Shrikrishna Holla

Section 2

Composing Services



In this Section, we are going to take a look at...

- Orchestration
- Docker compose
- Deploying composed services using machine
- Single host scaling



Shrikrishna Holla

Video 2.1

Composing Primer



In this Video, we are going to take a look at...

- Orchestration
- Docker compose
- Compose YAML for Diaspora setup



```
version: "2"
services:
 web:
    build: .
    command: '/bin/bash -l -c "bundle exec unicorn -c config/unicorn.rb"'
    portsi
     - "3000:3000"
    environment:
     - RAILS_ENV=development
     - PORT=3000
    volumes:
     - "./config/diaspora.yml:/home/diaspora/diaspora/config/diaspora.yml"
     - "./config/database.yml:/home/diaspora/diaspora/config/database.yml"
    Links:
      - "db:db"
 db1
    image: postgres:latest
```

```
→ diaspora git:(develop)
✓ diaspora git:(develop) * docker-compose build db uses an image, skipping
Building web
```

```
version: "2"
services:
 web:
   build:
    command: '/bin/bash -l -c "bundle exec unicorn -c config/unicorn.rb"'
    ports:
      - "3000:3000"
    environment:
      - RAILS_ENV=development
     - PORT=3000
    volumes:
      - "./config/diaspora.yml:/home/diaspora/diaspora/config/diaspora.yml"
      - "./config/database.yml:/home/diaspora/diaspora/config/database.yml"
   links:
      - "db:db"
 dbt
    image: postgres:latest
```



```
→ diaspora git:(develop) X
→ diaspora git:(develop) x docker-compose ps
   Name
                          Command
                                                State
                                                         Ports
diaspora_db_1 /docker-entrypoint.sh postgres
                                                       5432/tcp
                                               Up
→ diaspora git:(develop) x docker-compose run web /bin/bash -l -c "rake db:create db:schema:load"
```



```
07231310')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (0.8ms) INSERT INTO "schema_migrations" (version) VALUES ('201412
30214830')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201408
                                                                     (1.8ms)
26165533')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.3ms)
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201304
04211624')
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201501
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.6ms)
06050733')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201406
                                                                     (2.4ms)
01102543')
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201304
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
29073928')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.0 ms)
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201504
03192408')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.1ms)
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201502
20001357')
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201505
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.1ms)
31005120')
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201408
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (1.2ms)
01101352')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201412
                                                                     (3.5ms)
16213423')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201409)
06192846')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (3.8ms)
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201307
17104359')
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (3.7ms)
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201408
01101230')
                                                                              INSERT INTO "schema_migrations" (version) VALUES ('201412
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (0.7ms)
27120907')
                                                                              INSERT INTO "schema_migrations" (version) VALUES (201404
[2016-07-15T06:37:53] DEBUG PID-1 TID-8755600 ActiveRecord::Base:
                                                                     (0.8ms)
22134627")
                                                                                                                        VIDEO
→ diaspora git:(develop) X
                                                                                                                                udemy
```

→ diaspora git:(develop) x docker-compose up -d
diaspora_db_1 is up-to-date
Creating diaspora_web_1
→ diaspora git:(develop) x

