System Programming & OS 실습
Appendix2. Docker

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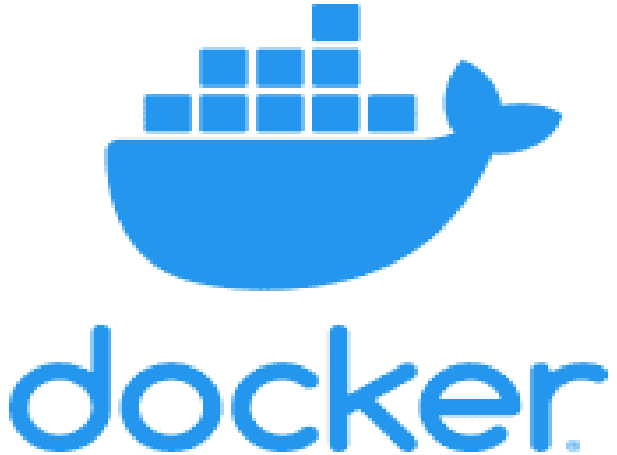
Index

What is docker?

- Docker
  - 가상화 소프트웨어
  - 간단한 application의 개발 및 배포
  - Application에 필요한 모든 dependencies, configuration, system tools, runtime을 함께 패키징



What is docker?

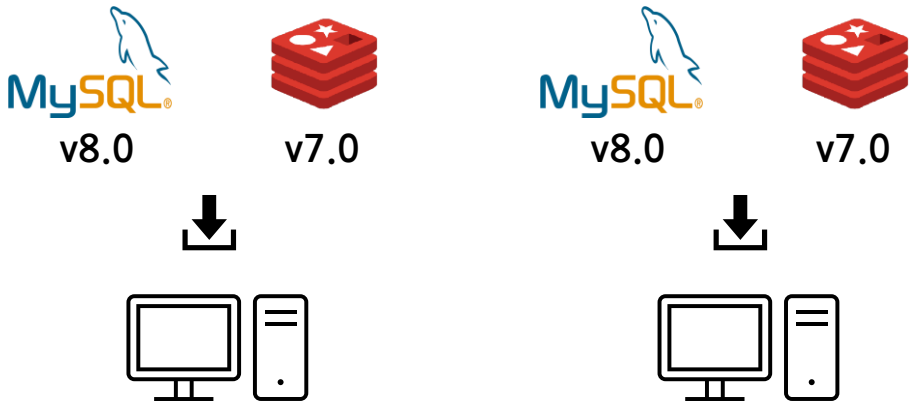
- 왜 이것이 중요한지?
- Docker 이전에는 어떻게 작업이 이루어졌는지?

What is docker?

- Docker 이전의 작업
  - 개발자는 자신의 로컬 기기의 OS에 모든 서비스를 직접 설치하고 구성

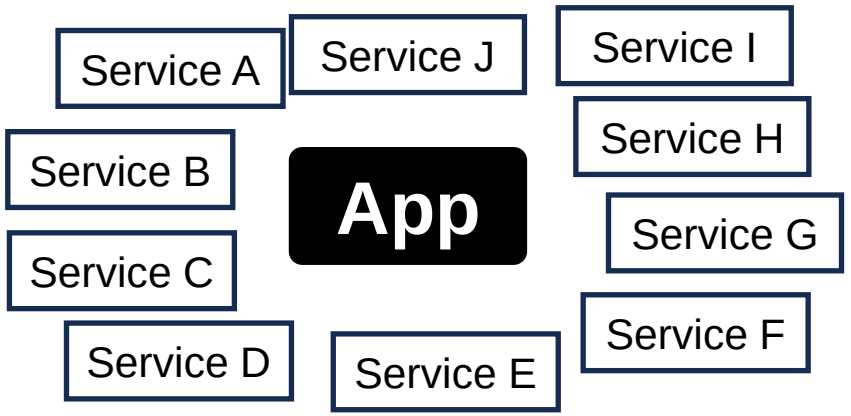
각 OS 환경마다 설치 과정이 다름

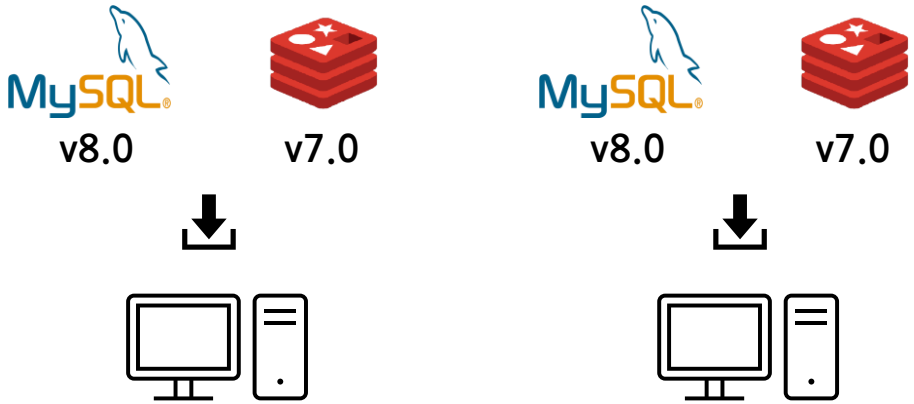
오류가 발생할 수 있는 많은 단계들이 존재



What is docker?

