
value will affect performance, depending on the environment. -->
          <UnpublishedOperationsLoadingBatchSize>2000</UnpublishedOperationsLoadingBatchSize>
        </Options>
      </TreePublishHandler>
    </Add>
  </Services>
</Web>
</Commands>
</Settings>

```

### 9.3. PromoterOptions

You use the `PromoterOptions` class to configure various aspects of the Publish Job promoter implementations to optimize performance. The `PromoterOptions` class is used by:

- `Sitecore.Framework.Publishing.DataPromotion.DefaultItemCloneManifestPromoter`
- `Sitecore.Framework.Publishing.DataPromotion.DefaultItemManifestPromoter`
- `Sitecore.Framework.Publishing.DataPromotionDefaultMediaManifestPromoter`



```
namespace Sitecore.Framework.Publishing.Abstractions.DataPromotion
{
    public class PromoterOptions
    {
        public int BatchSize { get; set; } = 500;
    }
}
```

The following configuration example specifies an alternative `BatchSize` class for the registered `ItemCloneManifestPromoter`:

```
<Settings>
<Commands>
<Web>
<Services>
    <Add>
        <ItemCloneManifestPromoter>
            <Options>
                <BatchSize>1000</BatchSize>
            </Options>
        </ItemCloneManifestPromoter>
    </Add>
</Services>
</Web>
</Commands>
</Settings>
```