DOCKER FOR DSPACE – LOWERING THE BARRIER OF ENTRY FOR NEW CONTRIBUTORS

OR 2019

- Terry Brady, Georgetown University Library
- Pascal Becker, The Library Code

http://bit.ly/dspace-docker

Please complete the Pre-work (Docker Install), if you have not already done so.

WHO WE ARE

TERRY BRADY

- Software Developer, Georgetown University Library
- DSpace Committer
- https://github.com/terrywbrady/info

PASCAL BECKER

- CEO and founder of The Library Code GmbH
- DSpace Committer
- Member of DSpace's Leadership and Steering Groups
- https://www.the-library-code.de/

ABOUT THIS WORKSHOP

BACKGROUND

- 2018 the DSpace for Docker was created
- Start any version of DSpace from your desktop
  - (Windows 10, MacOS, Linux)
- Helps newcomers to get a test system running quickly
- Helps developers to easily spin up development environments

WHO YOU ARE (WE THINK)

- People who want to ...
  - get a sneak peak on DSpace 7
  - get started with Docker
  - know if Docker can help them with their development environment
  - learn how they can get started with DSpace
  - become more involved in the DSpace project

WORKSHOP OBJECTIVES

- Understand basics of Docker (Images, Containers, Volumes, ...)
- What Docker images have been published for DSpace
- How to install Docker
- How to launch DSpace 6 and DSpace 7 using Docker
- How to participate in DSpace testing using Docker
- Exchanging tips and ideas about DSpace and Docker

MOTIVATION

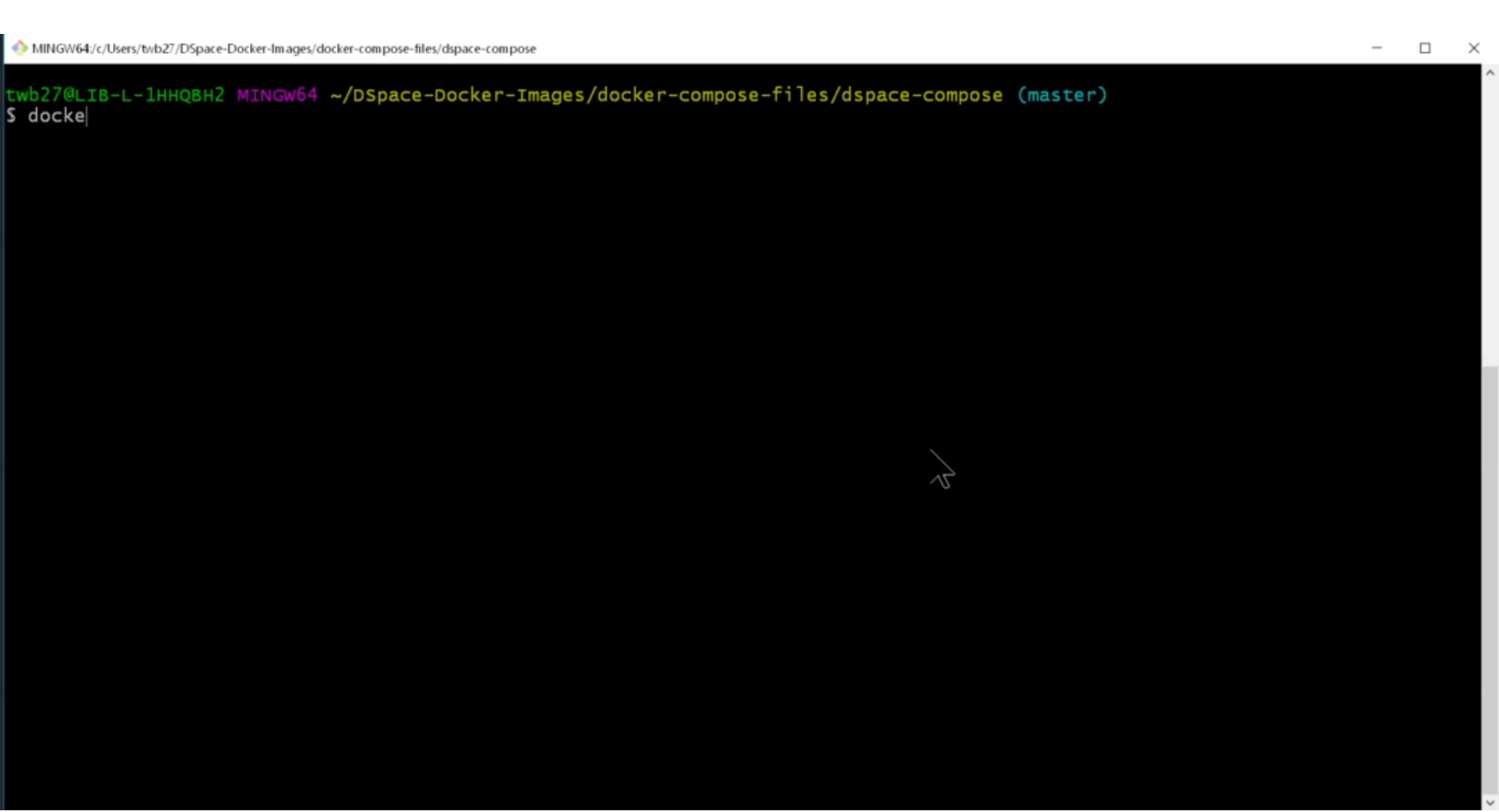
IMAGINE YOU COULD...

