



DYALOG

Belfast 2018

Workshop TP2

Docker-Compose

Kubernetes

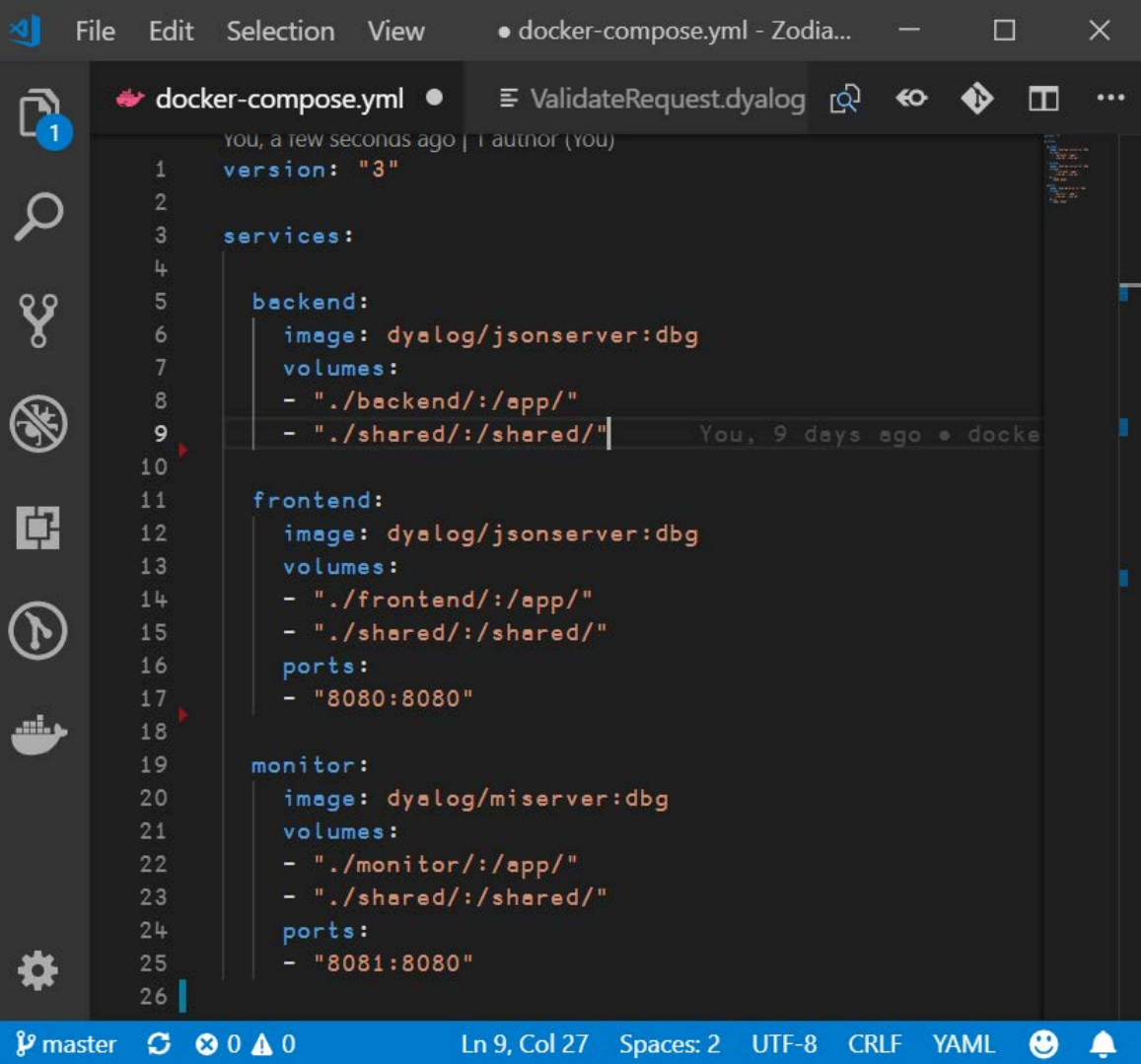
Morten Kromberg, CXO, Dyalog

Docker-Compose

- A docker-compose.yml file allows you to define a group of services that work together
- docker-compose will run the containers within a "virtual network"
- Local DNS allows each service to refer to the others by name



