



# Software Defined Networking

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*In this course, you will learn about software defined networking and how it is changing the way communications networks are managed, maintained, and secured.*

## Networking With Docker

### ⦿ Docker Networking Basics

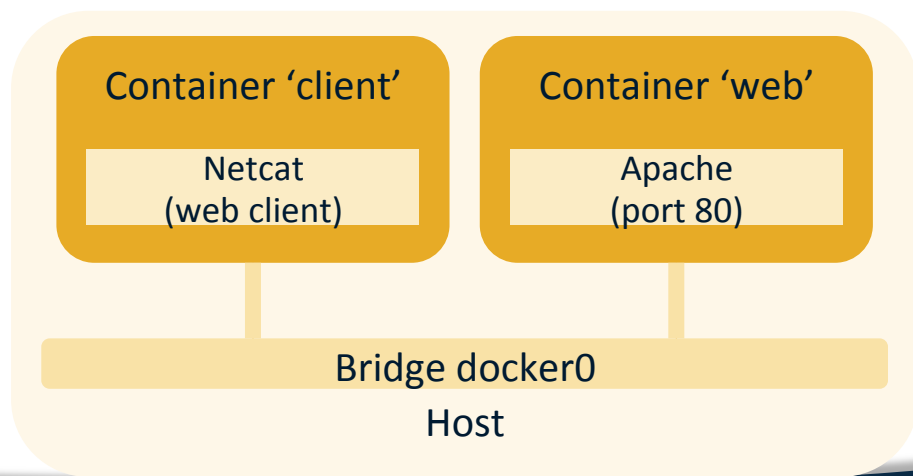
- Docker Bridge
- **Exposing** Ports
- **Linking** Containers
- **Mapping** Ports

### ⦿ Advanced Networking

- Linking via OVS

## Docker Bridge

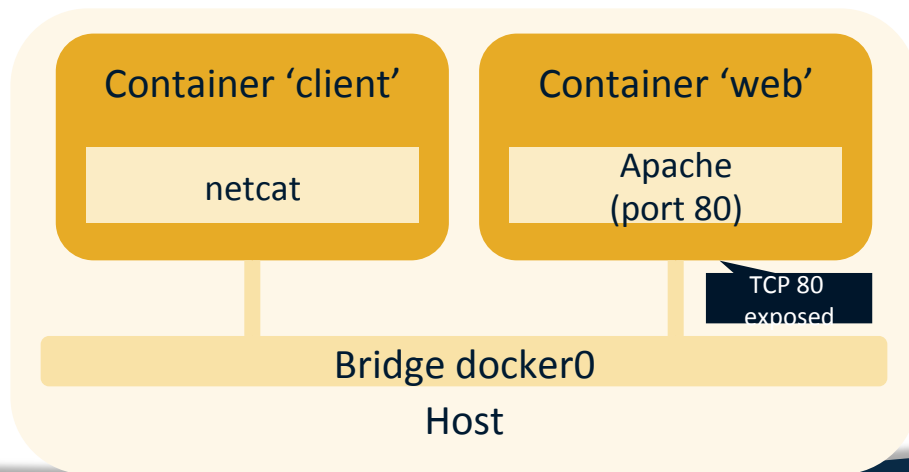
- By default, each container is isolated from other containers and from the external network
- Docker provides a bridge, but it must be configured to allow the containers to communicate with one another



# Software Defined Networking

## Exposing Ports

- Containers can communicate through the Docker bridge
  - Dockerfile:** add line “EXPOSE <port>” (several ports can be appended)
  - Command line switch:** “docker run ... **—expose** <port>”
  - Example for the ‘web’ container: “docker run ... **—expose** 80”



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## Linking Containers

- ◉ Enables a client container to get information related to the linked container
  - **Command line switch:**  
“`docker run -link <containername:alias>`”
  - Example on ‘client’ container: “`docker -run ... -link web:webalias`”

### Env variables

WEBALIAS\_PORT\_3306\_TCP=tcp://1.2.3.4:3306  
WEBALIAS\_PORT\_3306\_TCP\_PROTO=tcp  
WEBALIAS\_PORT\_3306\_TCP\_ADDR=1.2.3.4  
WEBALIAS\_PORT\_3306\_TCP\_PORT=3306

Container ‘client’

netcat

Container ‘web’

Apache  
(port 80)

