



Liferay Boot Camp 2021 Digital Edition

How to create Liferay DXP Docker Images

The first step towards OpenShift and K8s

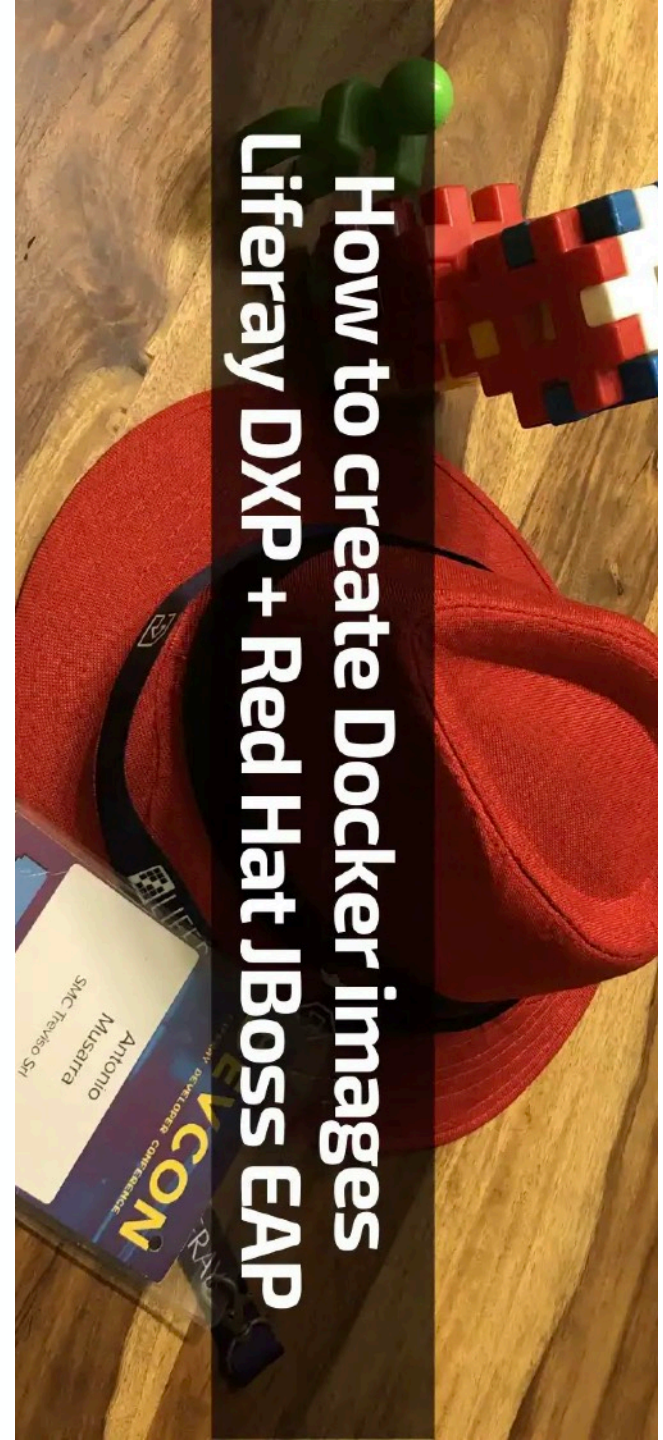


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Senior Software Architect



Presentation Topics

- ☒ Overview
- ☐ Liferay's standard Docker images
- ☐ Extension of the liferay-docker project
- ☐ Requirements
- ☐ How to create the Docker Image