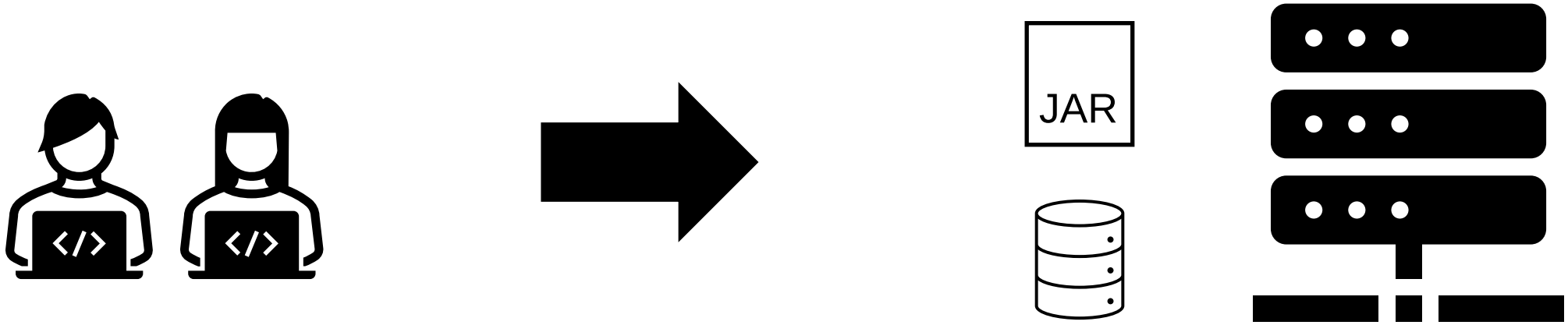
- **Docker 이전의 작업**
  - 10개의 서비스를 사용한다면, 각 개발자는 이 10개의 서비스를 모두 설치해야 함





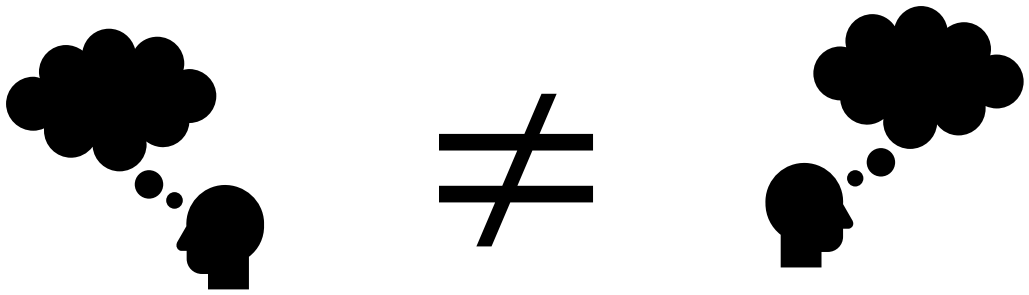
What is docker?

- **Docker 이전의 작업**
  - 설치와 설정은 서버의 OS에 직접 수행
  - 종속성으로 인해 버전 간의 충돌이 발생할 수 있음



What is docker?

- Docker 이전의 작업
  - 수작업으로 인한 문제발생 가능성
  - 필요한 작업 증가
  - …



What is docker?

- Docker를 사용한 작업
  - 독립적인 환경
  - Docker를 통해 패키징된 Postgres

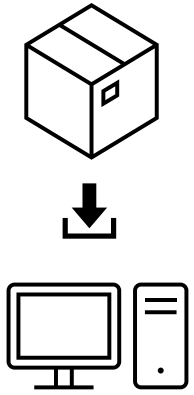
1개의 Docker command를 사용하여 서비스를 Docker container로 시작 가능

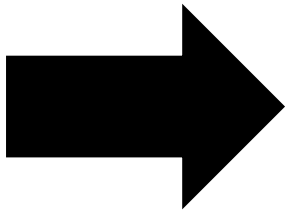
모든 OS에서 command 동일

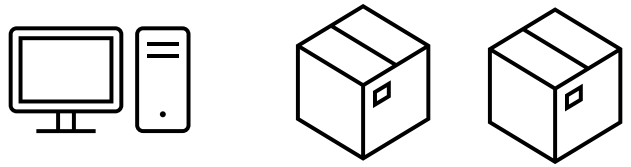
모든 서비스에 대한 command 동일

What is docker?

- **Docker를 사용한 작업**
  - 모든 OS에서 command 동일







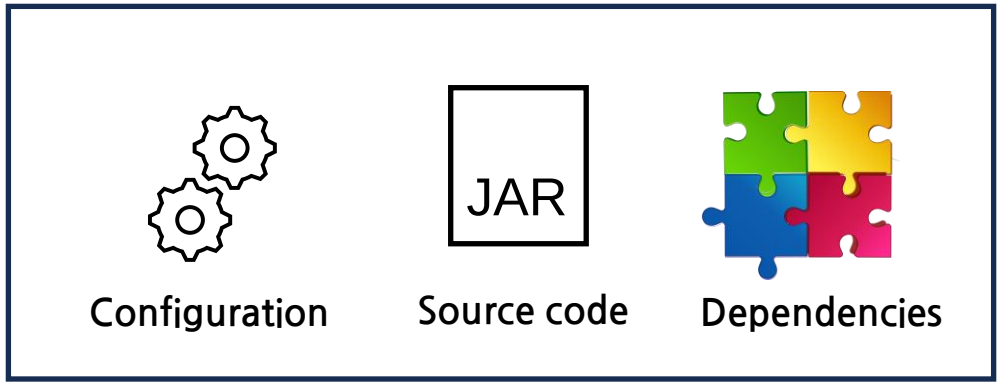
docker run mysql

docker run redis

docker run …

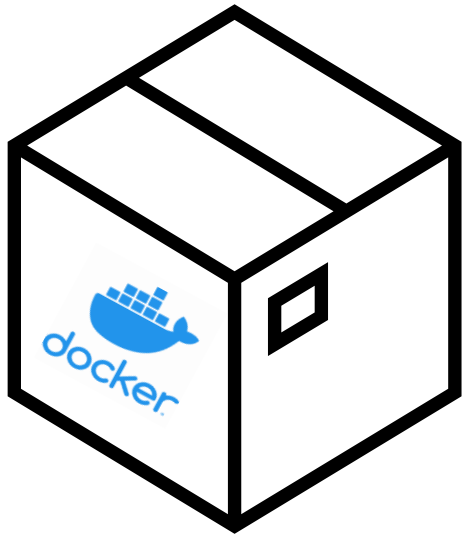
What is docker?

