SITECORE

Sitecore XP 10.3.1 Developer Workstation Deployment With Docker

How to install a Sitecore Experience Platform 10.3.1 on a developer workstation using containers with Docker

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1. Introduction to Docker Compose

Sitecore Experience Platform uses Docker Compose as the container orchestrator on developer workstations. Docker Compose is a simple container deployment tool that is bundled with Docker for Windows. You can use other tools to deploy Sitecore container images but we recommend that you use Docker Compose to deploy the containers that form the Sitecore Experience Platform.

1.1. Supported Sitecore topologies for Docker

You can install Sitecore XP on developer workstations using Docker containers.

Sitecore XP for Docker supports the following topologies:

- XP Workstation (XP Single)
- XM Server (XM Scaled)
- XP Server (XP Scaled)

All three topologies are included in the Sitecore Container Deployment package you can download from the Sitecore download page.

1.1.1. XP Workstation (XP Single)

The Sitecore Experience Platform Workstation for Docker topology, also known as *XP0*, is for developer workstation environments only. This topology is designed to reduce memory overhead, reduce download size, improve startup/shutdown time, and reduce complexity.

The XP0 topology supports the following Sitecore roles:

Role type	Sitecore role
Production	Sitecore Identity Server
Non-production	Content Management (Standalone)
	xConnect Server (Standalone)
	xConnect Search Indexer
	xDB Automation Engine
	Cortex Processing Engine
	Microsoft SQL Server
	Apache Solr
	RedisLabs Redis Server
	Traefik Reverse Proxy

For a list of the supported environment variables, in the Container Deployment Package, in the Docker Compose folder for the XP0 topology, see the environment variable configuration file.

1.1.2. XM Server (XM Scaled)

The Sitecore Experience Manager Server for Docker topology, also known as *XM1*, is suitable for use in both production and non-production environments.

NOTE

To reduce deployment time and lower the resource overhead in non-production environments, you can remove the Content Delivery role from the Docker Compose configuration.

The XM1 topology supports the following Sitecore roles:

Role type	Sitecore role
Production	Content Management
	Content Delivery
	Sitecore Identity Server
Non-production	Microsoft SQL Server
	Apache Solr
	RedisLabs Redis Server
	Traefik Reverse Proxy

For a list of the supported environment variables, in the Container Deployment Package, in the Docker Compose folder for the XM1 topology, see the environment variable configuration file.

1.1.3. XP Server (XP Scaled)

The Sitecore Experience Platform Server for Docker topology, also known as *XP1*, is suitable for use in both production and non-production environments.

The resources required to run the XP1 topology in a non-production environment can be significant but are required to mimic the exact configuration that is used in production environments. In non-production environments, it is best practice to use a workstation that meets the minimum workstation hardware requirements.

The XP1 topology supports the following Sitecore roles:

Role type	Sitecore role
Production	Content Management
	Content Delivery
	Sitecore Identity Server
	xDB Processing
	xConnect Collection
	xConnect Search
	xDB Automation Operations
	xDB Automation Reporting
	xDB Reference Data
	Cortex Processing

Role type	Sitecore role
	Cortex Reporting
	xConnect Search Indexer
	xDB Automation Engine
	Cortex Processing Engine
Non-production	Microsoft SQL Server
	Apache Solr
	RedisLabs Redis Server
	Traefik Reverse Proxy

For a list of the supported environment variables, in the Container Deployment Package, in the Docker Compose folder for the XP1 topology, see the environment variable configuration file.

1.2. Sitecore Docker Compose requirements

There are a number of requirements that your environment must fulfill before you can deploy containers with Sitecore Docker compose.

1.2.1. Software requirements

You must have the following software installed in order to install Sitecore Experience Platform on Docker:

- One of the following operating systems:
    - Windows 10 1903 or later. If you need to enable process isolation, you must have Windows 10 1909 or later.
    - Windows Server 1903 or later.

NOTE

Containers support Docker Compose V2 by activating the Use Docker Compose V2 setting in the Docker Desktop. This means that Docker CLI supports commands like `docker-compose` or `docker compose`.

Using Docker Compose V2 requires Docker Desktop version 4.12.0 or later.

For more information about Windows and containers, see Microsoft's documentation.

- Docker Desktop for Windows

In addition, you must download the Sitecore Container Deployment Package from the Sitecore download page.

