

# Exploring Database Containers



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# About me!



**Edith Puclla**



- Technology Evangelist at Percona
- Google Women Tech Maker
- Docker Captain
- Database enthusiast



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# Agenda

- Containers
- Docker Architecture
- Running a single Percona Server MySQL container
- Running Multiple Percona Server MySQL Containers
- Docker Volume
- Backups and restore of databases
- Best Practices

# What is a container?

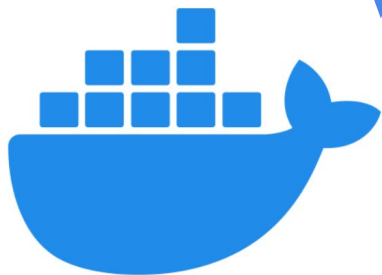
A container is a standard and **lightweight** unit of software that packages up code and all its dependencies: code, runtime, system tools, system libraries and settings. So the application runs quickly and reliably from one computing environment to another.

Containers  
work the same way on



# Tools for containerization

For the Demo!



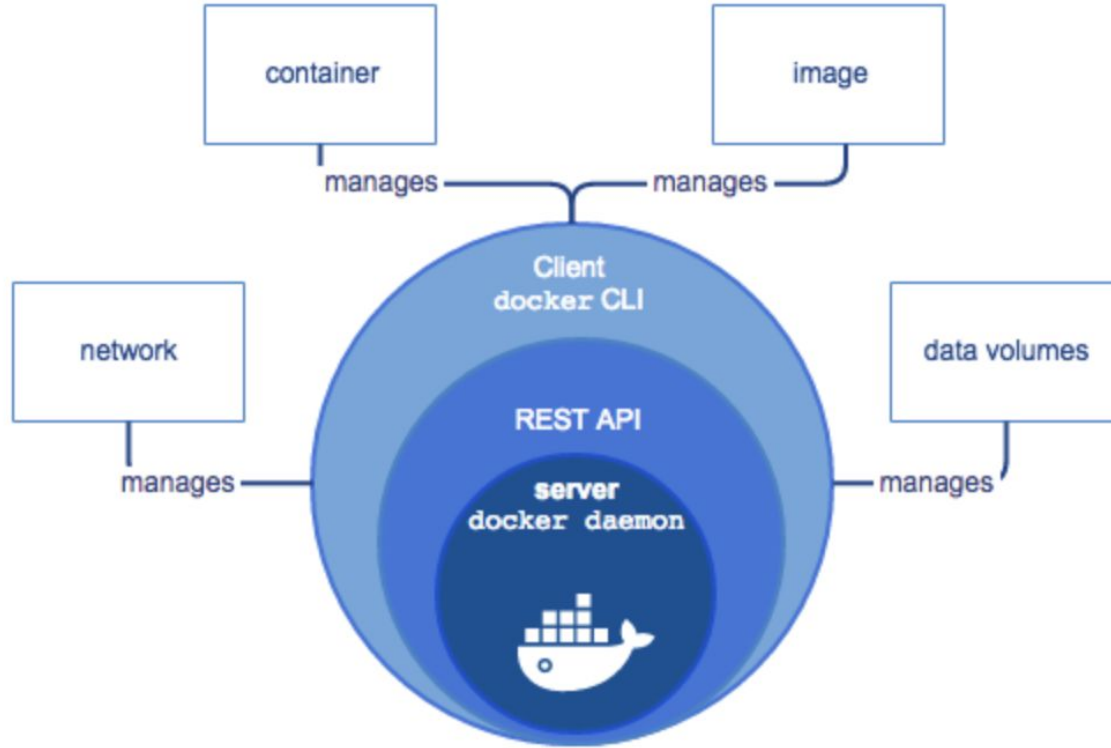
docker®



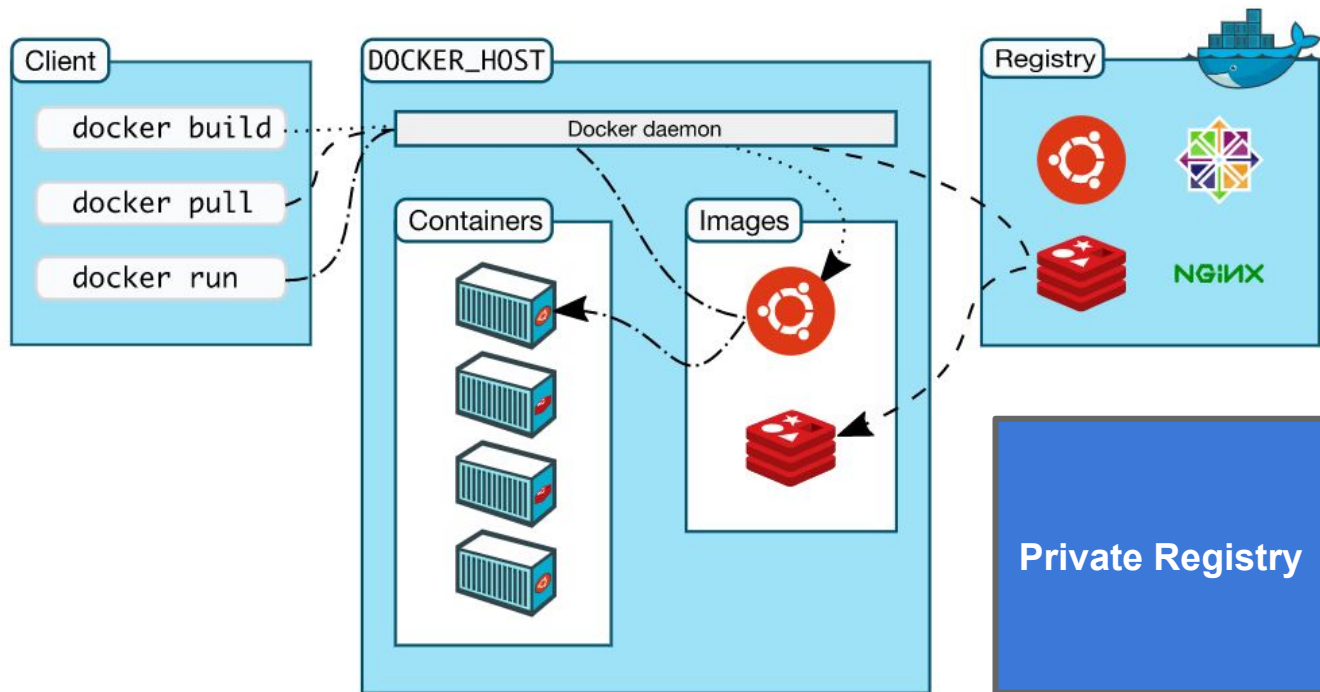
cri-o

containerd

