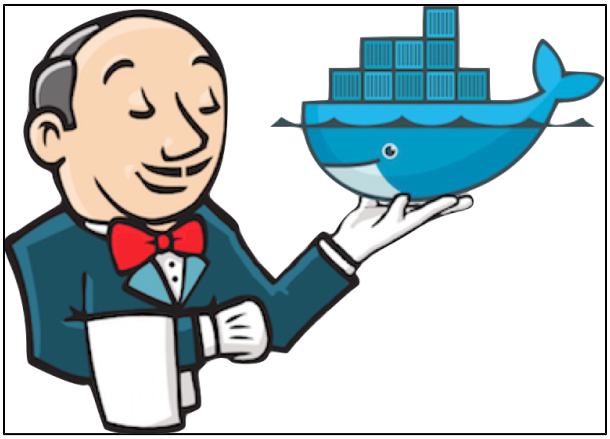
CloudBees Docker Custom Build Environment Plugin

Plugin Information
View CloudBees Docker Custom Build Environment on the plugin site for more information.

This plugin allows the definition of a build environment for a job using a Docker container.



Introduction

A major requirements for a Jenkins-based Continuous Integration/Delivery setup are:

- Ensure the build/test environment is exactly reproducible from a pre-defined setup.
- Ensure the build/test environment is well isolated from other builds executed on the same infrastructure.

Docker is a great way to bootstrap reproducible and isolated environments. Compared to a virtual machine, it's faster to launch and lighter to use. Another benefit is the Docker image can be defined both as a binary image pulled from repository, or as a plain text Dockerfile you can store in SCM along side the project source code, so that the source and environment are always in sync and recorded.

CloudBees Docker Custom Build Environment Plugin has been designed to make Docker Images / Dockerfile a first class citizen in a continuous delivery setup, which allows the simplest way for a development team to manage the exact bits of the build environment whilst the infrastructure team only has to focus on available resources hosting arbitrary docker containers.

User Guide

CloudBees Docker Custom Build Environment Plugin can be used from any job type, it appears in the "build environment" section and let you configure your build to run inside a Docker container.

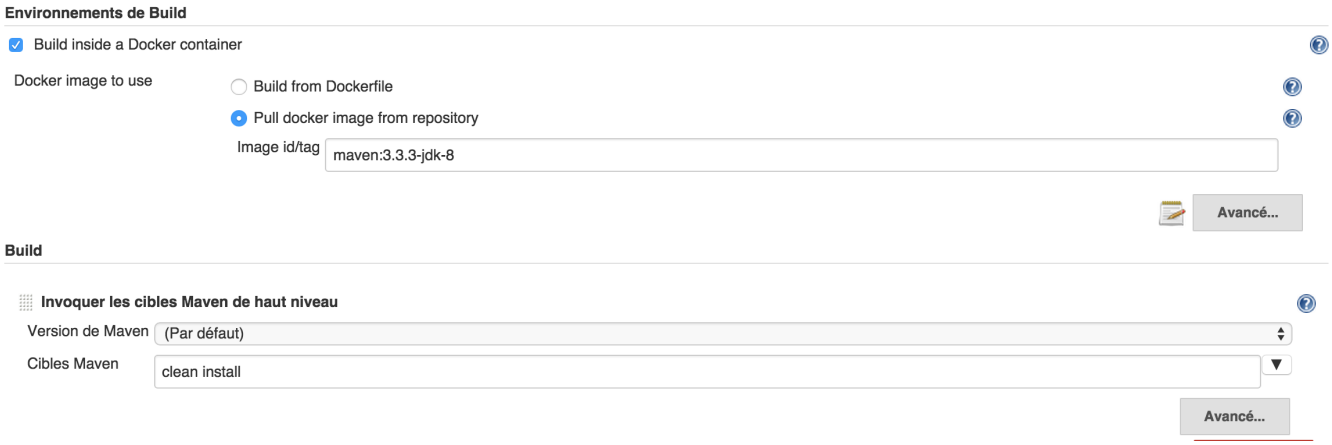
You can :

- Select the Docker image to run the build as a **Docker image** to be pulled. This is comparable to the docker-plugin approach to offer docker slaves within Jenkins, but without any prerequisites on the Docker image nor need for Administrator privileges to configure the adequate slave template.
- Configure the plugin to build a container image **from a Dockerfile** stored in project repository. With this setup, you get both the project source code and build environment defined in SCM. This is my preferred way to use this plugin.