- **Docker를 사용한 작업**
  - Docker artifact는 application이 필요로 하는 모든 것을 포함
  - 서버에서 별도의 설정이 필요하지 않음



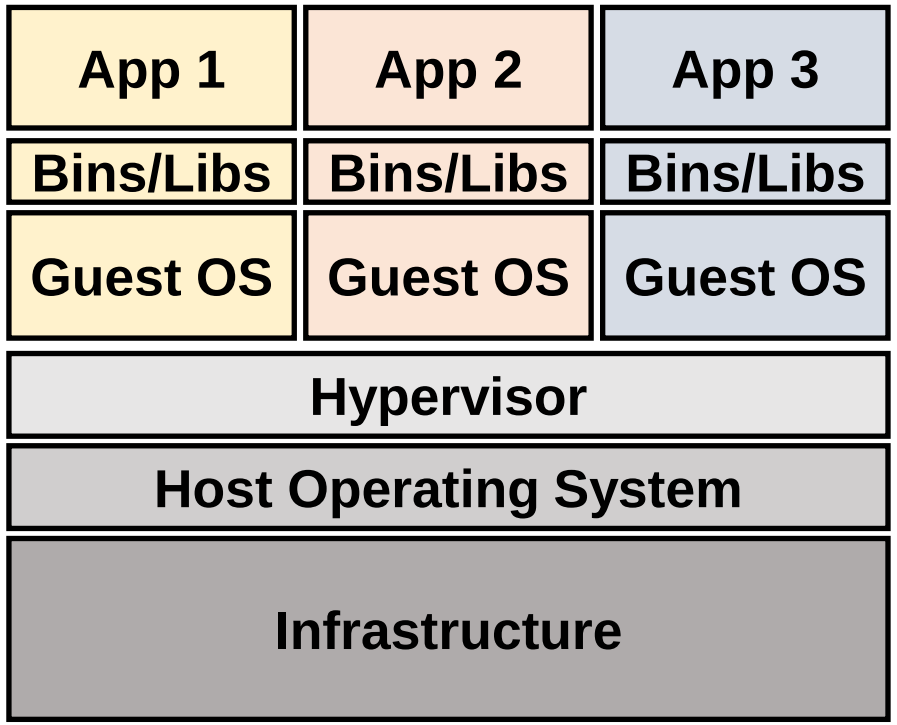
What is docker?

- Images와 containers?

