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Docker & Docker Hub

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Agenda

1. Docker Chinese community
2. Docker & Docker Governance
3. Namespaces & Cgoups
4. Storage Drive Kernel -> AUFS
5. Docker Hub & Docker Registry
6. Docker Registry API
7. Community Version Docker Hub
8. Docker Remote API
9. Dockerfile
10. OpenSource Projects Base Docker

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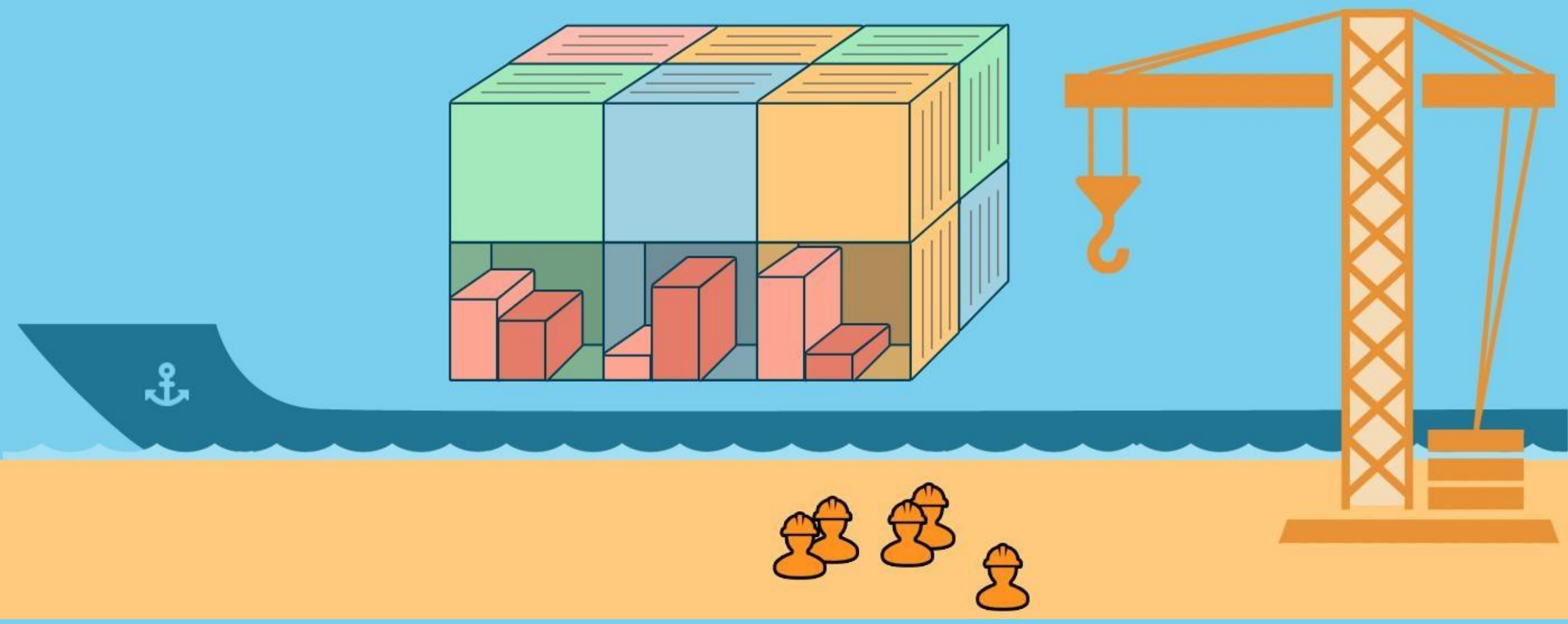
About Docker Community in China
dockboard.org