SCM checkout will run within a classic Jenkins slave execution context - this is required to access the project Dockerfile then build and run the required container.

Using Docker image

CloudBees Docker Custom Build Environment let you use arbitrary docker image to host the build. You can use such an image you build on your own (or using CloudBees Docker Build and Publish plugin) to define the set of prerequisites for your project and share with the development team, as well as reuse for your CI job. In following sample, maven+jdk8 image available on DockerHub is used as a reference environment to host a maven build.



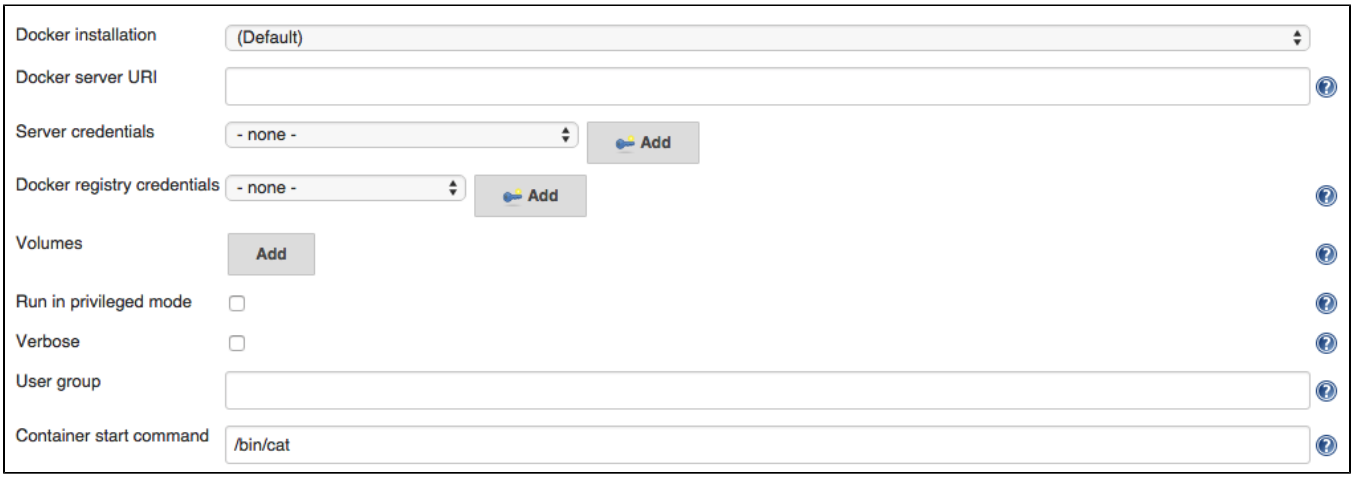
Using a Dockerfile

You also can have a Dockerfile and context stored in your project SCM aside your source code, so team can maintain them together and/or use distinct Dockerfile per branch. If you use this option, CloudBees Docker Custom Build Environment will build the image on first build and then will compare your Dockerfile with the one used on previous build to check a rebuild is necessary.

As for Docker images, there's no requirement on the Dockerfile you're using.

Advanced options

CloudBees Docker Custom Build Environment integrates with Docker-commons plugin so you can define the docker cli executable to be used to interact with Docker daemon, as well as select TLS credentials to be used to access a secured infrastructure (which is highly recommended)



- **Verbose** option allows to dump on build log the docker-cli command output. This is mostly designed for diagnostic purpose.