# Docker Architecture



# Docker Architecture



# Containers benefits



**Reduced costs**



**CI/CD Friendly**



**Multi-Cloud  
Compatibility**

peak-times



# Docker Installation

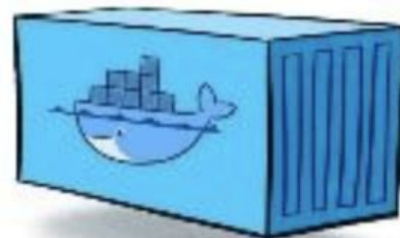
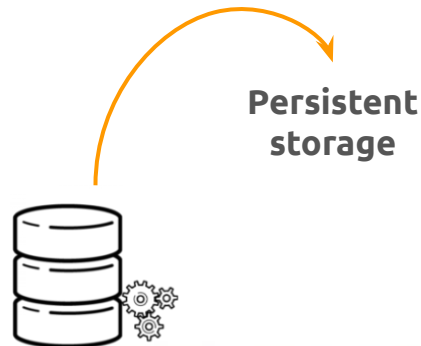
## Server

Docker provides `.deb` and `.rpm` packages from the following Linux distributions and architectures:

Platform	x86_64 / amd64	arm64 / aarch64	arm (32-bit)	s390x
CentOS	✓	✓		
Debian	✓	✓	✓	
Fedora	✓	✓		
Raspbian			✓	
RHEL				✓
SLES				✓
Ubuntu	✓	✓	✓	✓
Binaries	✓	✓	✓	

# MySQL

- MySQL is a disk-based relational database management system
- To run MySQL container we need to know about volumes



# Docker Container

# Running a single Percona Server MySQL container

```
docker run -d --name percona-server-1 -e  
MYSQL_ROOT_PASSWORD=root percona/percona-server:8.0
```

```
docker image ls
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
percona/percona-server	8.0	c377ca189334	2 m. ago	1.08GB

```
docker container ps
```

CONTAINER ID	IMAGE	PORTS	STATUS
a08359e1f6c2	percona/percona-server:8.0	3306/tcp	Up 13 minutes

# Data