https://github.com/dockboard

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QINIU
七牛云存储

腾讯云

MT 美团云
Meituan Open Services

UCLOUD

CODE

HUAWEI | 华为云服务 Beta

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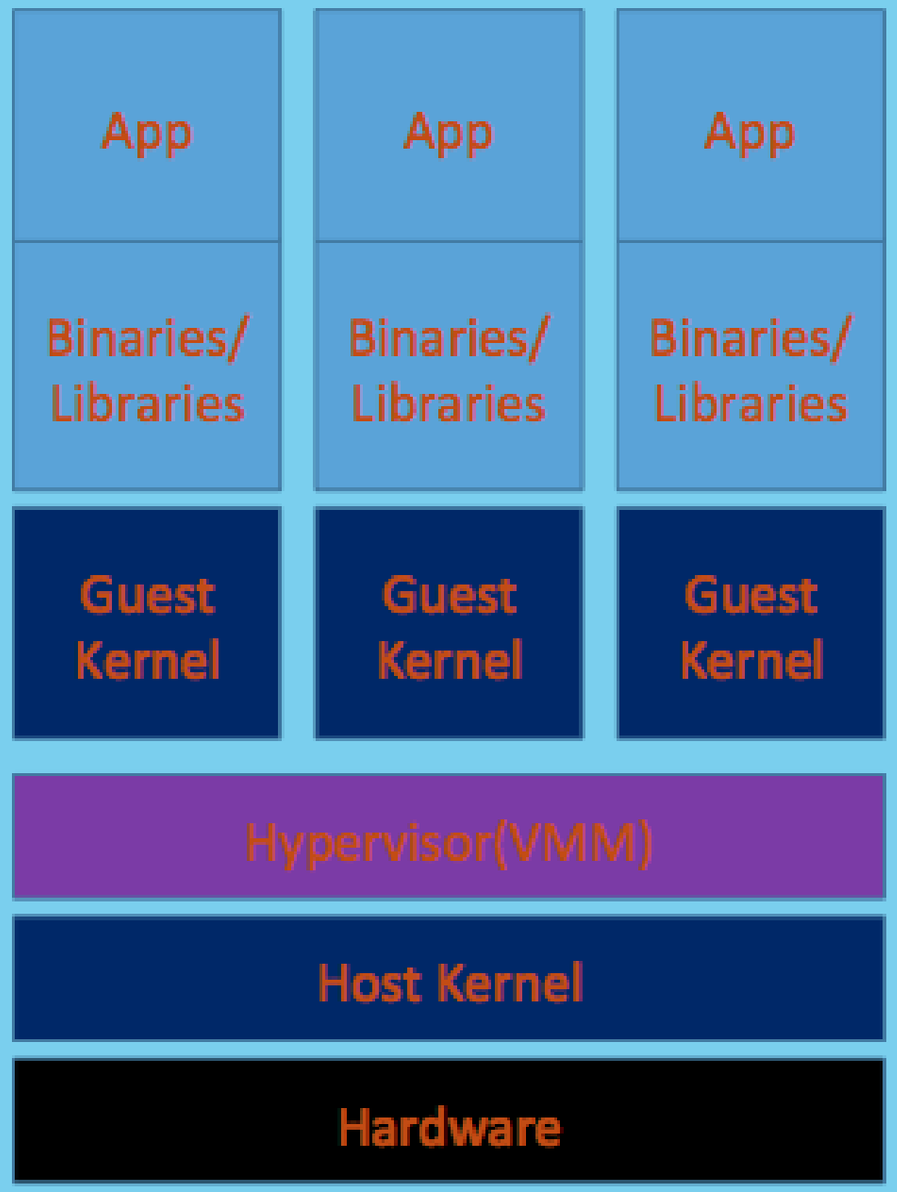
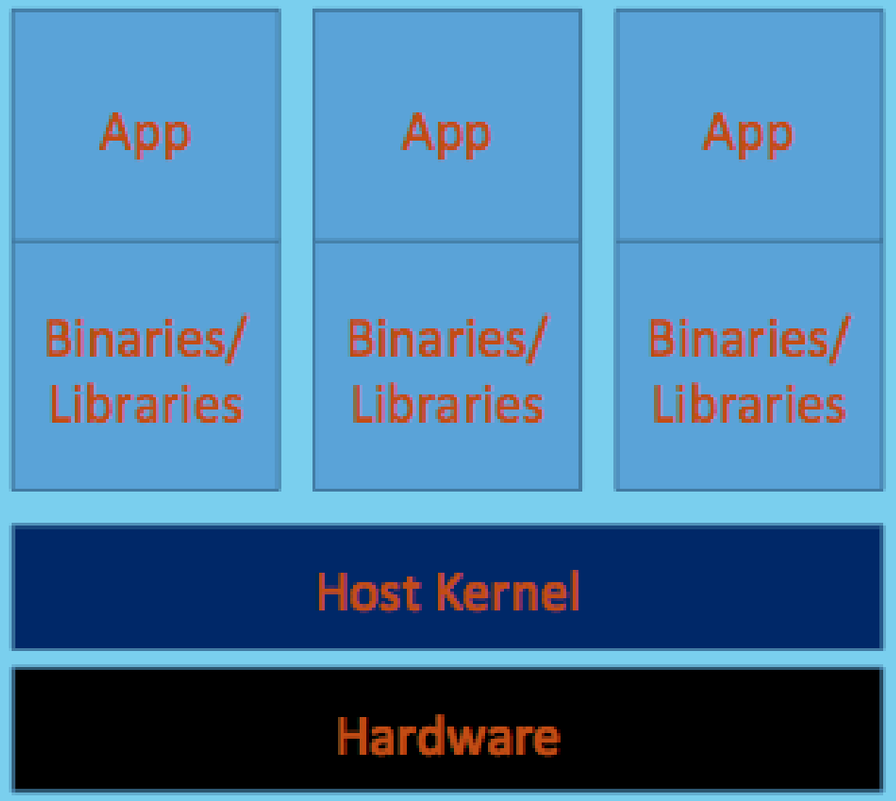
System Virtualization VS Container Virtualization