- ...create a DSpace installation with one single command
- ...install and start a new instance of any version of DSpace in under 3 minutes
- ...wouldn't need to have to think about database versions, operating systems, ordering virtual hosts, and further more.

DEMO: RUNNING DSPACE 7

- It takes 2-3 minutes to start up

```
docker-compose -p d7 -f docker-compose.yml -f d7.override.yml up -d
```


MINGW64:/c/Users/twb27/DSpace-Docker-Images/docker-compose-files/dspace-compose
twb27@LIB-L-1HHQBH2 MINGW64 ~/DSpace-Docker-Images/docker-compose-files/dspace-compose (master)
$ docke

Security Checkup

2 minutes to a more secure account

NO, THANKS START CHECKUP

Google Search I'm Feeling Lucky

Log In

All of DSpace | Statistics

Welcome to DSpace

DSpace is an open source software platform that enables organisations to:

- capture and describe digital material using a submission workflow module, or a variety of programmatic ingest options
- distribute an organisation's digital assets over the web through a search and retrieval system
- preserve digital assets over the long term

Search

WHAT IS POSSIBLE WITH DSPACE AND DOCKER?

- Try out a DSpace feature without impacting your existing instance
- Preview an enhancement or new version
- Give input on the implementation
- Verify a bug fix **before** it is released
- Onboard new developers and repository managers to the project
- and so much more...

DSPACE DOCKER IMAGES

- DSpace 7x, DSpace 6x, DSpace 5x, DSpace 4x
  - Install content from DSpace AIP files on creation
- DSpace Database
- DSpace Angular UI
- Published to https://hub.docker.com/u/dspace
- See DSpace Docker Tutorial Overview

CAN I USE YOUR IMAGES IN PRODUCTION?

- Not yet!
- Current images focus on testing and development
- We want to gain more experience on our own
- Do you want to help to create images for production? Contact us on slack!

INSTALL INSTRUCTIONS (RECAP)

Most attendees will have completed this step already

- Install Docker Desktop
- Install a terminal for running docker (Windows only)
- Download DSpace Docker Compose files

INSTALLATION INSTRUCTIONS

- Windows 10 Setup
- MacOS Setup
- Linux Desktop Setup

EXERCISE 1: VERIFY INSTALLATION

- Exercise 1: Verify Installation

DOCKER CONCEPTS

- Basic idea of Docker
- Docker Images
- Docker Containers
- Docker vs. virtualization
- Docker Volumes

WHY DOCKER?

Imagine you could pack an application's complete environment into one package easily.

WHY DOCKER?

- One *script* to start up your service / application
  - All necessary services are started at once (database, web server)
- Runs identically on **any** desktop or server that supports Docker
  - Windows, MacOS or Linux!
- Replicable process
  - Destroy and recreate your service easily

DOCKER IMAGES

> *An image is an executable package that includes everything needed to run an application - the code, a runtime, libraries, environment variables, and configuration files.*
>
> *- Docker Documentation, Get started with Docker, Part 1*
>
> *Orientation*

DOCKER IMAGES (CONTINUED)

An Image is

- A snapshot of an application and its complete environment
- Can be shared and downloaded
- Can be published
  - Online on docker hub
  - Or in a private repository

DOCKER CONTAINERS

- A running version of a docker image
- Like a small server running within your desktop
- Containing a complete environment
- Containing an application or service
- Started and stopped by Docker
- Runs independently of other applications