```
CREATE DATABASE cinema;
```

```
USE cinema;
```

```
CREATE TABLE movies (
```

```
book_id BIGINT PRIMARY KEY  
AUTO_INCREMENT,
```

```
title VARCHAR(100) UNIQUE NOT  
NULL,
```

```
publisher VARCHAR(100) NOT NULL,
```

```
labels JSON NOT NULL
```

```
) ENGINE = InnoDB;
```

```
INSERT INTO movies(title,publisher,  
labels)
```

```
VALUES('Green House', 'Joe Monter',  
'{"about" : {"gender": "action",  
"cool": true, "notes": "labeled"}}');
```

```
select * from movies;
```

# Running a single Percona Server MySQL container

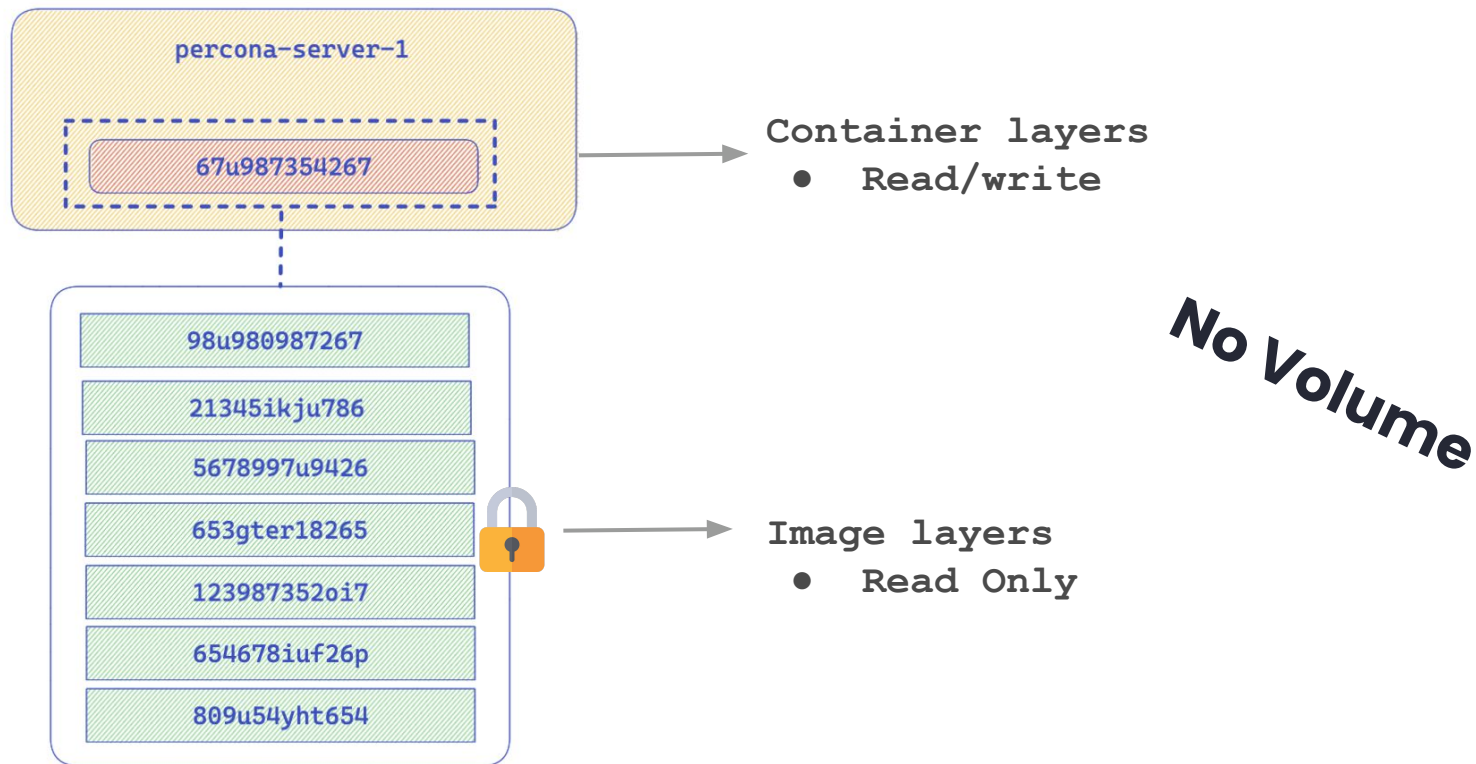


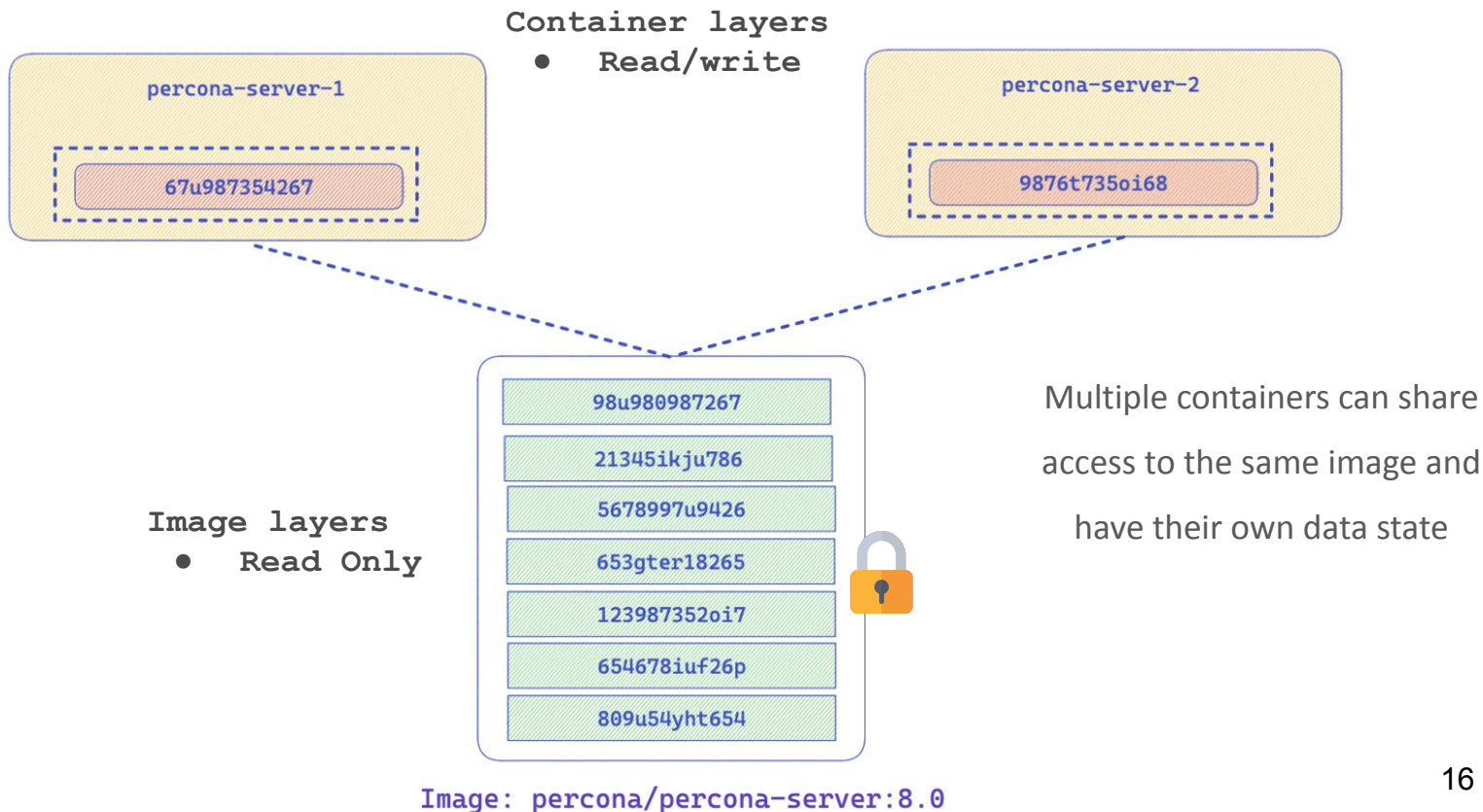
Image: percona/percona-server:8.0

# Running Multiple Percona Server MySQL Containers