System Virtualization



Container Virtualization

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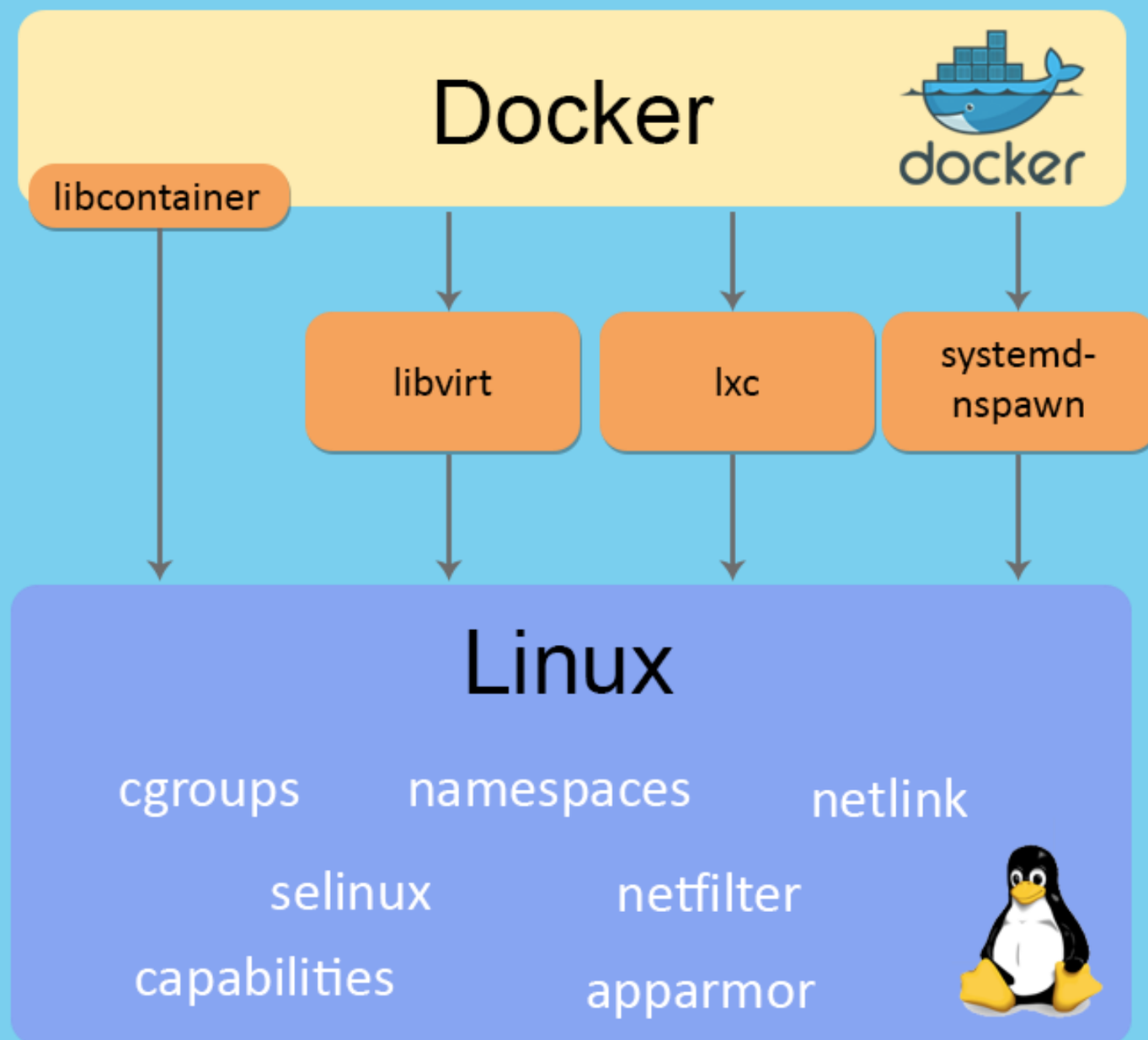
What's Docker ?