Volumes

The build container is ran with ~~Project workspace~~ entire Jenkins Home mounted inside container, so your build tools can access the SCM working copy and produce binaries / reports. The temporary directory is also mounted as many plugin do rely on this one to pass commands or credentials files that get deleted on build completion.

You can configure extra directories to be mounted into container, a common use-case is to have the dependency manager local cache storing artifacts on executor host so you don't have to download them again and again for every build.

User Group

Plugin design do require the user running build commands to be the same as jenkins slave agent user, so jenkins can manage files created in Workspace without hitting permission issues. As Docker does not (yet) support user namespace, there's no way to use a distinct user without breaking workspace at some point. For some use cases this is a major issue, as the container is designed with some specific permission set to a user.

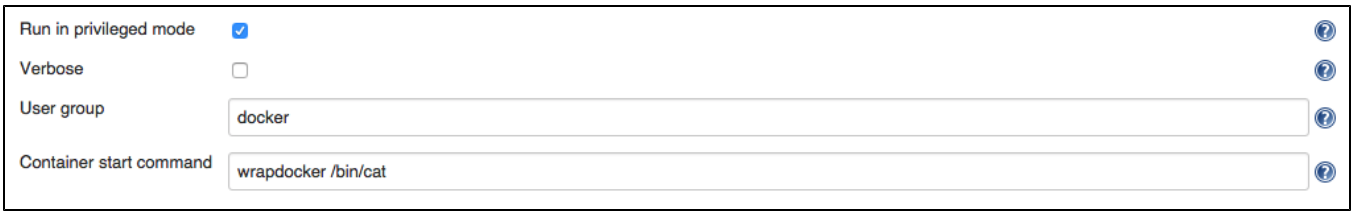
As a workaround, you can define the group for the user running commands during the build, and setup this group inside your container with adequate permissions.

Docker in Docker

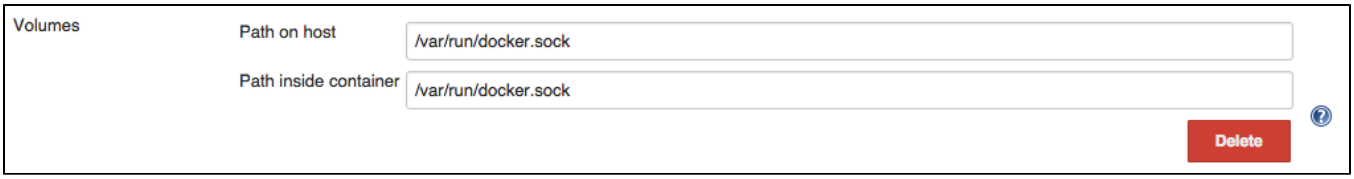
Sometime your build will require to create some other Docker containers, for sample to bootstrap a test database used by your integration tests.

Docker allows to host a docker daemon inside a docker container, known as "Docker in Docker". You can use jpetazzo/dind docker image (or a derived one) but will need to run container with escalated permission ("privileged mode") which you should consider twice as this has some significant security impacts. This also require some tweak in plugin configuration, so the command used to bootstrap the container do setup the docker daemon :

- run in privileged mode
- set startup command to run wrapdocker
- configure plugin to run within the 'docker' group so you can access the docker socket.



An alternative to Docker in Docker is to let the docker container hosting the build communicate with the host docker daemon so it can start other container, aside the build container. To achieve this, you can configure your Build container to run with docker daemon unix socket mounted, so you can run docker commands within your build. Use the "volumes" advanced option for this purpose



Please note : this is your responsibility to get the docker cli executable in your container. Simplest option is to include those lines in your Dockerfile :

```
RUN wget https://get.docker.io/builds/Linux/x86_64/docker-latest -O /bin/docker
RUN chmod +x /bin/docker
```

Within a build step in your job you can then run docker containers as you would from command line. If the container you're starting need to share files with the build, you can configure it to mount the same volumes used by your build container. Let's say for sample you have a docker image for application server which expect as launch parameter the path to your application WAR package. You can then run :

```
docker run --volumes-form $BUILD_CONTAINER_ID application_server_docker_image $WORKSPACE/dist/myapp.war
```

Environment variables

plugin do expose BUILD_CONTAINER_ID variable during the build so you can make reference to the container hosting the build when needed.