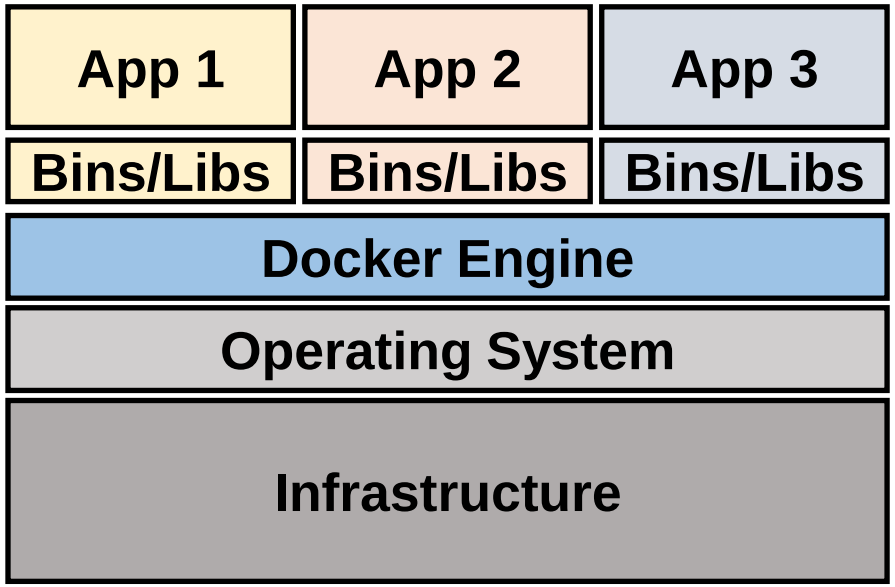


Virtual Machine and Docker

- Virtual Machine과 Docker



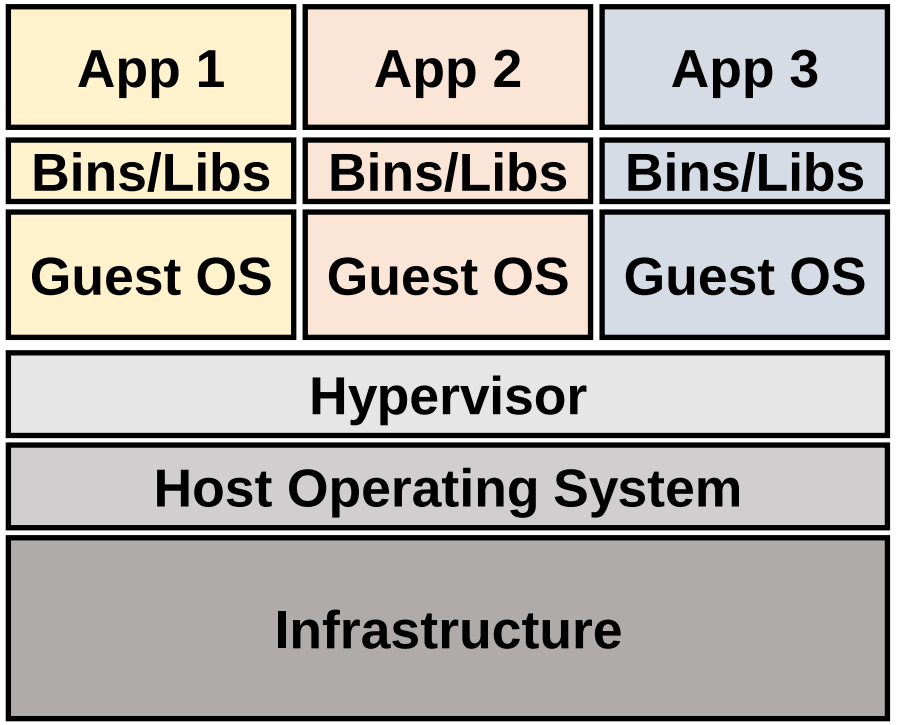
Virtual Machines



Docker

Virtual Machine and Docker

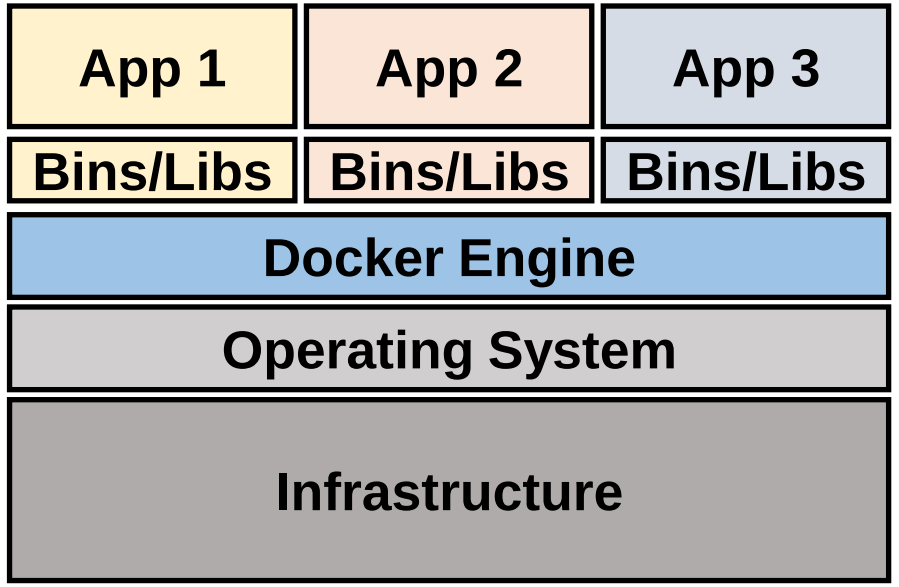
- **Virtual Machine**
  - Hypervisor를 통해 여러 개의 운영체제 생성 및 관리
  - 성능 손실
  - 배포 시 용량 - 게스트 운영체제를 사용하기 위한 라이브러리, 커널 등



Virtual Machines

Virtual Machine and Docker

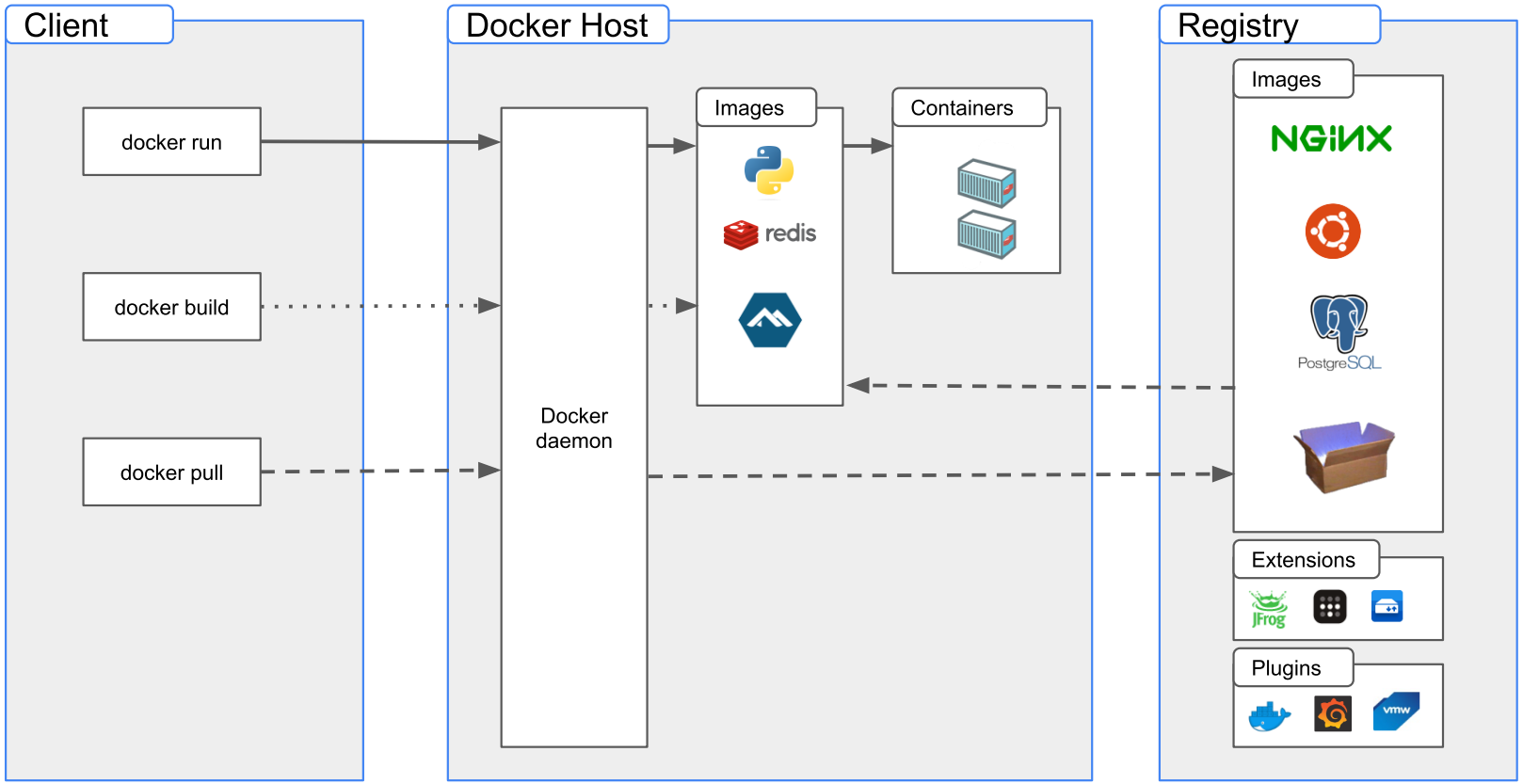
- Docker
  - 낮은 성능 손실
  - 배포 시 용량 - 커널 공유해서 사용, 적은 용량