Docker Hub +

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DGAB -> Docker Governance Advisory Board

1.DGAB or Fond?
2.Seats for commit, no fee or sponsorship.
3.Membership for 12 months, 24 months max.
4.DGAB is not charge.

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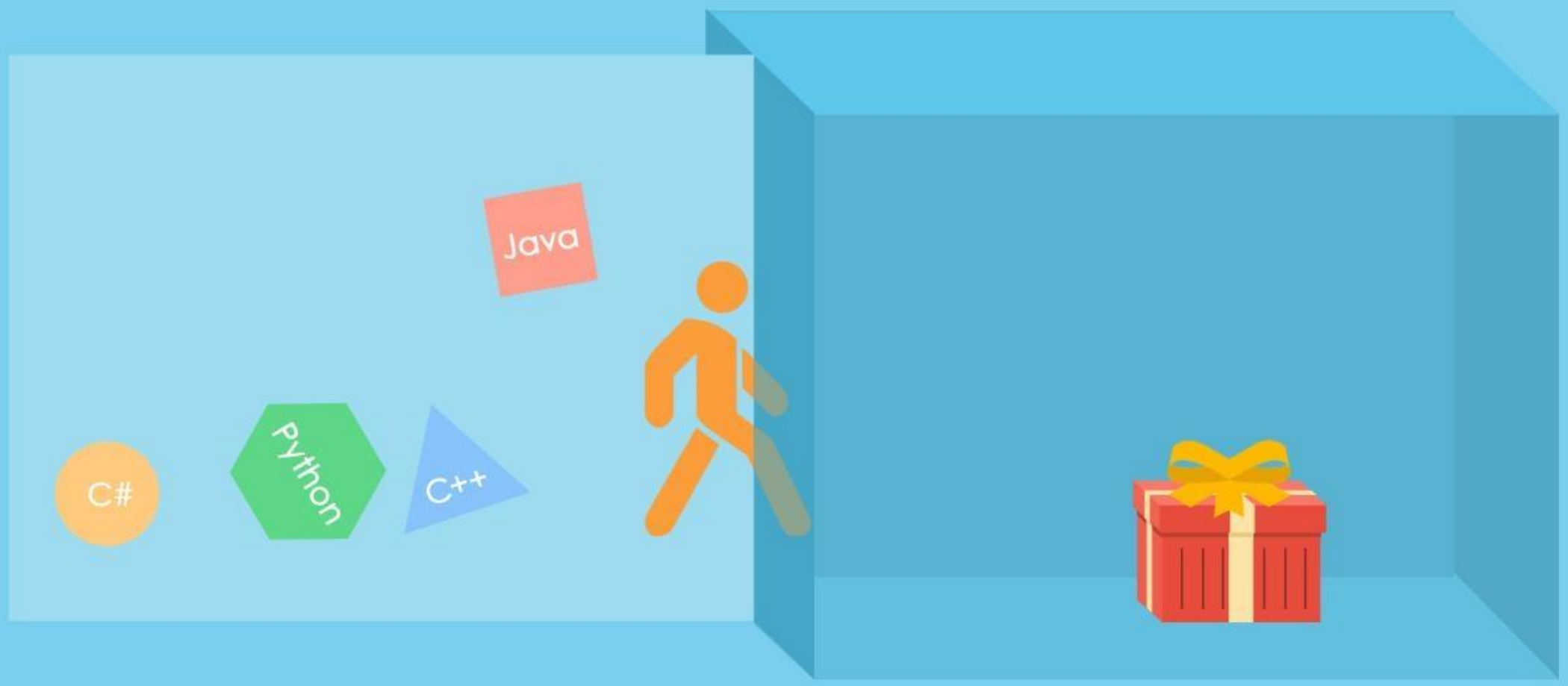
How to use Docker?



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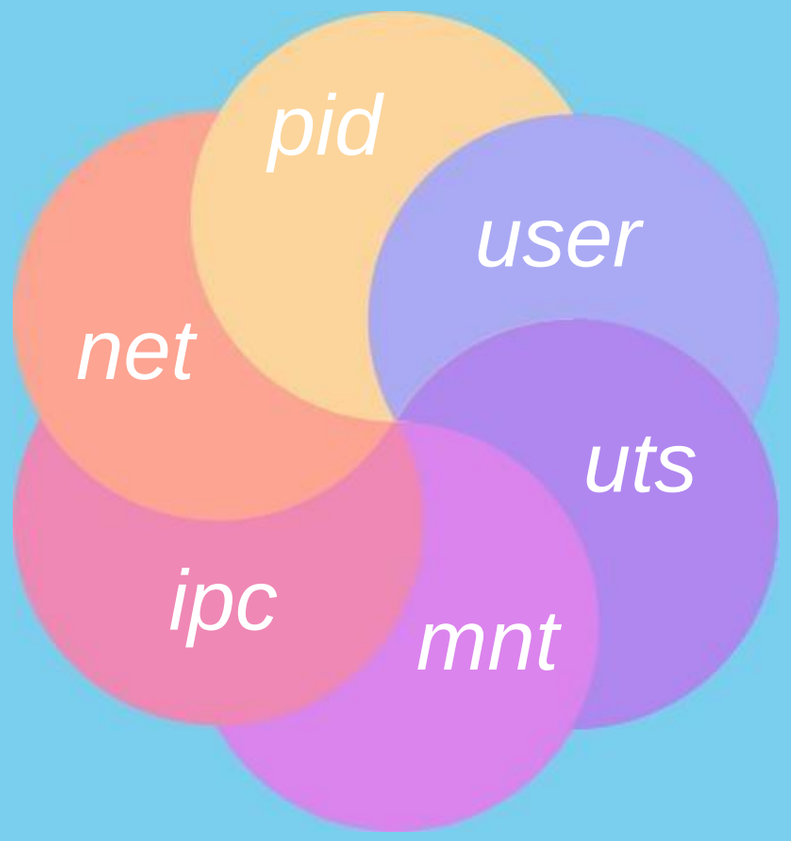
What’s namespaces?