Open JIRA issues

T	Key	Summary	Assignee	Reporter	P	Status	Resolution	Created	Updated	Due
	JENKINS-35025	Container command '/bin /cat' not found or does not exist	Unassigned	Cedric Thiebault		OPEN	Unresolved	May 23, 2016	Apr 24, 2019	
	JENKINS-40684	Can't add a shell build step with docker	Unassigned	Nicolas Poirey		OPEN	Unresolved	Dec 27, 2016	Aug 05, 2019	
	JENKINS-29621	EnvInject Plugin is only working to a limited extent in combination with the docker build environment	Unassigned	Michael Süß		OPEN	Unresolved	Jul 24, 2015	Apr 24, 2019	
	JENKINS-29677	Other build environment plugins aren't compatible with the Docker Build Environment Plugin	Jon Hermansen	Michael Süß		OPEN	Unresolved	Jul 28, 2015	Feb 18, 2018	

	JENKINS-30113	Environment variables aren't passed to the docker container anymore	Jon Hermansen	Michael Süß		OPEN	Unresolved	Aug 24, 2015	Feb 18, 2018
	JENKINS-32393	PATH and HOME are being overwritten when executing command	Unassigned	Jon Whitcraft		OPEN	Unresolved	Jan 11, 2016	Jan 28, 2020
	JENKINS-32542	Maven project failed with "Connection refused" when built in a docker Container	Unassigned	Sylvie Carrier		OPEN	Unresolved	Jan 20, 2016	Jun 08, 2017
	JENKINS-33000	Incompatibility with BuildWrapper	Unassigned	Nicolas De Loof		OPEN	Unresolved	Feb 17, 2016	Apr 24, 2019
	JENKINS-33232	Not working in internal network.	Jon Hermansen	Miyata Jumpei		OPEN	Unresolved	Mar 01, 2016	Aug 07, 2018
	JENKINS-34967	'alpine' image is automatically downloading	Jon Hermansen	Suraj Narwade		REOPENED	Unresolved	May 20, 2016	Feb 18, 2018
	JENKINS-35497	If a docker image already exists, Docker Custom Build Environment will not pull a newer version of the image	Jon Hermansen	Alex Taylor		OPEN	Unresolved	Jun 09, 2016	Feb 18, 2018
	JENKINS-36769	Cannot override /tmp volume mount	Unassigned	Elena Laskavaia		OPEN	Unresolved	Jul 18, 2016	Apr 24, 2019
	JENKINS-39012	Custom volumes not writable by user, dangling volumes remain after job finishes	Unassigned	wujek srujek		OPEN	Unresolved	Oct 16, 2016	Apr 24, 2019
	JENKINS-39273	Don't pass --user uid by default	Unassigned	Daniel Buteau		OPEN	Unresolved	Oct 26, 2016	Apr 24, 2019
	JENKINS-39735	Builds hang first shell executor step and never finish	Unassigned	Phil Porada		OPEN	Unresolved	Nov 15, 2016	Apr 24, 2019
	JENKINS-41260	Docker Image Removal Prevents Job Email emission	Unassigned	John Mellor		OPEN	Unresolved	Jan 20, 2017	Apr 24, 2019
	JENKINS-44782	Maven build job attempts to connect to 'dockerhost' even when not running in a docker container	Unassigned	Jeff Thornsen		OPEN	Unresolved	Jun 08, 2017	Apr 24, 2019
	JENKINS-54021	Pulling alpine image fails when using custom registry for build image.	Unassigned	Kimon Hoffmann		OPEN	Unresolved	Oct 11, 2018	Oct 29, 2018
	JENKINS-29239	Doesn't work when Jenkins itself is containerized	Jon Hermansen	Nicolas De Loof		OPEN	Unresolved	Jul 06, 2015	Feb 18, 2018
	JENKINS-29411	Starting path not respected in SBT plugin	Unassigned	Jacek Sniecikowski		OPEN	Unresolved	Jul 14, 2015	Apr 24, 2019