```
docker run -d --name percona-server-1 -e  
MYSQL_ROOT_PASSWORD=root percona/percona-server:8.0
```

```
docker run -d --name percona-server-2 -e  
MYSQL_ROOT_PASSWORD=root percona/percona-server:8.0
```

# Running Multiple Percona Server MySQL Containers





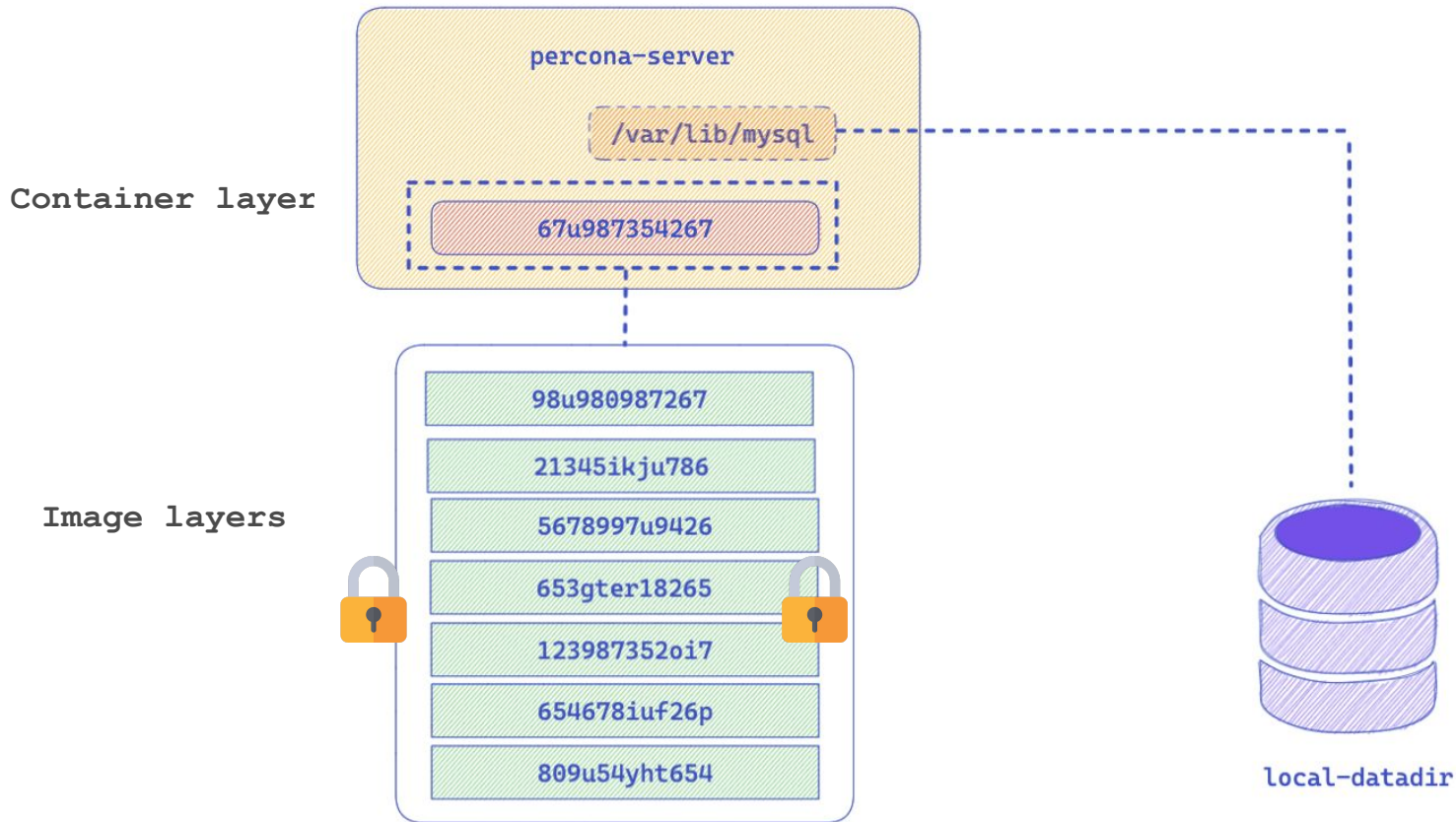
# Docker Volume

“Volumes open the door for stateful applications to run efficiently in Docker”

# Persistent Volume

```
docker run -d --name percona-server -e  
MYSQL_ROOT_PASSWORD=root -v local-datadir:/var/lib/mysql  
percona/percona-server:8.0
```

# Persistent Volume



# Backups and restore of databases

- Backups
  - Logical backups
    - mysqldump
  - Physical backups
    - Percona Xtrabackup and MariaDB backup
- Restore
  - mysqldump
  - Percona Xtrabackup

# Backups

```
docker exec -it percona-server-backup mysqldump -uroot  
--password=root --single-transaction >  
/path/in/physical/host/dump.sql
```

# Restore

```
docker exec -it percona-server-restore mysql -u root  
--password=root < /path/in/physical/host/dump.sql
```

# Best Practices

1. Constantly monitor your database and host system
2. Storage data in a persistent volume outside the container
3. Limit resources utilization e.g. Memory, CPU
4. Regularly backup the database and store backup in a secure and separate location
5. Have a plan for database migrations and disaster recovery

# Thank You!



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# Percona Live Denver'23 Ticket Raffle

<https://learn.percona.com/win-percona-live-pass-fosdem>

1. Scan QR code
2. Fill out a form

That's it!

One winner will be  
selected randomly