1. pid namespace
2. net namespace
3. mnt namespace
4. uts namespace
5. ipc namespace



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What’s cgroups

1. CPU
2. Memory
3. Blkio
4. Net_cls
5. Net_prio
6. Device

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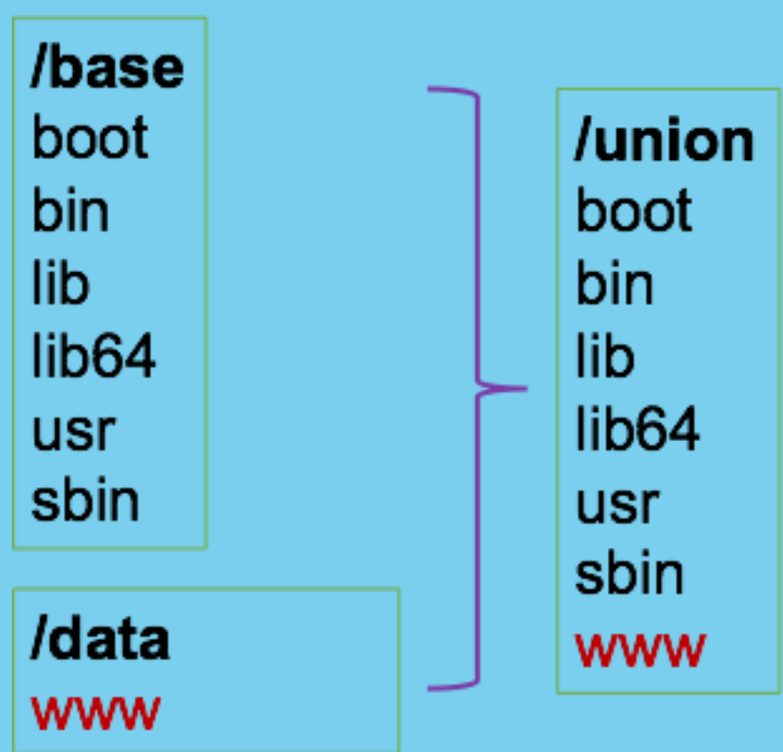
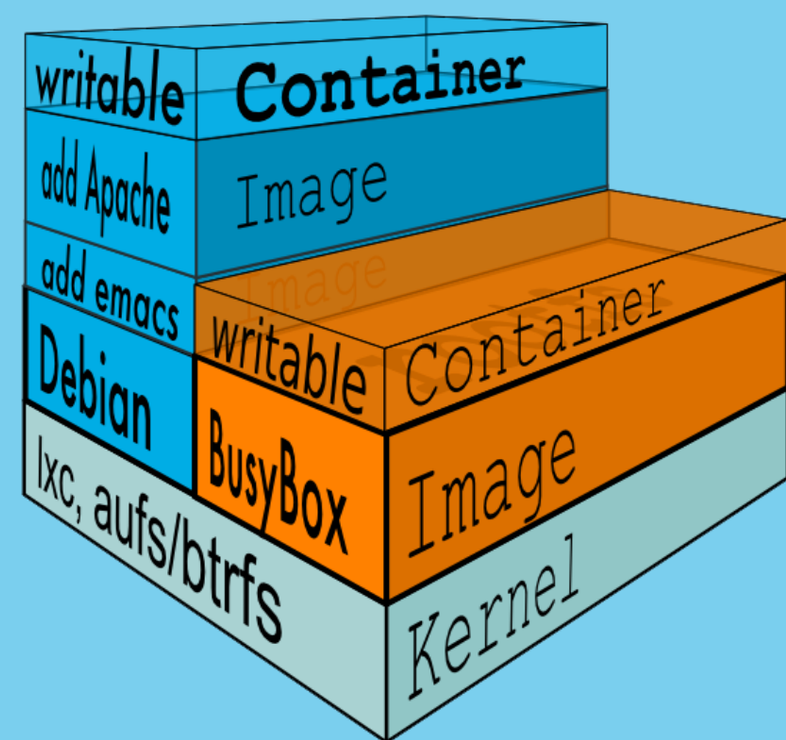
What's AUFS?