[PACKT] udemy



```
→ diaspora git: (develop) x docker-compose up -d
diaspora_db_1 is up-to-date
Creating diaspora_web_1
→ diaspora git:(develop) x docker-compose ps
    Name
                          Command
                                                State
                                                               Ports
diaspora_db_1 /docker-entrypoint.sh postgres Up 5432/tcp
diaspora_web_1 /bin/bash -l -c bundle exe ... Up
                                                       0.0.0.0:3000->3000/tcp
→ diaspora git: (develop) x docker-compose logs web
Attaching to diaspora_web_1
web_1 | I, [2016-07-15T07:17:30.797337 #1] INFO -- : Refreshing Gem list
web_1 | [2016-07-15T07:17:42] INFO PID-1 TID-17308040 DiasporaFederation: successfully configured the federation library
web_1 | I, [2016-07-15T07:17:44.885109 #1] INFO -- : listening on addr=0.0.0.0:3000 fd=12
web_1 | I, [2016-07-15T07:17:44.918837 #1] INFO -- : master process ready
web_1 | I, [2016-07-15T07:17:44.922178 #150] INFO -- : worker=0 ready
→ diaspora git:(develop) X
```



```
Composing Primer
diaspordertion B, Legtbien Tbash -1 -c bundle exe ... Up
                                                         0.0.0.0:
3000->3000/tcp
→ diaspora git:(develop) x docker-compose logs web
Attaching to diaspora_web_1
web_1 | I, [2016-07-15T07:17:30.797337 #1] INFO -- : Refreshing
Gem list
web_1 | [2016-07-15T07:17:42] INFO PID-1 TID-17308040 DiasporaFe
deration: successfully configured the federation library
web_1 | I, [2016-07-15T07:17:44.885109 #1] INFO -- : listening o
n addr=0.0.0.0:3000 fd=12
web_1 | I, [2016-07-15T07:17:44.918837 #1] INFO -- : master proc
ess ready
web_1 | I, [2016-07-15T07:17:44.922178 #150] INFO -- : worker=0
ready
→ diaspora git:(develop) x docker-compose logs --watch web
View output from containers.
Usage: logs [options] [SERVICE...]
Options:
    --no-color
                       Produce monochrome output.
   -f, --follow
                       Follow log output.
                       Show timestamps.
   -t, --timestamps
   --tail="all"
                       Number of lines to show from the end of th
e logs
                       for each container.
→ diaspora git:(develop) x docker-compose logs --watch web
```

diaspora*

Log In

Welcome, friend.

You're about to change the Internet. Let's get you set up, shall we?

Configure your pod



Look at config/diaspora.yml.example and config/database.yml.example for help.

Try it out

Start by creating an account

Make a contribution!



```
web_1 | [2016-07-15T07:18:48] INFO PID-150 TID-17308040 Rails: S
tarted GET "/assets/branding/logos/logo.png" for 192.168.99.1 at 2
016-07-15 07:18:48 +0000
web_1 | 192.168.99.1 - - [15/Jul/2016:07:18:48 +0000] "GET /brand
ing/logos/logo.png HTTP/1.1" 200 - 0.1544
web_1 | [2016-07-15T07:18:48] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:48] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:48] INFO PID-150 TID-17308040 Rails: S
tarted GET "/assets/landing/cog.png" for 192.168.99.1 at 2016-07-1
5 07:18:48 +0000
web_1 | 192.168.99.1 - - [15/Jul/2016:07:18:48 +0000] "GET /landi
ng/cog.png HTTP/1.1" 200 - 0.1267
web_1 | [2016-07-15T07:18:48] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:48] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:48] INFO PID-150 TID-17308040 Rails: S
tarted GET "/assets/landing/smiley_laughing.png" for 192.168.99.1
at 2016-07-15 07:18:48 +0000
web_1 | 192.168.99.1 - - [15/Jul/2016:07:18:49 +0000] "GET /landi
ng/smiley_laughing.png HTTP/1.1" 200 - 0.1614
web_1 | [2016-07-15T07:18:49] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:49] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:49] INFO PID-150 TID-17308040 Rails: S
tarted GET "/assets/landing/pen_write.png" for 192.168.99.1 at 201
6-07-15 07:18:49 +0000
web_1 | 192.168.99.1 - - [15/Jul/2016:07:18:49 +0000] "GET /landi
ng/pen_write.png HTTP/1.1" 200 - 0.1013
web_1 | [2016-07-15T07:18:51] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:51] DEBUG PID-150 TID-17308040 Rails:
web_1 | [2016-07-15T07:18:51] INFO PID-150 TID-17308040 Rails: S
tarted GET "/assets/favicon.png" for 192.168.99.1 at 2016-07-15 07
:18:51 +0000
     | 192.168.99.1 - - [15/Jul/2016:07:18:51 +0000] "GET /favic
on.png HTTP/1.1" 200 - 0.0838
```

diaspora*

Log In

Welcome, friend.

You're about to change the Internet. Let's get you set up, shall we?

Configure your pod



Look at config/diaspora.yml.example and config/database.yml.example for help.