Overview





Overview

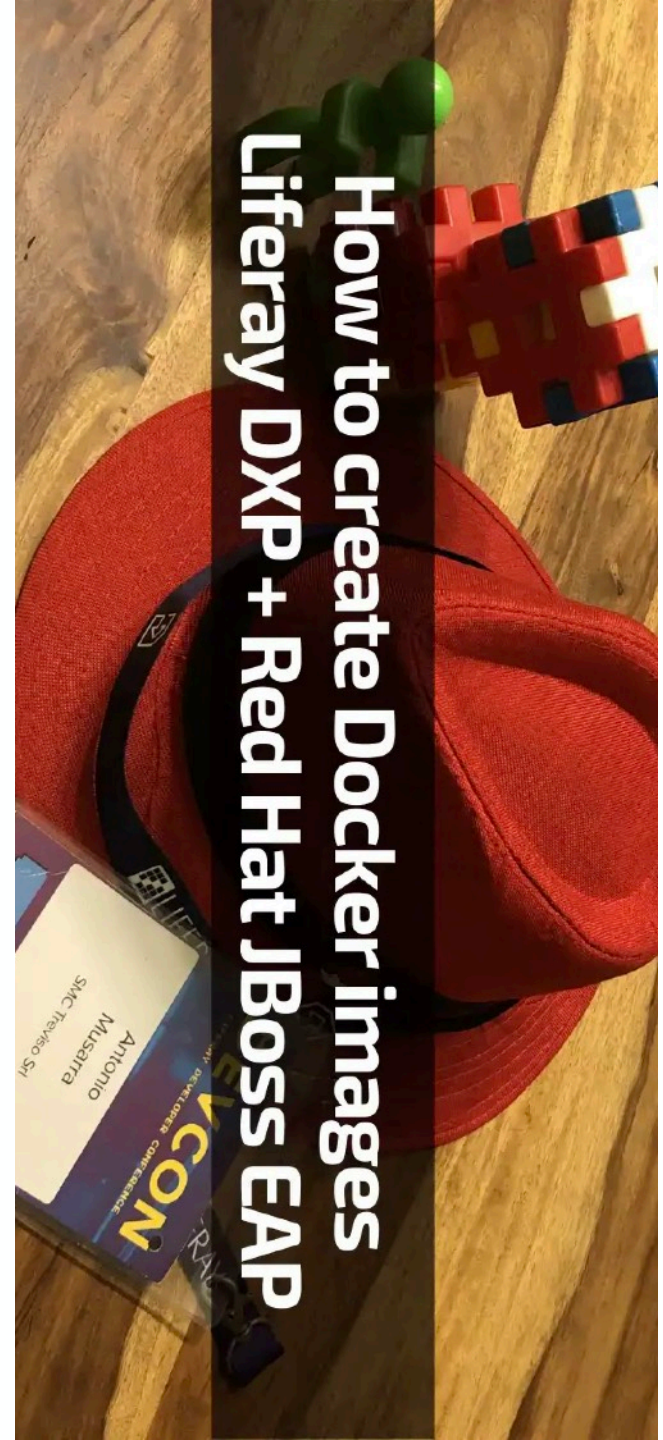
Introduction to Liferay and Docker

- 1** Docker has become increasingly popular in today's development lifecycle, providing an automated way to package software and its dependencies into a standardized unit that can be shared across multiple platforms.
- 2** With this presentation I want to take you by the hand and lead you to the construction of a Docker image of Liferay DXP installed on Red Hat JBoss EAP.
- 3** Some of you will know that October 13, 2020 was Liferay DXP version 7.3 released, and I'm sure you'll be pleased to know that I dedicated this presentation to creating the image with the latter Liferay version installed on the latest version of JBoss EAP 7.3.



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Liferay's standard Docker images

Introduction to Liferay and Docker





Liferay's standard Docker images

Liferay provides official Docker images for the following products. The related Docker image is available for each product release. The figure below shows the latest Liferay DXP version 7.3 Docker images on the Docker Hub registry.

- ✓ Liferay Portal (Community Edition)
- ✓ Liferay DXP
- ✓ Liferay Commerce
- ✓ Snapshot of the Liferay Portal



The screenshot shows the Docker Hub page for the `liferay/dxp` repository. The page header includes the Docker Hub logo and a search bar. The repository name `liferay/dxp` is displayed with a star icon. Below this, it says "By liferay • Updated 10 days ago" and "Official images for Liferay DXP releases". A "Container" badge is visible. The "Tags" tab is selected, showing a list of tags. The first tag is `7.3.10-ga1`, updated 10 days ago by `brianchandotcom`. The second tag is `7.3.10-ga1-d1.2.1-20201005160536`, also updated 10 days ago by `brianchandotcom`. Both tags show a digest of `8490c8694af9`.



Liferay's standard Docker images

[Liferay Workspace](#), however, it does provide an easy way to integrate Docker development into your own existing workflow with prepackaged Gradle activities or tasks. Thanks to the Liferay Workspace we can perform the following activities.

- ✓ Creating a Docker container based on a standard image provided via Docker Hub
- ✓ Container configuration
- ✓ Interact with the container
- ✓ Liferay Commerce
- ✓ Creating a custom Liferay image

All detailed information is available on the official documentation by Liferay [Leveraging Docker](#).