The package includes, among other things, two configuration files that are required by Sitecore Docker Compose:

- `docker-compose.yml`
  A Docker Compose configuration file that contains information about the different containers and configuration of each Sitecore role.
  Studying this file can help you understand how the containers and the connection strings between the different roles function.

- `.env`
  An environment variable configuration file that contains the configuration information for the environment you want to deploy. You can edit this file outside the main Docker Compose configuration.

1.2.2. Hardware requirements

The recommended minimum requirements for your workstation in order for it to run Sitecore Experience Platform on Docker are:

- RAM
  For the *XP1* server topology, we recommend a developer workstation with 32GB of RAM.
  For the *XM1* and *XP0* server topologies, we recommend a developer workstation with a minimum of 16GB of RAM.

- CPU
  We recommend a quad-core processor or higher.

- Disk
  The Sitecore container images require approximately 25 GB free space. It is best practice to use SSD disks for optimal performance when downloading and running Docker containers. The type of disks used for SQL Server and Solr can also have a significant impact on performance.

1.2.3. Network requirements

Before you deploy the Sitecore containers you must ensure that the following required TCP ports are available:

Required port	Role	Description
443	Traefik	HTTPS proxy
8079	Traefik	Traefik dashboard
8984	Solr	Solr API and dashboard
14330	SQL	SQL Server

1.3. Prepare for deploying

Before you start the process of deploying the Sitecore XP containers, there are some concepts and procedures you need to be familiar with.

1.3.1. Understanding environment variables

Environment variables are the preferred mechanism for passing configuration settings into Sitecore containers.

The environment variable configuration file `.env` contains all the environment variables. Docker Compose loads these automatically during startup. The `.env` file for the Sitecore deployment is included in the Sitecore Container Deployment package.

> **IMPORTANT**
>
> Each environment variable must fit inside a 30,000 character block in the `.env` file.
> If the size of the variable exceeds 30,000 characters, the system will not deploy successfully.

If you want to reuse environment variables across multiple environments, you must set the environment variables in the Windows OS and remove the corresponding keys from the environment variable configuration file that is used by Docker Compose.

1.3.2. Using non-production container images

To help developers get started quickly, Sitecore uses container images for the required services.

> **NOTE**
>
> The `.env` file in the Sitecore Experience Platform container package contains the information you need to access the images for your chosen version and topology.

The images include:

- Sitecore roles
- Third party software - SQL Server, Redis, and Solr
- Proxy service - Traefik

> **WARNING**
>
> These images are for *non-production* use only.

The non-production images are not supported by Sitecore in a production environment. The non-production services do not follow the recommended best practices for hosting a production environment and should not be considered as a basis for production environments.

Sitecore uses non-production Docker images for Microsoft SQL Server, Apache Solr, traefik from Traefik Labs, and RedisLabs Redis that are only for use on developer workstations. These images are preloaded with the required database and search configurations specific to each product and are designed to facilitate rapid deployment.

1.3.3. Run script to prepare for deployment

The Sitecore container deployment package provides a script for automating some of the preparations for Sitecore deployment to a developer machine. The `compose-init.ps1` file is located with the `.env` file.

The `compose-init.ps1` file performs the following actions:

- compresses the Sitecore license file
- creates the Identity Server token signing certificate
- populates the `.env` file

- generates TLS/HTTPS certificates
- installs the root certificate into your Trusted Root Certification Authorities
- updates Windows host names

The script accepts a number of parameters. The following table shows the parameters you can use.

Parameter	Description	Example	Mandatory
`LicenseXmlPath`	Path to the Sitecore license file. You must specify this.	`-LicenseXmlPath "c:\license.xml"`	Yes
`Topology`	The name of your chosen topology.	`-Topology "XM1"`	No
`IdHost`	A custom host name for the Identity Server.	`-IdHost mySCID_1`	No
`CdHost`	A custom host name for the CD server.	`-CdHost mySCCD_1`	No
`CmHost`	A custom host name for the CM server.	`-CmHost mySCCM_1`	No
`SitecoreAdminPassword`	A custom password for the `admin` user.	`-SitecoreAdminPassword df8732V45GH`	No
`SqlSaPassword`	A custom password for the database `SA` users.	`-SqlSaPassword poi3412xGH45`	No
`EnvFilePath`	Path to the `.env` file. Specify this if the `.env` file is located in a different folder.	`-EnvFilePath "c:\compose\.env"`	No
`SitecoreGalleryRepositoryLocation`	Path to the location of the Sitecore Gallery repository. Specify this if you are not using the official repository.	`-SitecoreGalleryRepositoryLocation "https:\\<path_to_repository>"`	No
`CertDataFolder`	Path to the folder where the traefik certificates are located. Specify this if the certificates are not located in `.\traefik\certs`.	`-CertDataFolder "c:\compose\certs"`	No
`SqlServer`	Name of the Sql server instance (only for `upgrade.env` file)	`-SqlServer "mssql"`	No