Try it out





```
closed connection [IP: 128.31.0.66 80]
E: Failed to fetch http://httpredir.debian.org/debian/pool/main/x/xtrans/xtrans-dev_1.3.4-1_all.deb Error reading from server. Remote
end closed connection [IP: 128.31.0.66 80]
E: Aborting install.
Adding user 'diaspora' ...
Adding new group 'diaspora' (1000) ...
Adding new user 'diaspora' (1000) with group 'diaspora' ...
Creating home directory `/home/diaspora' ...
Copying files from '/etc/skel' ...
---> 434aad2842e6
Removing intermediate container ff01e9e54146
Step 4 : USER diaspora
---> Running in 389a161d07a1
---> 8db50c9133f6
Removing intermediate container 389a161d07a1
Step 5: RUN gpg --keyserver hkp://keys.gnupg.net --recv-keys 409B6B1796C275462A1703113804BB82D39DC0E3
---> Running in 187d892db454
gpg: directory '/home/diaspora/.gnupg' created
gpg: new configuration file '/home/diaspora/.gnupg/gpg.conf' created
gpg: WARNING: options in '/home/diaspora/.gnupg/gpg.conf' are not yet active during this run
gpg: keyring `/home/diaspora/.gnupg/secring.gpg' created
gpg: keyring `/home/diaspora/.gnupg/pubring.gpg' created
gpg: requesting key D39DC0E3 from hkp server keys.gnupg.net
gpg: /home/diaspora/.gnupg/trustdb.gpg: trustdb created
gpg: key D39DC0E3: public key "Michal Papis (RVM signing) <mpapis@gmail.com>" imported
gpg: no ultimately trusted keys found
gpg: Total number processed: 1
gpg:
                 imported: 1 (RSA: 1)
```

E: Failed to fetch http://httpredir.debian.org/debian/pool/main/x/xorg/x11-common_7.7+7_all.deb Error reading from server. Remote end

Get:321 http://httpredir.debian.org/debian/ jessie/main nodejs amd64 0.10.29~dfsg-2 [648 kB]

Fetched 156 MB in 21min 13s (122 kB/s)

Unable to correct missing packages.

```
gpg: WARNING: options in '/home/diaspora/.gnupg/gpg.conf' are not yet active during this run
gpg: keyring '/home/diaspora/.gnupg/secring.gpg' created
gpg: keyring '/home/diaspora/.gnupg/pubring.gpg' created
gpg: requesting key D39DC0E3 from hkp server keys.gnupg.net
gpg: /home/diaspora/.gnupg/trustdb.gpg: trustdb created
gpg: key D39DC0E3: public key "Michal Papis (RVM signing) <mpapis@gmail.com>" imported
gpg: no ultimately trusted keys found
gpg: Total number processed: 1
                   imported: 1 (RSA: 1)
---> 27b4f8455132
Removing intermediate container 187d892db454
Step 6: RUN \curl -sSL https://get.rvm.io | bash -s stable
---> Running in f84024891a1d
/bin/sh: 1: curl: not found
---> 4d38e00db38c
Removing intermediate container f84024891a1d
Step 7: RUN /bin/bash -l -c 'source "$HOME/.rvm/scripts/rvm" && rvm autolibs read-fail && rvm install 2.2.1'
---> Running in 9583b9afadd8
/bin/bash: /home/diaspora/.rvm/scripts/rvm: No such file or directory
ERROR: Service 'web' failed to build: The command '/bin/sh -c /bin/bash -l -c 'source "$HOME/.rvm/scripts/rvm" && rvm autolibs read-fai
1 && rvm install 2.2.1'' returned a non-zero code: 1
→ diaspora git:(develop) x docker-compose build --no-cache y
db uses an image, skipping
Building web
Step 1 : FROM debian: jessie
---> 1b088884749b
Step 2 : MAINTAINER Shrikrishna Holla <shrikrishna.holla@gmail.com>
---> Running in e420efe8683e
---> 87cccc05e1ae
Removing intermediate container e420efe8683e
                                                                                           build-essential
                                                                                                                                     libssl-
Step 3: RUN apt-get update && apt-get install -y --fix-missing
                                                         libxml2-dev
              libcurl4-openssl-dev
dev
                                                                                          libxslt-dev
                                                                                                                            imagemagick
                ghostscript git
                                                        cmake
                                                                                                          libpq-dev
                                                                                 curl
                                                                                                 libreadline6-dev
ibmagickwand-dev
                                        nodejs
                                                                       gawk
```

Docker Stacks and Distributed Application Bundles

Overview

Docker Stacks and Distributed Application Bundles are experimental features introduced in Docker 1.12 and Docker Compose 1.8, alongside the concept of swarm mode, and Nodes and Services in the Engine API.