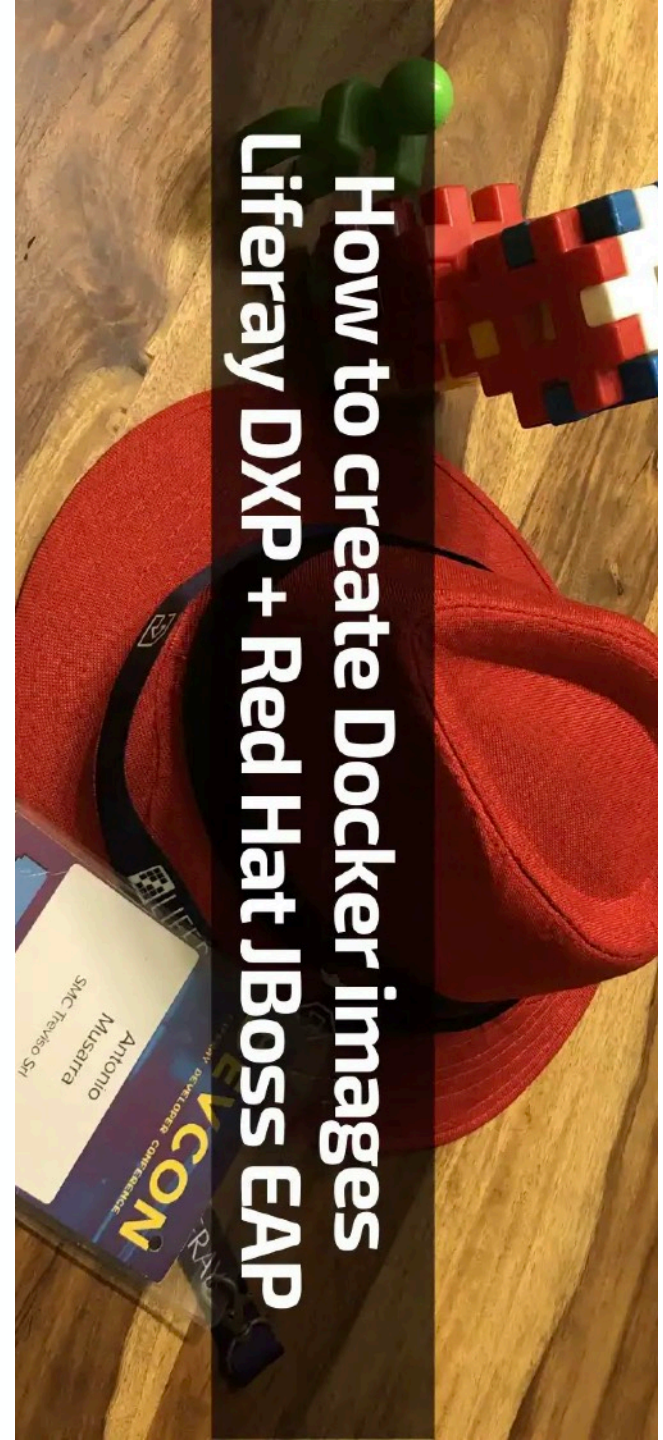
```
1
2 > Task :buildDockerImage
3 Building image using context
4   '/Users/antoniomusarra/Progetti/MyProjects/Liferay/sources/
5   patching-tool-via-docker/build/docker'.
6 Using tag 'liferay-dxp-patching-tool-via-docker-liferay:7.2
7 image.
8 Step 1/6 : FROM liferay/dxp:7.2.10.1-sp1
9
10 ----> 99e1d1d75b0d
11 Step 2/6 : ENV LIFERAY_WORKSPACE_ENVIRONMENT=local
12
13 ----> Using cache
14 ----> 79769a5abc19
15 Step 3/6 : COPY --chown=liferay:liferay deploy /mnt/liferay
16
17 ----> Using cache
18 ----> 531497a63f5d
19 Step 4/6 : COPY --chown=liferay:liferay scripts /mnt/liferay
20
21 ----> Using cache
22 ----> 2bdba70a7cb7
23 Step 5/6 : COPY --chown=liferay:liferay configs /home/liferay
24
25 ----> Using cache
26 ----> 0bea14f39898
27 Step 6/6 : COPY --chown=liferay:liferay 100_liferay_image_s
28 /usr/local/liferay/scripts/pre-configure/100_liferay_image_
29
30 ----> Using cache
31 ----> 2f9f40c7e7fc
32 Successfully built 2f9f40c7e7fc
33 Successfully tagged liferay-dxp-patching-tool-via-docker-
34 liferay:7.2.10.1-sp1
35 created image with ID '2f9f40c7e7fc'.
36
37 Task :createDockerContainer
38 created container with ID 'liferay-dxp-patching-tool-via-do
39
40 Task :startDockerContainer
41 Starting container with ID 'liferay-dxp-patching-tool-via-o
42 liferay'.
43
44 8
```





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Extension of the liferay-docker project

Liferay DXP + JBoss EAP Docker image creation process





Extension of the liferay-docker project

Liferay produces its own official Docker images via the published project on GitHub which is called [liferay-docker](#), not very well known. These images are created with the Apache Tomcat bundle only.

Instead, the need is to create a Docker image where Liferay is installed on JBoss EAP.

However, it is advisable to create the new image while keeping the "**services offered**" from the official images produced by Liferay (see: file system, environment variables, support for running pre-start scripts, etc.).

The screenshot shows the GitHub repository page for liferay-docker. The repository has 531 commits and 14 contributors. The contributor @antonio_musarra is highlighted with a red circle and a red arrow. The repository description states: "No description, website, or topics provided." The repository also has a README, a license, and no releases or packages published.