Docker

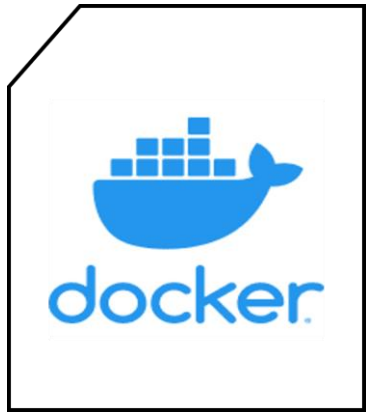
Virtual Machine and Docker

- Docker



Docker Registries

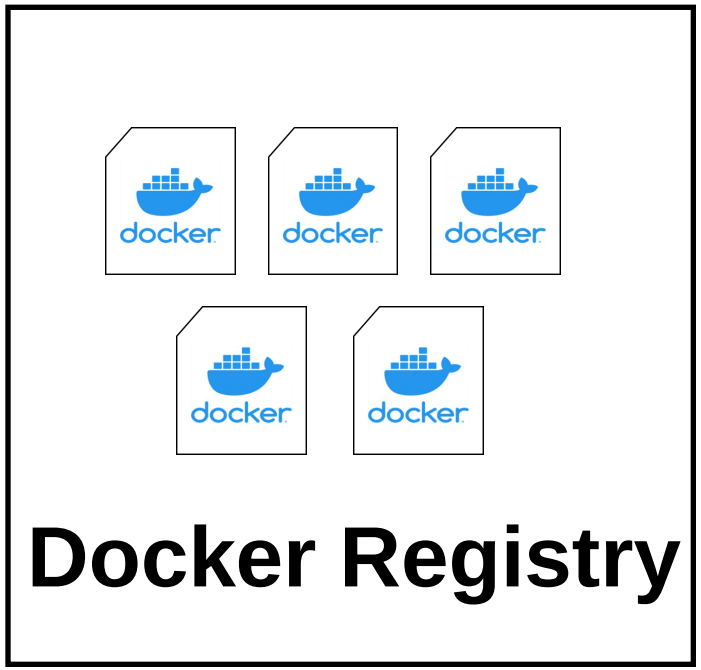
- Registries
  - 이미지를 어떻게 가져와야 하는지?



Docker Registries

• Docker Registries

- Docker 이미지를 위한 저장 및 배포 시스템
- Redis, Mongo, Postgres와 같은 애플리케이션에서 사용 가능한 공식 이미지
- 지속적으로 관리되는 이미지