mount -t aufs -o br=/base=ro:/data=rw none /union

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Docker Local Storage Path -> /var/lib/docker

diff
842b5a724d2d
f106b5d7508a
1e8abad02296
511136ea3c5a
...

layer
842b5a724d2d
f106b5d7508a
1e8abad02296
511136ea3c5a
...

mnt
842b5a724d2d
f106b5d7508a
1e8abad02296
511136ea3c5a
...

mount -t aufs –o br=
diff/511136ea3c5a=ro:
diff/1e8abad02296=ro:
diff/f106b5d7508a=ro:
diff/842b5a724d2d=rw
none
mnt/842b5a724d2d

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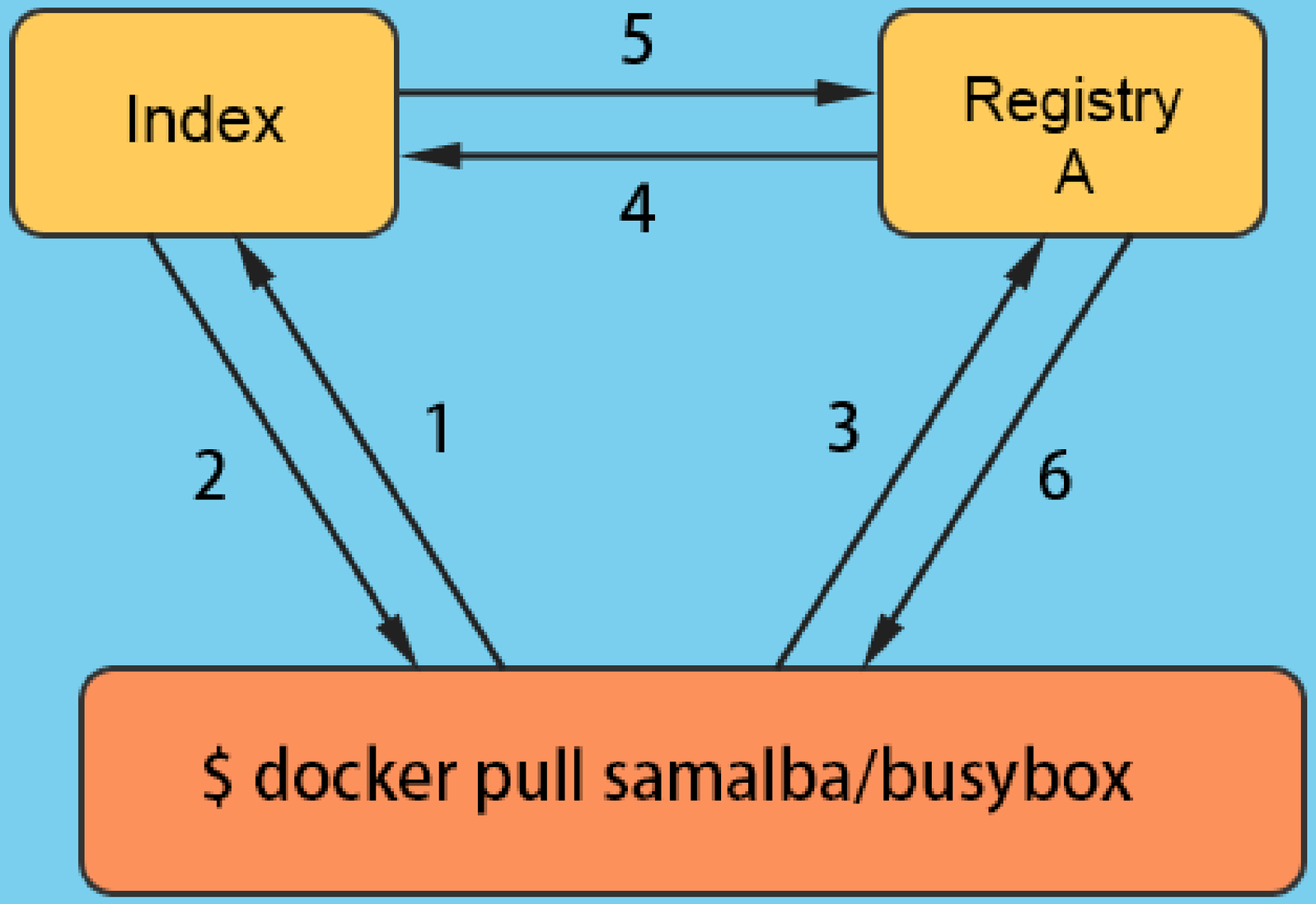
Docker Hub & Registry Workflow