Commit	Author	Time
GA1	antonio_musarra	5 days ago
1.5.6 change log	antonio_musarra	21 days ago
SF	antonio_musarra	last month
Rename to downloads	antonio_musarra	9 months ago
Empty space	antonio_musarra	3 months ago
LRDSO-152 file_url needs to be set earlier	antonio_musarra	2 months ago
7.4 GA1	antonio_musarra	5 days ago
LPS-121476 Rename env-os-jvm to base	antonio_musarra	7 months ago
LPS-130098 We should manually update the Patching Tool version, th...	antonio_musarra	21 days ago
LPS-121476 Rename	antonio_musarra	7 months ago
Wrong dir for Commerce	antonio_musarra	2 months ago
LPS-130098 Wordsmith	antonio_musarra	21 days ago
SF	antonio_musarra	last month
LPS-121476 Rename more	antonio_musarra	7 months ago



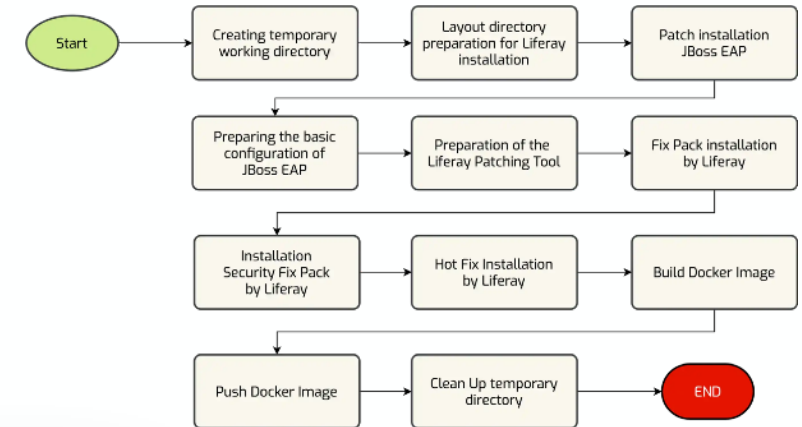
Extension of the liferay-docker project

To achieve this, it is enough to extend the **liferay-docker** project so that it is possible:

- ☑ build the Docker image where Liferay is installed on JBoss EAP;
- ☑ push the Docker image created to a repository;
- ☑ install the Liferay Patching Tool, Fix Pack, Hot Fix and Security Fix Pack directly during the build phase;
- ☑ run the JBoss EAP Patch installation.

Extension of the liferay-docker project

The object of the extension is the **build_local_image.sh** script. This is responsible the execution of the operations indicated above, of which the last are optional. The diagram shown in the following figure illustrates the various stages of the Liferay Docker image building process.



The creation of the Docker image follows the Liferay installation process on JBoss EAP as described by the official Liferay document called [Installing on JBoss EAP](#).

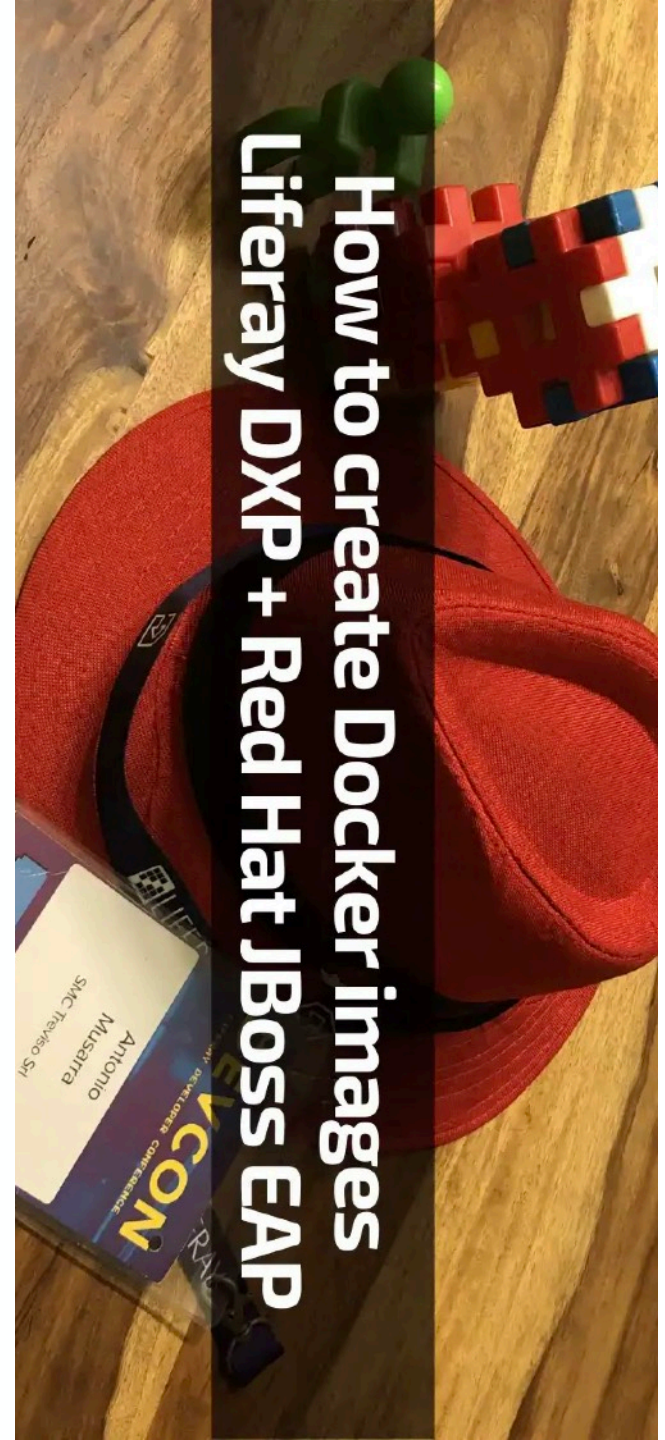
The software needed to create the image can be downloaded as an archive [liferay-docker-1.0.2.zip](#).