A CONTAINER'S LIFETIME

- Images package a complete environment
- Start a new container from an image is very easy
- A Container is just like a running version of an image
- Delete containers when they stop
- Create a new container everytime a service starts

DOCKER VOLUMES

- If you delete a container when it stops, how do you persist data?
- Volumes can be (re-)used when a container starts
- Volumes outlive the containers that uses them
- Like a really small disk drive or network drive
- Data you wish to save must be stored in a volume

EXERCISE 2: DOCKER IMAGES AND CONTAINERS

- Exercise 2: Docker Images and Containers

DOCKER-COMPOSE

DOCKER COMPOSE

- An image defines a service and its environment
- Today's applications are composed out of multiple services
- We need information about how to run an application
  - Is it composed out of multiple services?
  - How do they depend on each other?
  - Which ports are used?
  - How to start and stop it all together?

DOCKER-COMPOSE.YAML

- Docker Compose is a command to control environments of multiple containers that work together
- Docker Compose defines information within configuration files about how to run an application
- Docker Compose builds complex docker commands for you to start up multiple services in the right order

POSSIBILITIES OF DOCKER-COMPOSE

- Docker Compose can describe complex setups
  - Defines which services to run in which order
  - Configures volumes, ports, network structure, limits, environment variables, ...
  - Can apply limits regarding CPU and/or RAM usage
- docker-compose contains shortcuts to interact with the containers it started

DOCKER COMPOSE AND DSPACE

- The DSpace project heavily uses docker compose
- We have several docker-compose files that can be used together
- Some parts of a docker compose file gets overridden by another docker-compose file
- That allows us to easily tweak the instance of DSpace you're running

RUNNING DSPACE 6 WITH DOCKER-COMPOSE

```
docker-compose -p d6 -f docker-compose.yml -f d6.override.yml up -d
```

```
docker-compose -p d6 -f docker-compose.yml -f d6.override.yml down
```

```yaml
version: "3.7"

services:
  dspacedb:
    image: dspace/dspace-postgres-pgcrypto
    # Note that a separate image exists for DSpace 4x
    # image: dspace/dspace-postgres-4x
    container_name: dspacedb
    environment:
      - PGDATA=/pgdata
    volumes:
      - pgdata:/pgdata
      - "../../add-ons/dspace-docker-tools:/dspace-docker-tools"
    networks:
      - dspacenet
    tty: true
    stdin_open: true
```

Docker Compose File

OVERRIDING WITH DOCKER-COMPOSE

command to start DSpace 5:

```
docker-compose -p d5 -f docker-compose.yml -f d5.override.yml pull
```

DSpace's default image:

```
dspace:
  image: "${DOCKER_OWNER:-dspace}/dspace:${DSPACE_VER:-dspace-6_x-jdk8-te
```

d5.override.yaml:

```
dspace:
  image: "${DOCKER_OWNER:-dspace}/dspace:${DSPACE_VER:-dspace-5_x-jdk8-te
```

EXERCISE 3A: UNDERSTANDING DOCKER COMPOSE

EXERCISE 3B: RUNNING DSPACE 6 WITH DOCKER-COMPOSE

EXERCISE 4: RUNNING DSPACE 7 WITH DOCKER-COMPOSE

ADVANCED TOPICS

- Our ideas
  - Building code changes with Docker Composse
  - Running DSpace 6 and DSpace 7 on different ports
- Your ideas
  - Anything specific you would like us to cover?

EXERCISE 5: ADVANCED TOPICS

- Exercise 5: Advanced Topics

WE NEED YOUR HELP

- Try it yourself, give us feedback on the documentation
  - Join the **#dspace-docker** Slack Channel
- Help us assemble assets to distribute in AIP files

WHAT WE NEED

- Curating and Assembling AIP Resources
  - Public domain / restriction free
  - Real repository content (but not very large)
    - Small PDFs
    - Small image
  - Realistic metadata

DISCUSSION

- Could you imagine using this capability?
- What would be needed to make this compelling for the repository manager community?

FEEDBACK/QUESTIONS?

- What ideas do you have?
- What questions do you have?

REFERENCE LINKS

- DSpace Docker Tutorial Overview
- Docker Documentation
- Docker Compose Documentation
- Join the **#dspace-docker** Slack Channel

THANK YOU

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- Pascal Becker, The Library Code

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