Parameter	Description	Example	Mandatory
`SqlUserName`	Name of the user of sql server (only for `upgrade.env` file)	`-SqlUserName "sa"`	No
`IsAlwaysEncrypted`	Option for sql server which allows using of encryption (only for `upgrade.env` file)	`-IsAlwaysEncrypted $false`	No
`ProcessingEngineTasksDatabaseUsername`	Name of the least privileged user in database (only for `upgrade.env` file)	`-ProcessingEngineTasksDatabaseUsername "dbo"`	No

If you do not specify passwords for the `admin` or `SA` users, the script assigns default values to them.

To use the script:

1. Open a Windows command window with administrator access. Navigate to the folder containing the `compose-init.ps1` file.

2. Run the script. For example:

```
.\compose-init.ps1 -Topology "<your_topology>" -LicenseXmlPath
"<path_to_the_license_file>" -IdHost <custom_Id_host_name> -CdHost <custom_cd_host_name>
-CmHost <custom_cm_host_name> -SitecoreAdminPassword <your_password_for_Sitecore_admin>
-SqlSaPassword <your_password_for_sql_sa_user>
```

NOTE
If your Traefik certificates folder already contains certificates the script does not install new certificates.

1.3.4. Change the database prefix

By default, Sitecore uses the prefix *Sitecore* when it deploys databases. You can replace the default prefix with your own custom prefix. You have to do this before deploying the Sitecore databases.

NOTE
If you are deploying to an existing MS SQL environment, you must change the prefix to your existing MS SQL prefix.

To use a custom prefix:

1. Open the `.env` secret file for editing.

2. In the SQL_DATABASE_PREFIX variable, replace *Sitecore* with your custom prefix.

3. If the `mssql-init` image contains `dacpac` files for custom databases, in the SQL_CUSTOM_DATABASE_PREFIX_UPDATE_FROM variable, replace *Sitecore* with your custom prefix.

4. Save the file.

2. Deploy a workstation

You use Docker for Windows to deploy the Sitecore Experience Platform (SXP) container packages.

To deploy an SXP developer workstation on containers:

1. In Docker for Windows, switch to Windows container mode.
2. Download the SXP Container Deployment Package from the Sitecore download page and extract it to a folder on your local workstation. Navigate to the `compose\<windows version>\<topology>` folder for the topology that you want to deploy, for example, `compose\ltsc2019\xp1`.
3. In the topology folder, run the `compose-init.ps1` script.
4. In the Windows console, go to the folder that the `docker-compose.yml` file is in and run the following Docker Compose command:

   ```
   docker compose up --detach
   ```

   Docker Compose pulls all the required images from the Sitecore Container Registry, creates the required Docker network configuration, and deploys all the containers to the local environment.

   > **NOTE**
   > The required images include Sitecore roles and third party services for your chosen topology.

   When the deployment is successfully completed, the Docker Compose command exits.
5. To check the Docker container status, run the following command:

   ```
   docker compose ps
   ```

   This command generates a list of all the containers and their current status.
6. When the status of all the containers is listed as *healthy*, open a browser and enter the URL for the content management instance.
   The default URLs for, for example, the XP1 topology are:
   - `https://xp1cm.localhost`
   - `https://xp1cd.localhost`
   - `https://xp1id.localhost`

   The content management, content delivery, and identity services instances use the HTTPS protocol on port 443. If this port is in use by another process, you get an error message.
7. Verify that there are no errors in the internal container log files.

2.1. Rebuild the search indexes

When the deployment is done, you must rebuild the search indexes.