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Requirements

Software requirements for building the Docker image





Requirements

So that you can successfully complete the image creation Docker, a number of software requirements must be met for the machine dedicated to the build operation. The software requirements to be met are the following.

- ☑ Unix/Linux/macOS Operating System with Bash shell (at least from the version 3.x).
- ☑ Docker Engine 18.x, 19.x or 20.x.
- ☑ Git 2.x (optional).
- ☑ JDK 1.8 0 11.



Requirements

As for Docker, you can install Docker Desktop on your own workstation, available for both Microsoft operating systems and Apple operating systems. I recommend installing the stable version avoiding the edge version, this is useful for experimenting with the latest features.

If you have already installed Docker, check the version on your system using the `docker version` command making sure the version is in range indicated by the requirements. An example of the command output is shown by the figure in the side. In this case the version is 20.10.5, this version meet the requirements

```
~ docker version
Client: Docker Engine - Community
 Cloud integration: 1.0.12
 Version:           20.10.5
 API version:       1.41
 Go version:        go1.13.15
 Git commit:        55c4c88
 Built:             Tue Mar  2 20:13:00 2
 OS/Arch:           darwin/amd64
 Context:           default
 Experimental:      true

Server: Docker Engine - Community
 Engine:
  Version:           20.10.5
  API version:       1.41 (minimum version 1.24)
  Go version:        go1.13.15
  Git commit:        363e9a8
  Built:             Tue Mar  2 20:15:47 2
  OS/Arch:           linux/amd64
  Experimental:      false
 containerd:
  Version:           1.4.4
  GitCommit:         05f951a3781f4f2c1911b
 crio:
  Version:           1.0.0-rc93
  GitCommit:         12644e614e25b05da6fd0
 rkt:
  Version:           0.19.0
  GitCommit:         de40ad0
```



Requirements

Dependency downloads





Dependency downloads

The image creation process requires the following to be available bundle.

- ☑ Liferay DXP WAR
- ☑ Liferay DXP Dependencies
- ☑ Liferay DXP OSGi Dependencies
- ☑ Liferay Patching Tool
- ☑ Liferay DXP Fix Pack (optional)
- ☑ Liferay DXP Hot Fix (optional)
- ☑ Liferay DXP Security Pack (optional)
- ☑ Red Hat JBoss EAP
- ☑ Red Hat JBoss EAP Patch (optional)



Dependency downloads

Oct 13, 2020

Liferay DXP 7.3 and Liferay Commerce 3.0

[DXP Release Highlights](#) | [Commerce Release Highlights](#)

Liferay DXP 7.3 is now bundled with Liferay Commerce 3.0. An additional subscription is required to activate Liferay Commerce.

Bundled with Tomcat (tar.gz)

Download

Bundle

Bundled with Tomcat (tar.gz)

Bundled with Tomcat (7-Zip)

For Developers

Source

Reference Docs

Additional Files

Client

Dependencies

OSGi Dependencies

DXP WAR

Admin Tools

Documentation

Account Support

Marketplace

Re

Do

Activation Keys

Support FAQ

LESA





Dependency downloads

As for the JBoss EAP bundle, this can be downloaded in GA version and any patches from the RedHat Customer Portal.

For this presentation, the reference version of Liferay is DXP 7.3 and that of RedHat JBoss is 7.3. The table below shows in detail the list of required dependencies that we will use for the build the image.

Software Downloads

Product:

Version:

[Releases \(9\)](#) [Patches \(19\)](#) [Security Advisories \(24\)](#)