docker-compose

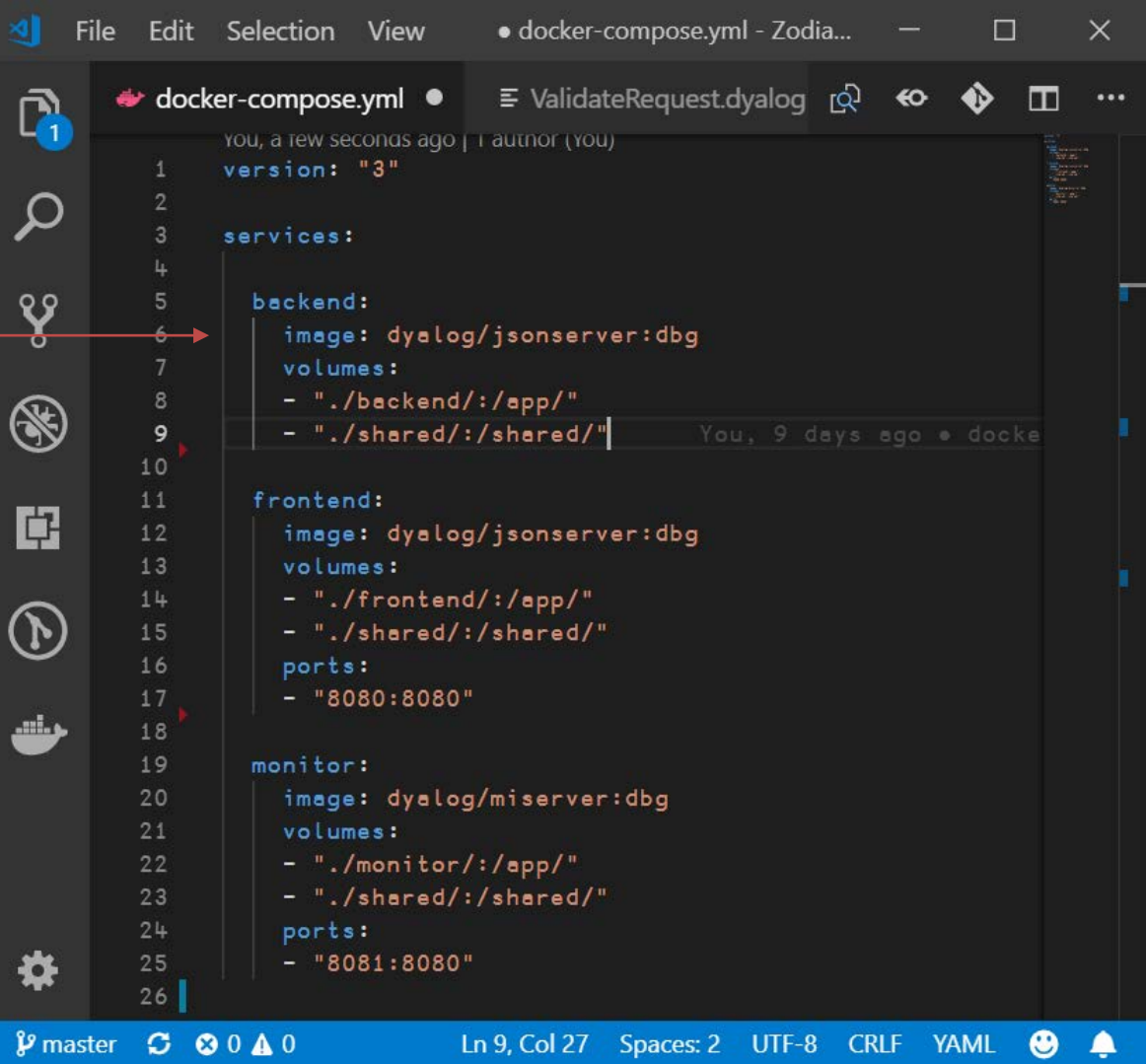


```
File Edit Selection View • docker-compose.yml - Zodia...
docker-compose.yml • ValidateRequest.dyalog
1 you, a few seconds ago | I author (you)
2 version: "3"
3
4 services:
5     backend:
6         image: dyalog/jsonserver:dbg
7         volumes:
8             - "./backend:/app/"
9             - "./shared:/shared/"
10
11     frontend:
12         image: dyalog/jsonserver:dbg
13         volumes:
14             - "./frontend:/app/"
15             - "./shared:/shared/"
16         ports:
17             - "8080:8080"
18
19     monitor:
20         image: dyalog/miserver:dbg
21         volumes:
22             - "./monitor:/app/"
23             - "./shared:/shared/"
24         ports:
25             - "8081:8080"
26
```