Showing 20 out of 41 issues

Prerequisites

The slave executor(s) running jobs need to have docker installed and the daemon running. We suggest you use a "docker" label for such slaves, so you benefit from Jenkins slave management and cloud capabilities.

History

This plugin was already known as "Oki-Docki" but this name made it difficult for people to discover it within update center :-\

It has been created as part of DockerCon hackathon by Nicolas and Yoann. We ended as #2 team on the challenge :D

Developer tips

If you want to run this plugin on Windows / OSX for development, please note the plugin will bind mount the temporary directory inside container, so you probably will have to run jenkins JVP with -Djava.io.tmpDir=$HOME/tmp as only the users home directory is accessible when using boot2docker.

Future plans

- support docker-compose

Versions

Not released yet

1.6.4

- Fixed a NPE for jobs created prior to 1.6.2 (JENKINS-31220)

1.6.3

- Fixed a regression introduced in 1.6.2, corrupting environment variables (JENKINS-31166)

1.6.2

- Support bridge 'net' flag (commit)
- Do not append command if not set (JENKINS-30692) (#33)
- Added an option to force pull the image
- Expose build wrappers contributed environment variables
- Ensure docker0 is up before trying to resolve it

1.6.1

- Use the Java API to lookup docker0 ip (JENKINS-30512) (#32)
- Add buildwrapper environment variables to the docker context

1.6

- support maven job type
- expose dockerhost IP as "dockerhost" in /etc/host
- configure container with a subset of build environment, as slave node environment doesn't make sense inside container.

1.5

- Option to configure volumes
- plugin now can run docker-in-docker and comparable advanced use-cases

1.4

- Support Node Properties environment variables (to define DOCKER_HOST per node for example)

1.3

- Support use of alternate Dockerfile
- Allows to run containers from the container hosting the build (see "Docker in Docker")
- Expose build container identifier as BUILD_CONTAINER_ID environment variable
- Code cleanup

1.2

- Initial release as "CloudBees Docker Custom Build Environment Plugin" (plugin was previously known as "*Oki-Docki*").

Notes

Implementation details

The docker container is ran after SCM has been checked-out into a slave workspace, then all later build commands are executed within the container thanks to docker exec introduced in Docker 1.3. When configured to build container from a Dockerfile, the plugin computes the Dockerfile checksum and uses it as container ID, so it can detect if the image exists on a slave and so only build it the first time it is requested.

Comparison

Compared to docker plugin,

- This plugin can use arbitrary docker images, there is NO prerequisite to get a specific user set, ssh daemon, or even JDK available in docker container you use for the build - no need for CI-specific docker image, can use the exact same docker image you use on developer workstation to run/test your project.
- Changes to the project that require new tools / version upgrades can be reflected in the Dockerfile within an atomic commit. No need to reconfigure the job or wait for the adequate slave to be setup. You can also use a distinct Dockerfile per project branch.
- The user doesn't need Administrator privileges to setup a docker-slave template, you just need to commit a Dockerfile to your source repository.
- Docker-plugin abuses the Jenkins Cloud API. i.e. you have to define a fixed IP address and can't benefit from a Cloud slave provider, or a pool of generic slaves. CloudBees Docker Custom Build Environment only relies on slaves which have docker installed, and Jenkins will provision/pick-up available ones using all available slaves provider plugins.