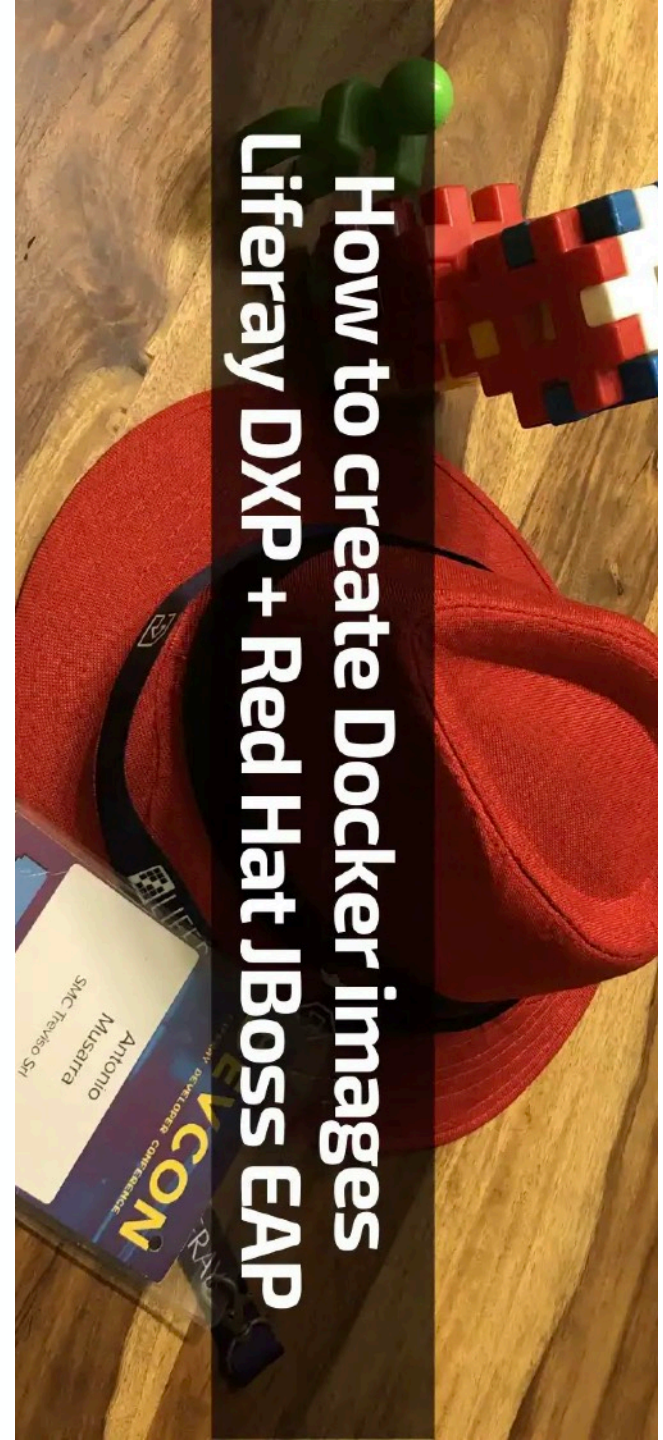
Download File	Release Date	
Red Hat JBoss Enterprise Application Platform 7.3.0	03/24/2020 07:05 AM EDT	Download
Red Hat JBoss Enterprise Application Platform 7.3.0 Installer	03/24/2020 07:05 AM EDT	Download
Red Hat JBoss Enterprise Application Platform 7.3.0 Quickstarts	03/24/2020 07:04 AM EDT	Download

Artifact Name	File Name	Version	Source
Liferay DXP WAR	liferay-dxp-7.3.10-ga1-20200930160533946.war	7.3.10 GA1	Liferay Customer Portal
Liferay DXP Dependencies	liferay-dxp-dependencies-7.3.10-ga1-20200930160533946.zip	7.3.10 GA1	Liferay Customer Portal
Liferay DXP OSGi Dependencies	liferay-dxp-osgi-7.3.10-ga1-20200930160533946.zip	7.3.10 GA1	Liferay Customer Portal
Liferay Patching Tool	patching-tool-3.0.22.zip	3.0.2	Liferay Customer Portal
Liferay DXP Fix Pack	liferay-fix-pack-dxp-1-7310.zip	7.3.10 SP1	Liferay Customer Portal
RedHat JBoss EAP	jboss-eap-7.3.0.zip	7.3.0 GA	RedHat Customer Portal
RedHat JBoss EAP Patch	jboss-eap-7.3.6-patch.zip	7.3.6 GA	RedHat Customer Portal



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- ✓ Overview
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- ✓ Extension of the liferay-docker project
- ✓ Requirements
- ✓ How to create the Docker Image