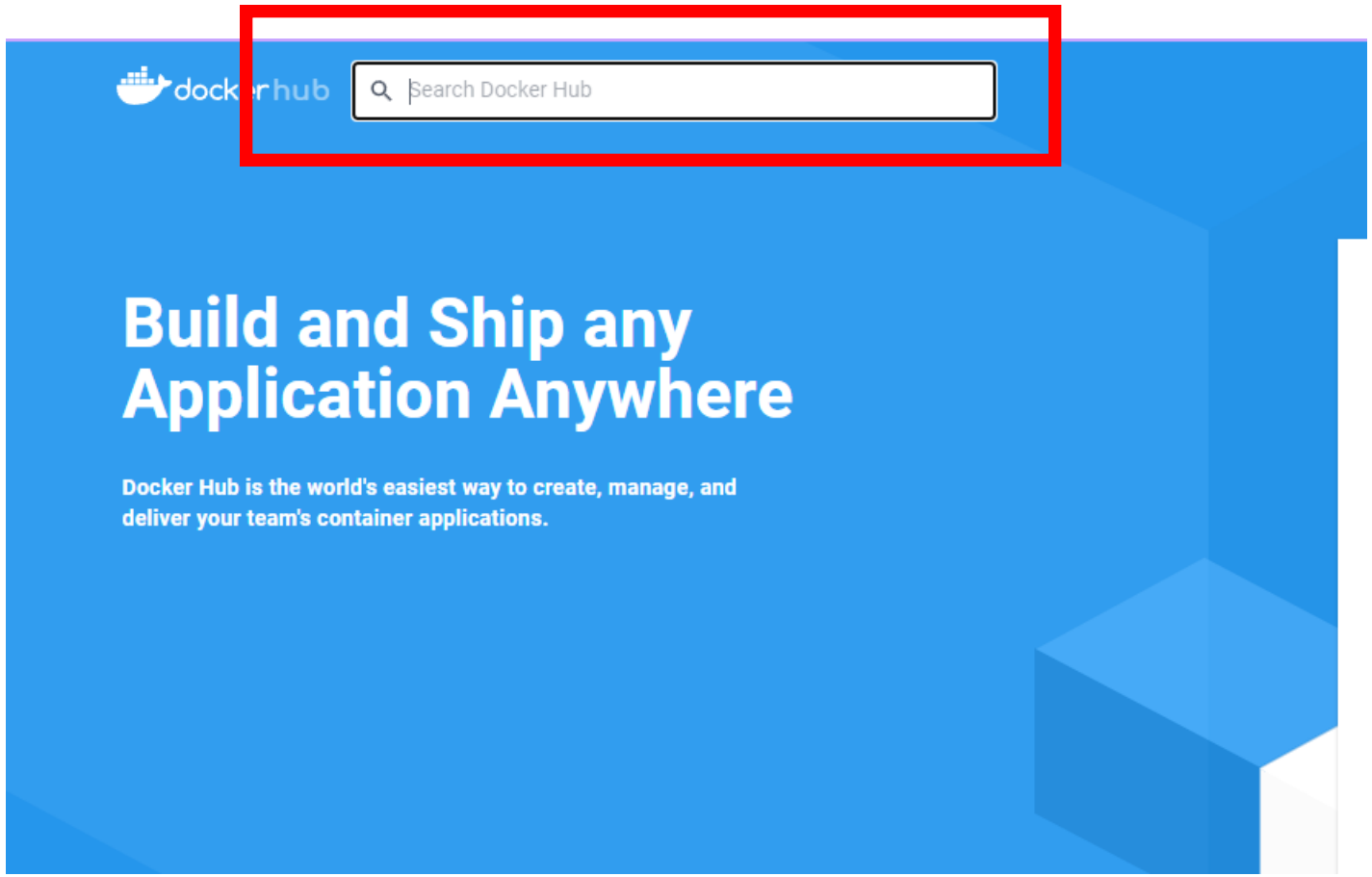
Docker Registries

- Docker Registries

  https://hub.docker.com/

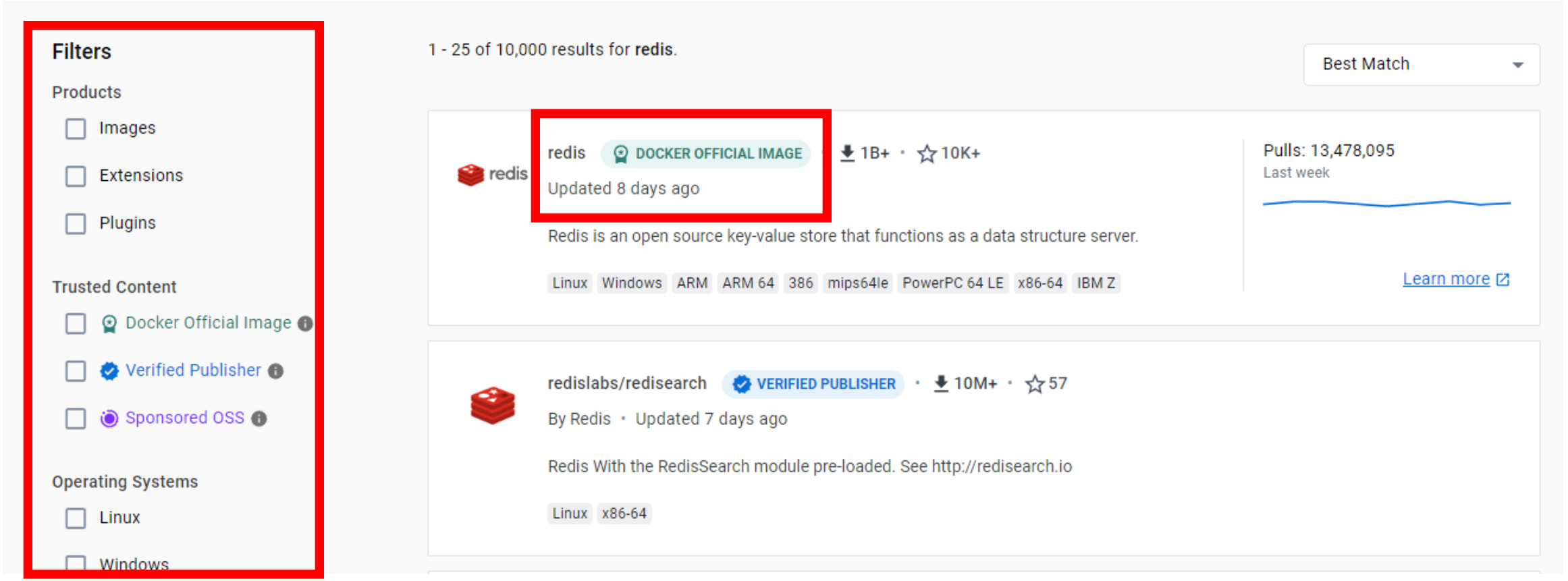
Docker Registries

- Docker hub



Docker Registries

- Docker hub

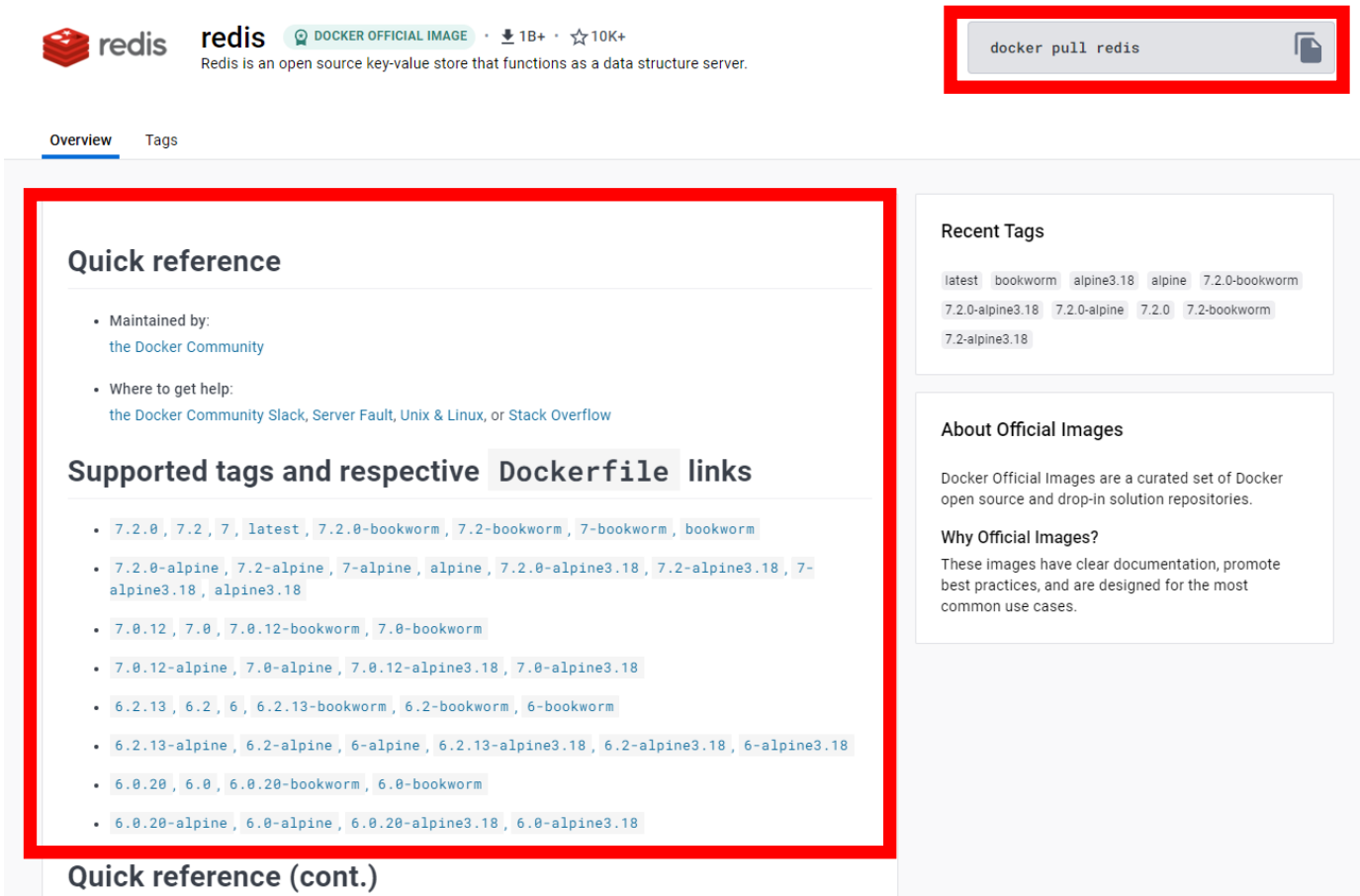


Docker Registries

- **Docker Official image**
  - 품질 보증 - 내용과 구성에 일관된 기준을 준수
  - 업데이트 - 정기적으로 업데이트 및 보안 패치, 소프트웨어 버전 업그레이드, 최적화를 진행
  - 보안 - 안전한 방식으로 생성되며, 알려진 보안 취약성이 발견될 경우 즉시 패치를 진행
  - 명료성 - 이미지를 어떻게 사용할 수 있는지에 대한 가이드를 제공

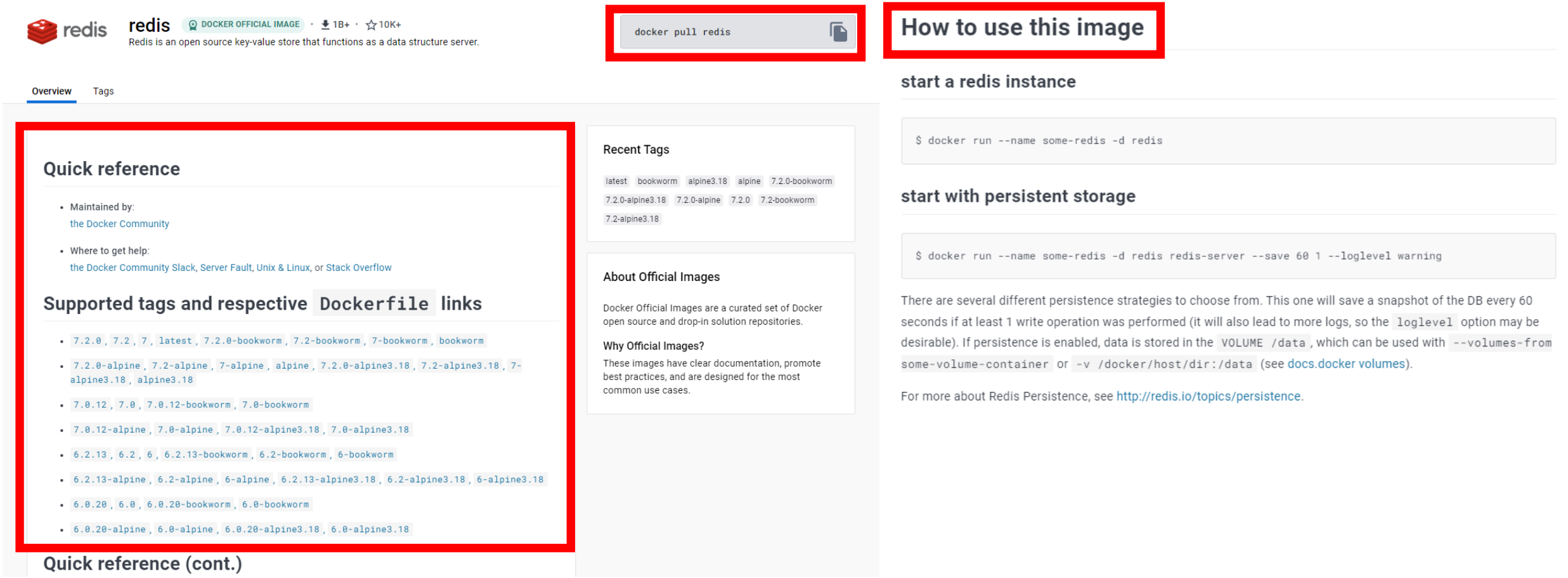
Docker Registries

- Docker Official image



Docker Registries

- Docker Official image



redis

redis DOCKER OFFICIAL IMAGE · 1B+ · 10K+

Redis is an open source key-value store that functions as a data structure server.

```
docker pull redis
```

Overview Tags

Quick reference

- Maintained by:
  the Docker Community
- Where to get help:
  the Docker Community Slack, Server Fault, Unix & Linux, or Stack Overflow

Supported tags and respective `Dockerfile` links

- `7.2.0`, `7.2`, `7`, `latest`, `7.2.0-bookworm`, `7.2-bookworm`, `7-bookworm`, `bookworm`
- `7.2.0-alpine`, `7.2-alpine`, `7-alpine`, `alpine`, `7.2.0-alpine3.18`, `7.2-alpine3.18`, `7-alpine3.18`, `alpine3.18`
- `7.0.12`, `7.0`, `7.0.12-bookworm`, `7.0-bookworm`
- `7.0.12-alpine`, `7.0-alpine`, `7.0.12-alpine3.18`, `7.0-alpine3.18`
- `6.2.13`, `6.2`, `6`, `6.2.13-bookworm`, `6.2-bookworm`, `6-bookworm`
- `6.2.13-alpine`, `6.2-alpine`, `6-alpine`, `6.2.13-alpine3.18`, `6.2-alpine3.18`, `6-alpine3.18`
- `6.0.20`, `6.0`, `6.0.20-bookworm`, `6.0-bookworm`
- `6.0.20-alpine`, `6.0-alpine`, `6.0.20-alpine3.18`, `6.0-alpine3.18`

Quick reference (cont.)