master 0 0 Ln 9, Col 27 Spaces: 2 UTF-8 CRLF YAML

docker-compose

Image



```
1  version: "3"
2
3  services:
4
5      backend:
6          image: dyalog/jsonserver:dbg
7          volumes:
8              - "./backend:/app/"
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14              - "./frontend:/app/"
15              - "./shared:/shared/"
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17              - "8080:8080"
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19      monitor:
20          image: dyalog/miserver:dbg
21          volumes:
22              - "./monitor:/app/"
23              - "./shared:/shared/"
24          ports:
25              - "8081:8080"
26
```

docker-compose

Image

-v (volume mount)

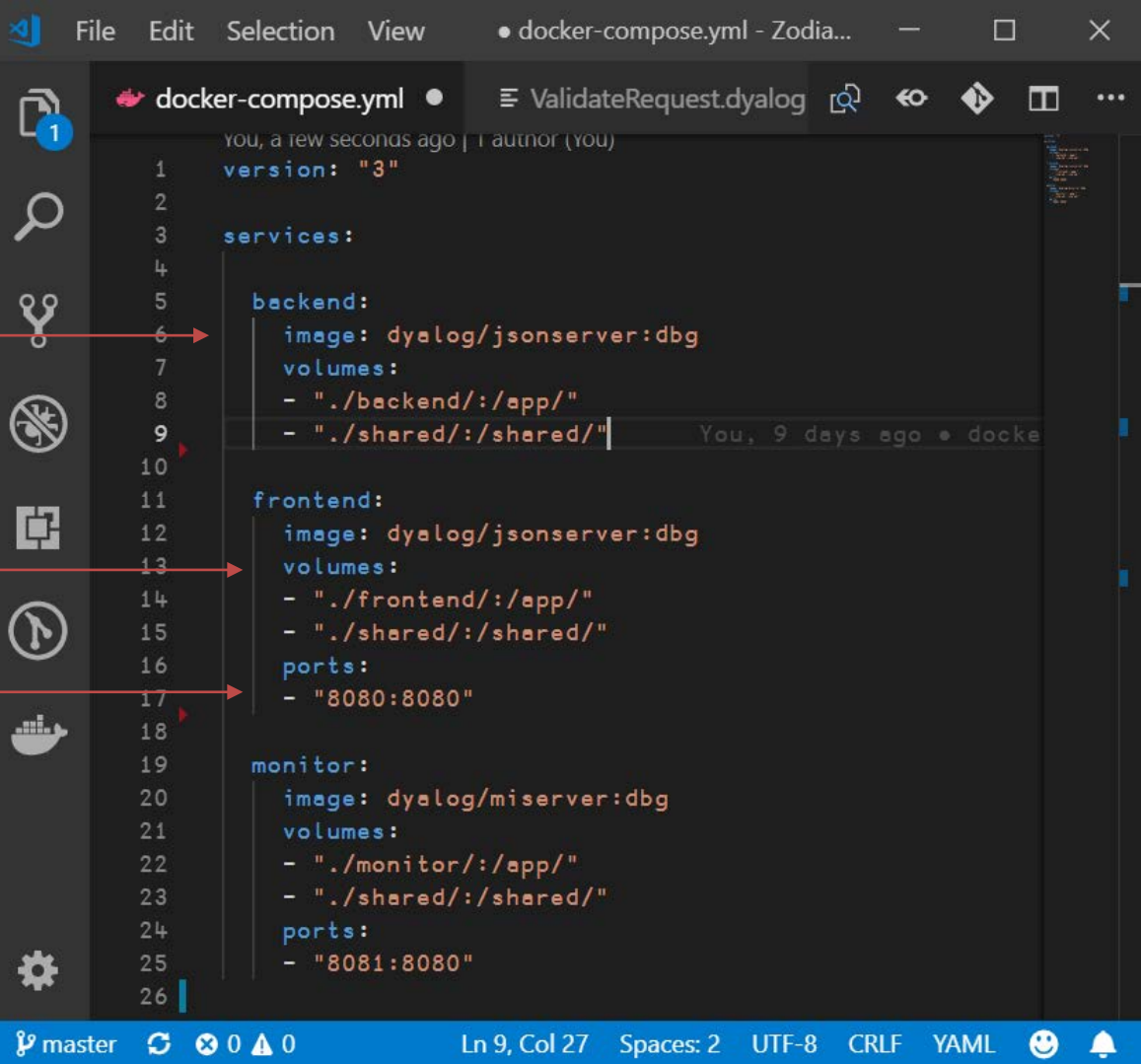
```
you, a few seconds ago | I author (you)
1  version: "3"
2
3  services:
4
5      backend:
6          image: dyalog/jsonserver:dbg
7          volumes:
8              - "./backend:/app/"
9              - "./shared:/shared/"
10
11     frontend:
12         image: dyalog/jsonserver:dbg
13         volumes:
14             - "./frontend:/app/"
15             - "./shared:/shared/"
16         ports:
17             - "8080:8080"
18
19     monitor:
20         image: dyalog/miserver:dbg
21         volumes:
22             - "./monitor:/app/"
23             - "./shared:/shared/"
24         ports:
25             - "8081:8080"
26
```