A Dockerfile can be built into an image, and containers can be created from that image. Similarly, a dockercompose.yml can be built into a **distributed application bundle**, and **stacks** can be created from that bundle. In that sense, the bundle is a multi-services distributable image format.

As of Docker 1.12 and Compose 1.8, the features are experimental. Neither Docker Engine nor the Docker Registry support distribution of bundles.

Producing a bundle

The easiest way to produce a bundle is to generate it using docker-compose from an existing docker-compose.yml.

Of course, that's just one possible way to proceed, in the same way that docker build isn't the only way to produce a Docker image.



From docker compass

```
→ diaspora git:(develop) X
→ diaspora git:(develop) X
→ diaspora git:(develop) X
→ diaspora git:(develop) X docker-compose bundle --fetch-digests
Pulling db (postgres:latest)...
latest: Pulling from library/postgres
Digest: sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077
Status: Image is up to date for postgres:latest
WARNING: Unsupported key 'volumes' in services.web - ignoring
Wrote bundle to diaspora.dab
→ diaspora git:(develop) X
```

→ diaspora git:(develop) X



→ diasprection 3 Lecture 57p) X → diaspora git:(develop) X → diaspora git:(develop) X → diaspora git:(develop) x docker-compose bundle --fetch-digests Pulling db (postgres:latest)... latest: Pulling from library/postgres Digest: sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077 Status: Image is up to date for postgres:latest WARNING: Unsupported key 'volumes' in services.web - ignoring Wrote bundle to diaspora.dab → diaspora git:(develop) x cat diaspora.d

Continue >

· diaspooning Brimer

```
"Services": {
 "db": {
    "Image": "postgres@sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077",
    "Networks": [
      "default"
  "web": {
    "Args": [
      "/bin/bash",
      "-1",
     "-c",
      "bundle exec unicorn -c config/unicorn.rb"
   ],
    "Env": [
      "PORT=3000",
      "RAILS_ENV=development"
    "Image": "shrikrishna/diaspora@sha256:afb4725fc95f42482ef0e2c2d7e00eb25ba6c8112acbc40bd837d0c3224a1620",
    "Networks": [
      "default"
    ],
    "Ports": [
        "Port": 3000,
        "Protocol": "tcp"
"Version": "0.1"
```

→ diaspora git:(develop) X



→ diaspora git: (develop) x docker swarm init



```
diaspora git:(develop) x
```





```
→ diaspora git:(develop) X
→ diaspora git:(develop) X
→ diaspora git:(develop) X
→ diaspora git:(develop) X docker-compose bundle --fetch-digests
Pulling db (postgres:latest)...
latest: Pulling from library/postgres
Digest: sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077
Status: Image is up to date for postgres:latest
WARNING: Unsupported key 'volumes' in services.web - ignoring
Wrote bundle to diaspora.dab
→ diaspora git:(develop) X cat diaspora.dab
```

→ diaspora git:(develop) X



```
"Services": {
 "db": {
    "Image": "postgres@sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077",
    "Networks": [
      "default"
  "web": {
    "Args": [
      "/bin/bash",
      "-1",
     "-c",
      "bundle exec unicorn -c config/unicorn.rb"
   ],
    "Env": [
      "PORT=3000",
      "RAILS_ENV=development"
    "Image": "shrikrishna/diaspora@sha256:afb4725fc95f42482ef0e2c2d7e00eb25ba6c8112acbc40bd837d0c3224a1620",
    "Networks": [
      "default"
    ],
    "Ports": [
        "Port": 3000,
        "Protocol": "tcp"
"Version": "0.1"
```

→ diaspora git:(develop) X



diaspora git:(develop) x docker swarm init No --secret provided. Generated random secret: bmgnzx832233tntj9usqvey3o



→ diaspora git: (develop) x docker swarm init



```
diaspora git:(develop) x
```