To rebuild the search indexes:

1. On the Sitecore Launchpad, open the Control Panel.
2. In the **Indexing** section, click **Populate Solr Managed Schema**.
3. In the **Schema Populate** dialog box, click **Select All**, then click **Populate**. Wait for the process to finish.
4. On the Control Panel,cewasIn the **Indexing** section, click **Indexing Manager**.
5. In the **Indexing Manager** dialog box, click **Select All**, then click **Rebuild**.

2.2. Deploy custom modules

For Sitecore components, by default, you deploy only the Solr collections and dacpacs included in the platform. In Sitecore 10.1 and later versions you can also deploy custom modules.

If the module you want to deploy requires database updates and/or custom Solr collections, you might need to build a new layer on top of the `mssql-init` and/or `solr-init` images.

2.2.1. Add database updates to a module

To add database updates to a module:

1. Build a new layer on top of the `mssql-init` image.
2. In your build-script, add a command for the following action:
   - Copy the module dacpacs from the module asset image into the `c:\module_name_data` folder for the new image.

2.2.2. Add Solr collections to a module

To add Solr collections to a module:

1. Build a new layer on top of the `solr-init` image.
2. Add the Solr collections module configuration files from the module assets image to the `c:\data` folder.

NOTE

You must use the JSON file format for collections. If the module name is `sxa`, you can, for example, name the Solr collections file `cores-sxa.json`.

2.3. Removing the Docker environment

With Docker Compose commands, you can stop, resume, or remove a workstation environment.

The basic commands are:

- To stop a Docker Compose environment without removing its contents:

  ```
  docker compose stop
  ```

- To resume a previously stopped Docker Compose environment:

  ```
  docker compose start
  ```

- To remove a Docker Compose environment and all the non-mounted volumes:

  ```
  docker compose down
  ```

3. Appendices

This section contains additional information and helper functions to help you with deployment to Docker.

3.1. Environment variable list

The following table describes the environment variables and lists their default values.

Variable name	Default value	Description
SITECORE_DOCKER_REGISTRY	*scr.sitecore.com/sxp/*	Sitecore container registry
SITECORE_VERSION	`10.3.1-ltsc2019`	Image tag with the version to be pulled from the container registry
SITECORE_ADMIN_PASSWORD		Sitecore application administrator password
SQL_SA_PASSWORD		SQL Server administrator password
SQL_DATABASE_PREFIX	*Sitecore*	The default prefix for Sitecore MS SQL databases. If you use an existing MS SQL deployment, you must change this to your existing MS SQL prefix.
SQL_CUSTOM_DATABASE_PREFIX_UPDATE_FROM		Your prefix for custom databases.
REPORTING_API_KEY		Symmetric key used to access the Sitecore XDB Processing Service. Length: 64-128 characters
TELERIK_ENCRYPTION_KEY		Symmetric key used by the Telerik web controls. Length: 64-128 characters

Variable name	Default value	Description
SITECORE_IDSECRET		Shared secret between the Identity Server and client roles. Length: 64 characters
SITECORE_ID_CERTIFICATE		Identity Server certificate used to encrypt data
SITECORE_ID_CERTIFICATE_PASSWORD		Password to open the Identity Server certificate
SITECORE_LICENSE		License file content converted to GZIP Compressed and Base64 encoded string
ISOLATION	*default*	Override for Docker isolation level (Possible values: `default`, `hyperv`, `process`)
SOLR_CORE_PREFIX_NAME	*sitecore*	A common prefix for Solr core names. If you use an existing Solr deployment, you must change this to your actual Solr core name prefix.
MEDIA_REQUEST_PROTECTION_SHARED_SECRET		Shared secret. You must change this to a random string. Do not use the default value.
SITECORE_GRAPHQL_ENABLED	*false*	Controls if the GraphQL endpoint is enabled or not.
SITECORE_GRAPHQL_EXPOSEPLAYGROUND	*false*	Controls if the GraphQL Playground is enabled or not. In a production environment this setting must be set to *false*.
SITECORE_GRAPHQL_UPLOADMEDIAOPTIONS_ENCRYPTIONKEY	*432A462D4A614E64*	The encryption key used for media upload in GraphQL. You must change this to a random string. Do not use the default value.

Variable name	Default value	Description
LOG_LEVEL_VALUE	*INFO*	Select which messages Sitecore writes to the log. You can choose between different levels of severity.

3.2. Common issues

This section lists some common issues related to the installation of a Developer Workstation with containers, along with proposed solutions.