docker-compose

Image

-v (volume mount)

-p (port maps)

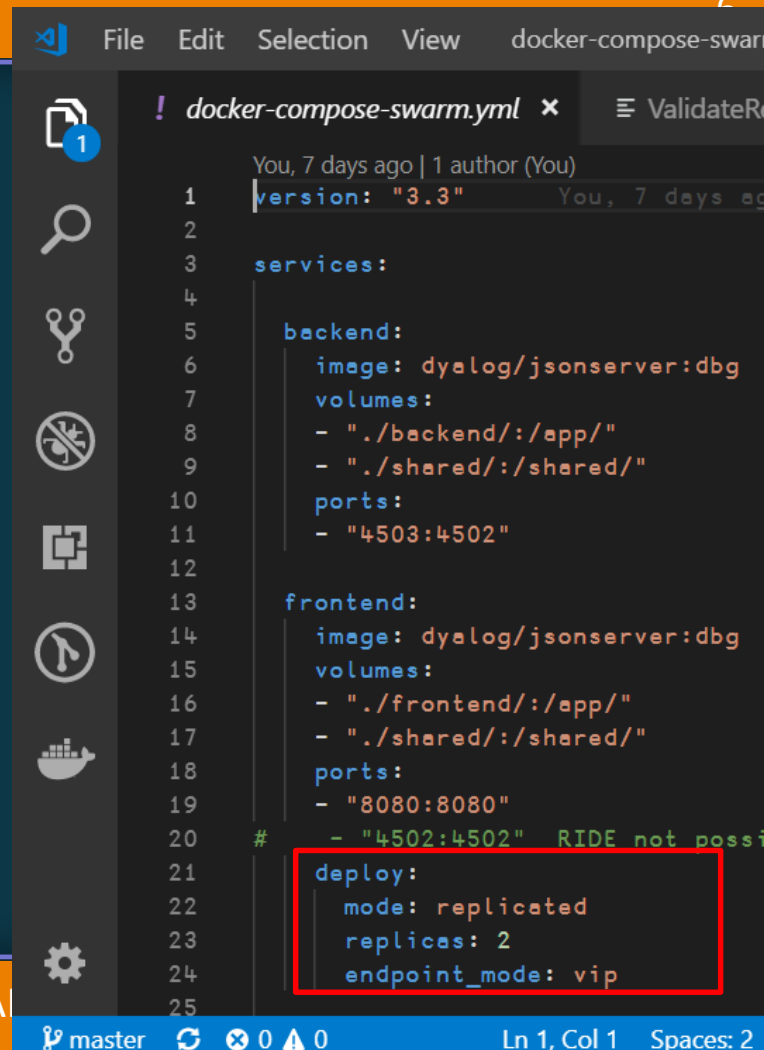


The screenshot shows a code editor with a dark theme. The top bar includes a menu (File, Edit, Selection, View) and a title bar (docker-compose.yml - Zodia...). The left sidebar contains icons for file explorer, search, source control, and other tools. The main editor area displays the content of docker-compose.yml. Red arrows point from yellow callout boxes on the left to specific lines in the code: 'Image' points to line 6, '-v (volume mount)' points to line 13, and '-p (port maps)' points to line 17. The code defines three services: backend, frontend, and monitor, each with an image, volumes, and ports.

```
1  version: "3"
2
3  services:
4
5      backend:
6          image: dyalog/jsonserver:dbg
7          volumes:
8              - "./backend:/app/"
9              - "./shared:/shared/"
10
11      frontend:
12          image: dyalog/jsonserver:dbg
13          volumes:
14              - "./frontend:/app/"
15              - "./shared:/shared/"
16          ports:
17              - "8080:8080"
18
19      monitor:
20          image: dyalog/miserver:dbg
21          volumes:
22              - "./monitor:/app/"
23              - "./shared:/shared/"
24          ports:
25              - "8081:8080"
26
```

docker-compose

- Docker-compose provides simple replication features
- Each replica thinks it is the only listener on port 8080
- Load balancers using virtual networking to switch between
- A selection of load balancers is available, the default is "round robin".



```
File Edit Selection View docker-compose-swarm
! docker-compose-swarm.yml x ValidateR
You, 7 days ago | 1 author (You)
1 version: "3.3" You, 7 days ago
2
3 services:
4
5     backend:
6         image: dyalog/jsonserver:dbg
7         volumes:
8             - "./backend:/app/"
9             - "./shared:/shared/"