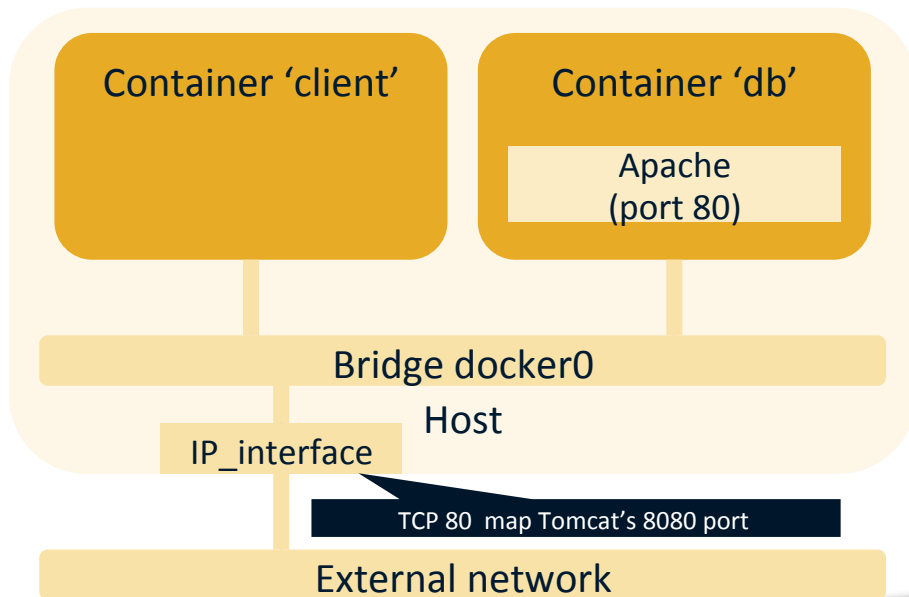
Bridge docker0

Host

# Software Defined Networking

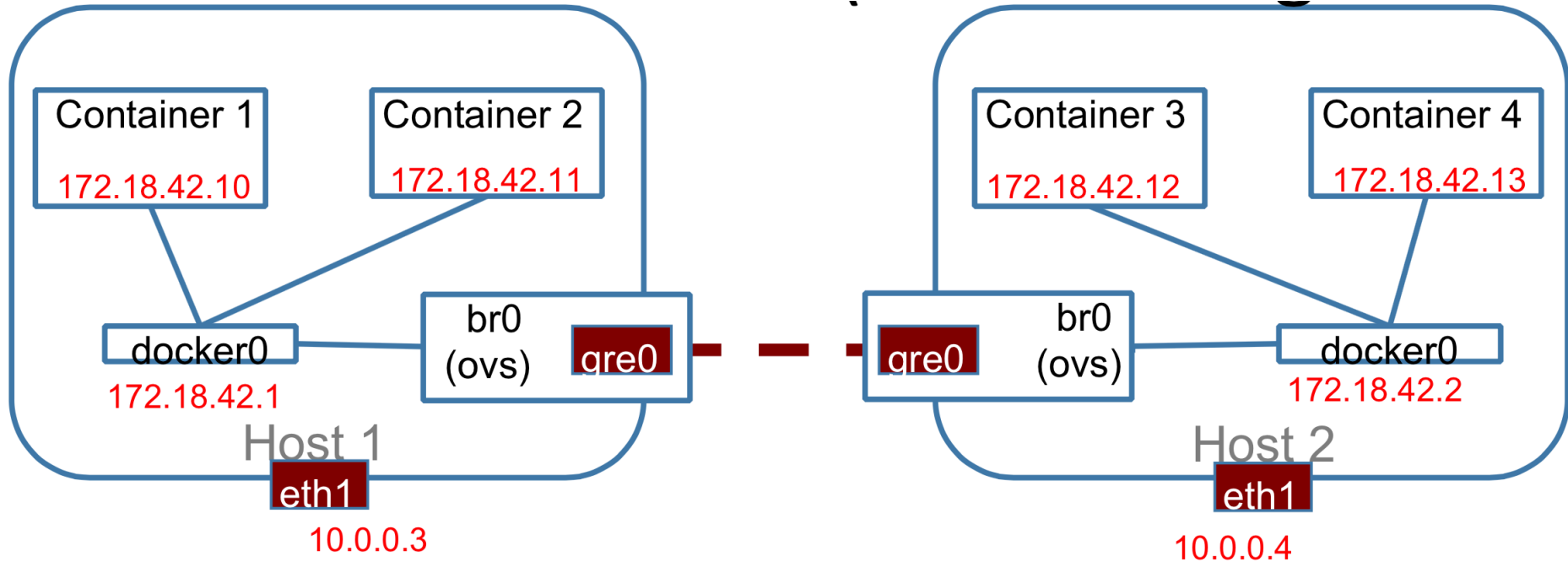
## Mapping Ports

- ◎ Publish container's ports on external interfaces.
  - Command line switch: “`docker run -p <externalport:insideport>`”
  - Example for ‘web’ container: “`docker -run ... -p 8080:80`”



# Software Defined Networking

## Advanced Networking: Linking via OVS



<https://bitbucket.org/snrism/containeret/>

## Conclusion

- ◎ Many different ways to network Docker containers
  - Exposing ports to other docker containers
  - Linking containers with aliasing
  - Mapping ports to externally visible ports
- ◎ Integration with OVS is still primitive, but this is likely to improve.