**How to create Docker images
Liferay DXP + Red Hat JBoss EAP**

How to create the Docker Image

A real scenario





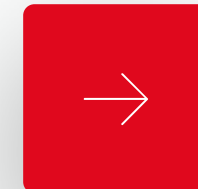
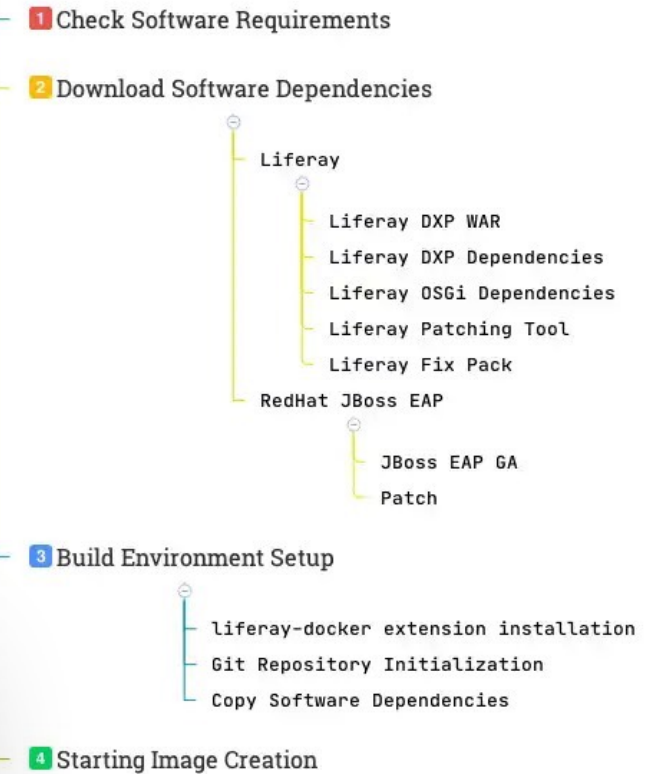
How to create the Docker Image

We will see what are the steps to create your own Docker image Liferay + JBoss EAP, assuming the following scenario.

Let's say we want to build a Liferay DXP 7.3 GA 1 Docker image with JBoss EAP 7.3.0 as application server and want to apply the Liferay Fix Pack 1 and the patch 7.3.6 JBoss EAP. To obtain this result it is necessary proceed with the steps shown in the diagram shown below.

We assume that we have successfully performed the first step and the second step, for which I recommend to review [Requirements and Download dependencies](#). For the rest of the steps, execute the commands indicated in order from the console (Bash).

Image Creation Step Docker Liferay





How to create the Docker Image

```
# Step 3.1 Installing the liferay-docker project extension
# - The zip file of the project from the network via URL https://github.com/smclab/liferay-docker/archive/v1.0.1.zip
$ unzip ~/Downloads/liferay-docker-1.0.2.zip

# Step 3.2 Initializing the Git Repository
# - Replace the Git repository URL with your own
# - Give the branch a name that is possibly explanatory
$ cd liferay-docker-1.0.2
$ git init
$ git add .
$ git commit -m "Initial import liferay-docker image builder"
$ git checkout -b build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6

# Step 3.3 Preparing the directory that will contain the bundles
$ cp -a ~/Downloads/bundles .

# Step 4 Running the image build process
# - specify the name of your repository (in this case replace amusarra/liferay-dxp)
# - the version of the docker image tag should be as explanatory as possible.
#   In this case it is liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 which corresponds with the branch name
$ ./build_local_image.sh bundles amusarra/liferay-dxp liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 no-push jboss-eap
```

Essential Steps for Creating Docker Liferay DXP 7.3.10 FP 1 + JBoss EAP 7.3.6



How to create the Docker Image

```
~/tmp/liferay-docker-1.0.1 | build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 | ? | ./build_local_image.sh bundles amusarra/liferay-dxp liferay  
-dxp-7.3.10-fp-1-jboss-eap-7.3.6 no-push jboss-eap
```

Creating Liferay DXP 7.3 FP 1 Docker Image on JBoss EAP 7.3.6



How to create the Docker Image

At the end of step 4, then the execution of the build_local_image.sh script, using the docker images command you can verify the new image just created (see figure below).

```
~/tmp/liferay-docker-1.0.1 ➤ build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 ● ? ➤ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
amusarra/liferay-dxp	liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6	9c6fc305bf12	7 hours ago	2.34GB
amusarra/liferay-dxp	liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6-202104280326	9c6fc305bf12	7 hours ago	2.34GB
amusarra/liferay-dxp	liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6-202104280315	c1e0998b369e	7 hours ago	2.34GB
nodered/node-red	1.3.1	179893d17974	2 weeks ago	455MB
emqx/emqx-edge	latest	e6c74c9fae7d	4 weeks ago	145MB
emqx/emqx-edge	4.2.9	e18ab0b979df	4 weeks ago	90.8MB
moby/buildkit	buildx-stable-1	be8e8392f56c	2 months ago	123MB
amusarra/artemis-adoptopenjdk-11	latest	7c45e9b033e2	2 months ago	321MB
nodered/node-red	latest	c060f9cb7fd5	2 months ago	456MB
mysql	5.6.50	6e68afc1976f	3 months ago	302MB
postgres	9.6.10	89bf0dc0dee0	2 years ago	229MB
store/oracle/database-enterprise	12.2.0.1	12a359cd0528	3 years ago	3.44GB

```
~/tmp/liferay-docker-1.0.1 ➤ build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 ● ? ➤ 10:15:55 5.33G RAM 100% hdd < 3.
```

Docker image of Liferay DXP 7.3.10 FP 1 + JBoss EAP 7.3.6



How to create the Docker Image

The advantage of initializing the build environment as Git repository, lies in the fact that once it is established that it works of the newly created image, after performing the commit and push operations, we can build the specific version at any time image.

Another advantage of using Git for versioning of image creation it is immediately evident when using the docker image inspect <imageid> command. The Docker image labels report information about the commit hash and the url of the repository, as shown in the figure below.