3.2.1. I cannot upload a Translations file to the website root folder

If the **Upload Files** dialog hangs during the upload operation, it writes the following errors to the log file:

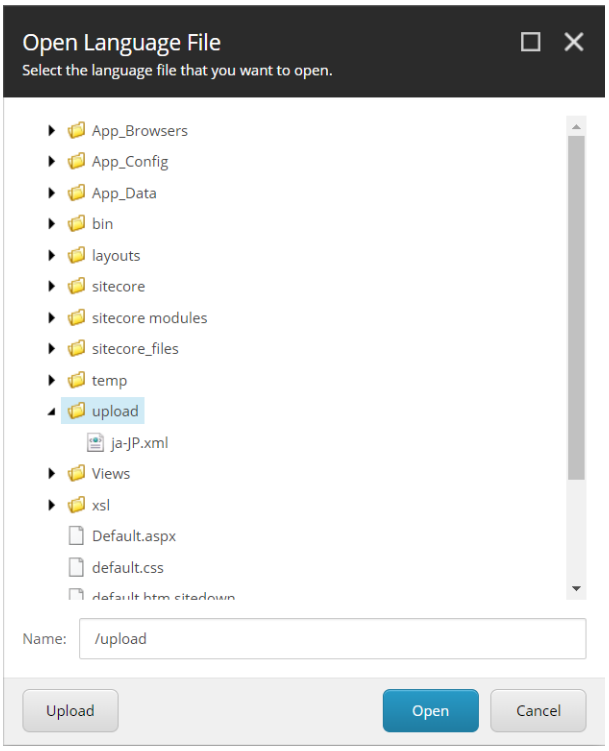
```
ERROR Could not save posted file: ja-JP.xml
Exception: System.UnauthorizedAccessException
Message: Access to the path 'C:\inetpub\wwwroot\ja-JP.xml' is denied.
```

This happens because the **Import language** dialog box uploads translations files to the `website` root folder by default and for security reasons *Write* access is denied for the website root folder.

The `upload` folder, however, has *Write* access enabled. To resolve this issue, upload the translations files to the `upload` folder.

To upload a translations file:

1. In the **Open Language File** dialog box, select the `upload` folder and then click **Upload**.



2. In the **Upload Files** dialog box, upload the translations file to the `upload` folder.

3. Import the translations file from the `upload` folder.

NOTE

The translations xml file is saved to the Media library. You can delete it after you import the translations.

3.2.2. I can only see the main Sitecore log files for the Sitecore roles containers

The LogMonitor tool collects the log files for containers. By default, it monitors the following log files:

- System event log – error level entries
- IIS logs
- Primary Sitecore log – `log.*.txt` files for the Sitecore roles
- xConnect log – `xconnect-log-*.txt` files for the xConnect roles

Auxiliary Sitecore log files, such as for search, crawling, and publishing, are not monitored on Sitecore containers.

To see all the Sitecore log files for a Sitecore role container, you must create a Dockerfile with the corresponding role image and reconfigure the LogMonitor tool or replace the entire configuration file with the updated configuration.

To reconfigure the LogMonitor tool:

1. In the `c:\inetpub\wwwroot\App_data\logs` folder, open the `C:\LogMonitor\LogMonitorConfig.json` file.
2. In the `sources` node, edit the `filter` setting:

```
{
    "LogConfig": {
        "sources": [
            ...
            {
                "type": "File",
                "directory": "c:\\inetpub\\wwwroot\\App_data\\logs",
                "filter": ".*log*.txt",
                "includeSubdirectories": false
            }
        ]
   }
}
```

Now you can use the Dockerfile to build a new docker image for the Sitecore role.

You can also view all the Sitecore log files directly from the container's file system by connecting to the corresponding container from a PowerShell or command prompt terminal.

3.2.3. I am experiencing performance issues on Hyper-V

If you are running your content management (CM) server on Hyper-V, and you experience performance issues, such as the server hanging or crashing during resource consuming tasks, the server might not have enough memory. The default memory amount for Hyper-V is 1 GB, however, we recommend a minimum of 4 GB to avoid performance issues.

To set a minimum memory limit of 4 GB:

- In the Container Deployment Package, in the `docker-compose.yml` file, in the CM service configuration, add `mem_limit:4GB`.