Recent Tags

`latest` `bookworm` `alpine3.18` `alpine` `7.2.0-bookworm` `7.2.0-alpine3.18` `7.2.0-alpine` `7.2.0` `7.2-bookworm` `7.2-alpine3.18`

About Official Images

Docker Official Images are a curated set of Docker open source and drop-in solution repositories.

Why Official Images?

These images have clear documentation, promote best practices, and are designed for the most common use cases.

How to use this image

start a redis instance

```
$ docker run --name some-redis -d redis
```

start with persistent storage

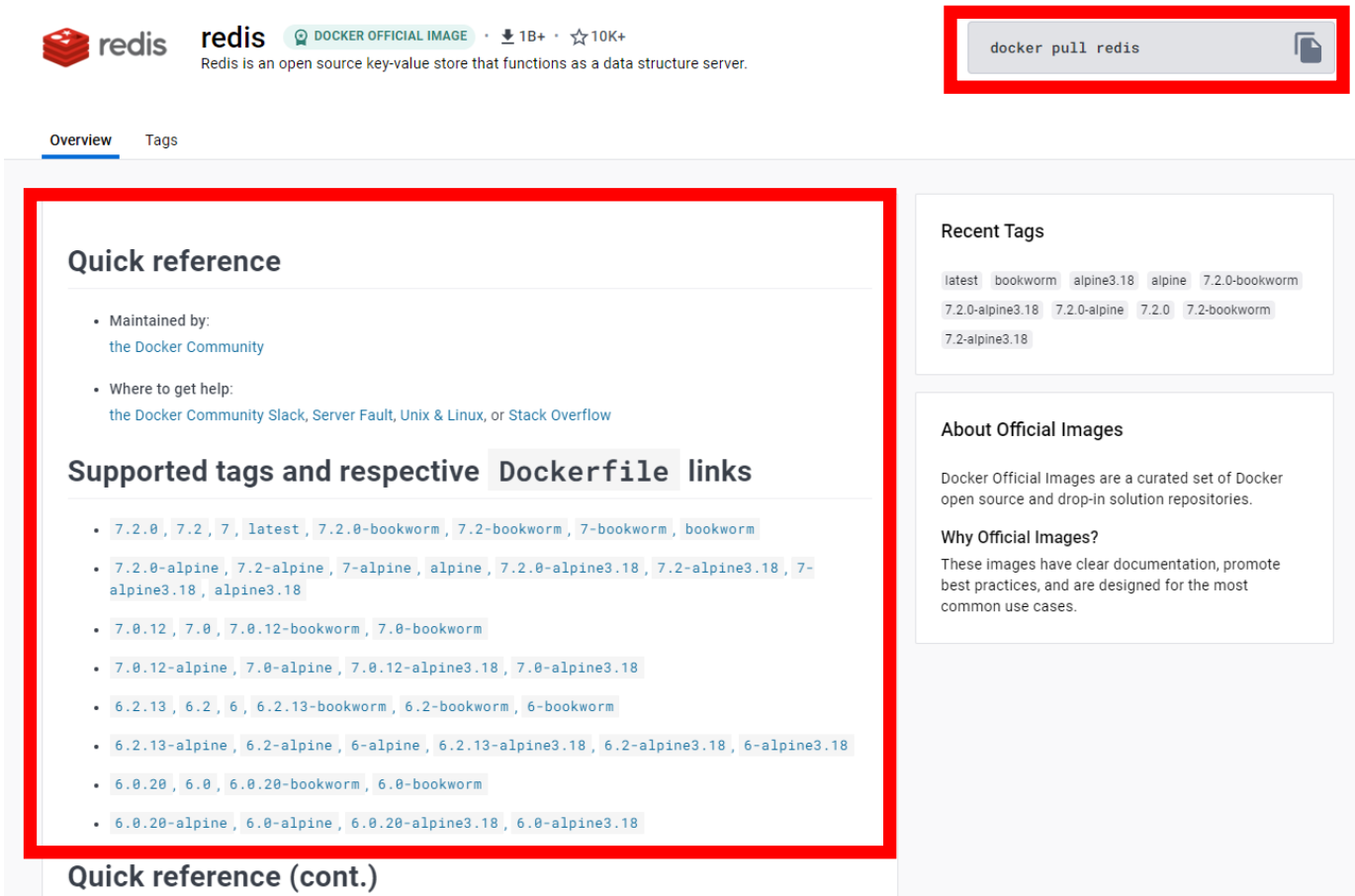
```
$ docker run --name some-redis -d redis redis-server --save 60 1 --loglevel warning
```

There are several different persistence strategies to choose from. This one will save a snapshot of the DB every 60 seconds if at least 1 write operation was performed (it will also lead to more logs, so the `loglevel` option may be desirable). If persistence is enabled, data is stored in the `VOLUME /data`, which can be used with `--volumes-from some-volume-container` or `-v /docker/host/dir:/data` (see docs.docker volumes).

For more about Redis Persistence, see http://redis.io/topics/persistence.

Docker Registries

- Docker Official image



Docker Registries

- **Registry vs Repository**

  - Registry - Docker 이미지들을 저장하고 배포하기 위한 서버 측 응용 프로그램 또는 서비스

  - Repository - Docker Registry 내에서 특정 이미지와 관련된 모든 버전의 이미지들의 집합