```
{
  "Image": "sha256:554f0c88bb1667e826c59b0292f69851d634241a5a598c7a413b29e2c43c61b6",
  "Volumes": null,
  "WorkingDir": "/opt/liferay",
  "Entrypoint": [
    "/bin/sh",
    "-c",
    "/usr/local/bin/liferay_entrypoint.sh"
  ],
  "OnBuild": null,
  "Labels": {
    "org.label-schema.build-date": "2020-10-06T23:59:59Z",
    "org.label-schema.name": "amusarra-liferay-dxp-7.2.10-fp-8",
    "org.label-schema.schema-version": "1.0",
    "org.label-schema.vcs-ref": "57b04cb55cd31aae7736a73a98d6b25cfc86ba42",
    "org.label-schema.vcs-url": "https://git.smc.it/antonio.musarra/liferay-docker.git",
    "org.label-schema.vendor": "Liferay, Inc.",
    "org.label-schema.version": "liferay-dxp-7.2.10-fp-8"
  },
  "DockerVersion": "19.03.13",
  "Author": "",
  "Config": {
    "Hostname": "",
    "Architecture": "amd64",
    "Platform": "linux/amd64"
  }
}
```

How to create the Docker Image

Test a Liferay DXP 7.3 + JBoss EAP 7.3 Docker Image





How to create the Docker Image

In order to perform a verification of the newly created image, it is enough run the `docker run -it {<imageid> | <image name>}` command. From the logs shown in console we can check if the Liferay instance does not go up correctly.

Using the `docker ps` command, and looking at the **status** column we should see initially the **health: starting** value which should become **healthy** when the Liferay service is on, as shown by the two figures below.

```
~/tmp/liferay-docker-1.0.1 | build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 | docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
3dc43cfb4053	amusarra/liferay-dxp:liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6	"/bin/sh -c /usr/loc..."	4 minutes ago	Up 4 minutes (health: st
	0.0.0.0:8080->8080/tcp, 0.0.0.0:55002->8000/tcp, 0.0.0.0:55001->8009/tcp, 0.0.0.0:55000->11311/tcp			zealous_villani

```
~/tmp/liferay-docker-1.0.1 | build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 | docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
3dc43cfb4053	amusarra/liferay-dxp:liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6	"/bin/sh -c /usr/loc..."	5 minutes ago	Up 5 minutes (healthy)
	0.0.0.0:8080->8080/tcp, 0.0.0.0:55002->8000/tcp, 0.0.0.0:55001->8009/tcp, 0.0.0.0:55000->11311/tcp			zealous_villani

```
~/tmp/liferay-docker-1.0.1 | build/liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 |
```

Verification of the Liferay service after the creation of the container.



How to create the Docker Image

```
~ docker images
REPOSITORY          TAG          IMAGE ID      CREATED      SIZE
amusarra/liferay-dxp liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6 f46a674012cb 2 minutes ago 2.34GB
amusarra/liferay-dxp liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6-202104281352 f46a674012cb 2 minutes ago 2.34GB
moby/buildkit        buildx-stable-1 be8e8392f56c 2 months ago 123MB
mysql                5.6.50      6e68afc1976f 3 months ago 302MB
postgres             9.6.10     89bf0dc0dee0 2 years ago 229MB
store/oracle/database-enterprise 12.2.0.1 12a359cd0528 3 years ago 3.44GB
```

```
~ docker run -it -p 8080:8080 -P --env LIFERAY_JVM_OPTS=-Dorg.jboss.as.logging.per-deployment=false amusarra/liferay-dxp:liferay-dxp-7.3.10-fp-1-jboss-eap-7.3.6
```

Tech Blog SMC

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Starting Liferay 7.3 DXP FP 1 Docker container



Resources

The extension of the [liferay-docker](#) project is available on the [SMC](#) GitHub repository. To follow I leave a series of resources that are the reference point for contents of this presentation.

- ✓ [Leveraging Docker](#) (source Liferay)
- ✓ [Creating a Liferay DXP Docker Container](#) (source Liferay)
- ✓ [Configuring a Docker Container](#) (source Liferay)
- ✓ [Deploying Liferay DXP Using Docker](#) (source Liferay)
- ✓ [How to build a Docker Liferay 7.2 image with the Oracle Database support](#) (source Antonio Musarra's Blog)
- ✓ [How to create Docker images Liferay DXP + Red Hat JBoss EAP](#) (source SMC Tech Blog)



Until next time

Welcome to the end!

I have tried to show the easiest way to create our custom Liferay images using the project that Liferay itself uses to create its Docker images.

This is the first step required to install Liferay in environments such as OpenShift or K8S.



Q&A



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Liferay Boot Camp 2021 Digital Edition

Thank you 😊