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```
→ diaspora git:(develop) *
→ diaspora git:(develop) X
→ diaspora git;(develop) *
→ diaspora git:(develop) *
→ diaspora git:(develop) x
→ diaspora git:(develop) *

→ diaspora git:(develop) X
→ diaspora git:(develop) X
→ diaspora git:(develop) *

→ diaspora git:(develop) X
→ diaspora git:(develop) * docker stack
Usage: docker stack COMMAND
Manage Docker stacks
Options:
      --help Print usage
Commands:
  config
             Print the stack configuration
             Create and update a stack from a Distributed Application Bundle (DAB)
  deploy
             Remove the stack
  1000
             List the tasks in the stack
  tasks
Run 'docker stack COMMAND --help' for more information on a command.
→ diaspora git:(develop) X
```



```
→ diaspora git:(develop) *

→ diaspora git:(develop) x
→ diaspora git:(develop) *

→ diaspora git:(develop) X
→ diaspora git:(develop) * docker stack
Usage: docker stack COMMAND
Manage Docker stacks
Options:
      --help Print usage
Commands:
  config
             Print the stack configuration
             Create and update a stack from a Distributed Application Bundle (DAB)
  deploy
             Remove the stack
  200
             List the tasks in the stack
  tasks
Run 'docker stack COMMAND --help' for more information on a command.
→ diaspora git:(develop) x docker stack tasks diaspora-dev
                                             SERVICE
ID
                                                                                                                                                           LAST STATE
                                                                                                                                                                                  DESIRED STATE NODE
4dpuljwghpkb4boiem1u5o7ke diaspora-dev_web.1 diaspora-dev_web shrikrishna/diaspora@sha256:afb4725fc95f42482ef0e2c2d7e00eb25ba6c8112acbc40bd837d0c3224a1620
                                                                                                                                                          Running 24 seconds ago Running
                                                                                                                                                                                                 dev
dz@ukap3xpsn6rnl8immw7fmv diaspora-dev_db.1 diaspora-dev_db
                                                               postgres@sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077
                                                                                                                                                           Running 2 minutes ago
                                                                                                                                                                                  Running
                                                                                                                                                                                                 dev
→ diaspora git:(develop) x
```

→ diaspora git:(develop) x
 → diaspora git:(develop) x
 → diaspora git:(develop) x



```
→ diaspora git:(develop) x

→ diaspora git:(develop) X
→ diaspora git:(develop) x
→ diaspora git:(develop) X

→ diaspora git:(develop) X
→ diaspora git:(develop) x
→ diaspora git:(develop) *
→ diaspora git:(develop) * docker stack
Usage: docker stack COMMAND
Manage Docker stacks
Options:
      --help Print usage
Commands:
  config
             Print the stack configuration
             Create and update a stack from a Distributed Application Bundle (DAB)
  deploy
             Remove the stack
  1700
             List the tasks in the stack
  tasks
Run 'docker stack COMMAND --help' for more information on a command.
→ diaspora git:(develop) * docker stack tasks diaspora-dev
                                              SERVICE
ID
                                                                                                                                                           LAST STATE
                                                                                                                                                                                   DESIRED STATE NODE
4dpuljwghpkb4boiem1u5o7ke diaspora-dev_web.1 diaspora-dev_web shrikrishna/diaspora@sha256:afb4725fc95f42482ef0e2c2d7e00eb25ba6c8112acbc40bd837d0c3224a1620
                                                                                                                                                           Running 24 seconds ago Running
                                                                                                                                                                                                  dev
dz@ukap3xpsn6rnl8immw7fmv diaspora-dev_db.1 diaspora-dev_db
                                                               postgres@sha256:e0a230a9f5b4e1b8b03bb3e8cf7322b0e42b7838c5c87f4545edb48f5eb8f077
                                                                                                                                                           Running 2 minutes ago
                                                                                                                                                                                  Running
                                                                                                                                                                                                 dev
→ diaspora git:(develop) x docker -v
Docker version 1.12.0-rc4, build e4a0dbc, experimental
→ diaspora git:(develop) x
```

→ diaspora git:(develop) x
 → diaspora git:(develop) x
 → diaspora git:(develop) x



Next Video

Deploying Composed Services