10        ports:
11            - "4503:4502"
12
13     frontend:
14         image: dyalog/jsonserver:dbg
15         volumes:
16             - "./frontend:/app/"
17             - "./shared:/shared/"
18        ports:
19            - "8080:8080"
20            - "4502:4502" RIDE not possi
21        deploy:
22            mode: replicated
23            replicas: 2
24            endpoint_mode: vip
25
```

Docker Swarm

docker-compose services can be deployed under "Docker Swarm" for additional scaling support:

```
docker swarm init
docker node ls
docker stack deploy --compose-file docker-compose-swarm.yml zodiacservice
docker stack rm zodiacservice
docker service scale zodiacservice_frontend=3
docker swarm leave --force
```

Docker-compose, Swarm and Kubernetes are evolving very rapidly and I ran out of time researching them.



Exercise

- Experiment with docker-compose and docker swarm.
- Run 4 copies of the frontend
- Verify using the monitor



Exercise / Project

- Complete the ZodiacService application to
 - record calls in a shared component file
 - enhance the monitor to report usage of each frontend instance in a replicated deployment



Marko's "Serverless Laboratory"

Minikube VM



Docker daemon



Private
Docker
Registry

Kubernetes cluster



Linux Node

Kubeless
Service



Kubeless Replica Set



Kubeless
Pod



Kubeless
Pod



Marko's "Serverless Laboratory"

Minikube VM



Docker daemon



Private
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Kubernetes cluster



Linux Node

Kubeless
Service



Kubeless Replica Set



Kubeless
Pod



Kubeless
Pod



Kubernetes

- The equivalent of a docker-compose file is called a "Pod"
- Kubernetes manages a number of nodes (1 master + 0 or more)
- Services can be replicated within a Pod, and Pods can be replicated across the network of nodes.
- This turned out to be too difficult to set up for/in a 3 hour workshop 😊