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How To Deploy Docker Registry?

https://github.com/dotcloud/docker-registry

docker run -p 5000 samalba/docker-registry

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Docker Registry API -> Push

1. docker 向 HUB 服务器注册 repository：PUT /v1/repositories/<username>/<repository>
2. 参数是 JSON 格式的 <repository> 所有 image 的 id 列表，按照 image 的构建顺序排列。
3. 根据 <repository> 的 <tags> 进行循环：
   3.1 获取 <image> 的 JSON 文件：GET /v1/images/<image_id>/json
   3.2 如果没有此文件或内容返回 404 。
   3.3 docker push 认为服务器没有 image 对应的文件，向服务器上传 image 相关文件。
      3.3.1 写入 <image> 的 JSON 文件：PUT /v1/images/<image_id>/json
      3.3.2 写入 <image> 的 layer 文件：PUT /v1/images/<image_id>/layer
      3.3.3 写入 <image> 的 checksum 信息：PUT /v1/images/<image_id>/checksum
   3.4 上传完此 tag 的所有 image 后，向服务器写入 tag 信息：
      PUT /v1/repositories/(namespace)/(repository)/tags/(tag)
4. 所有 tags 的 image 上传完成后，向服务器发送所有 images 的校验信息：
   PUT /v1/repositories/(namespace)/(repo_name)/images

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Docker Registry API -> Pull

1. docker 访问 Hub 服务器 repository 的 images 信息：
   GET /v1/repositories/<username>/<repository>/images
2. docker 访问 registry 服务器 repository 的 tags 信息：
   GET /v1/repositoies/<username>/<repository>/tags
3. 根据 <repository> 的 <tags> 中 image 信息进行循环：
   3.1 获取 <image> 的 Ancestry 信息：GET /v1/images/<image_id>/ancestry
   3.2 获取 <image> 的 JSON 数据：GET /v1/images/<image_id>/json
   3.3 获取 <image> 的 Layer 文件：GET /v1/images/<image_id/layer

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Golang Version Docker Registry

```
beego.Router("/_ping", &controllers.PingController{}, "get:GetPing")

//Static File
beego.Router("/favicon.ico", &controllers.StaticController{}, "get:GetFavicon")

ns := beego.NewNamespace("/v1",

        beego.NSRouter("/_ping", &controllers.PingController{}, "get:GetPing"),

        beego.NSRouter("/_status", &controllers.StatusController{}),

        beego.NSRouter("/users", &controllers.UsersController{}, "get:GetUsers"),
        beego.NSRouter("/users", &controllers.UsersController{}, "post:PostUsers"),

        beego.NSNamespace("/repositories",
                beego.NSRouter("/:namespace/:repo_name/tags/:tag", &controllers.RepositoryController{}, "put:PutTag"),
                beego.NSRouter("/:namespace/:repo_name/images", &controllers.RepositoryController{}, "put:PutRepositoryImages"),
                beego.NSRouter("/:namespace/:repo_name/images", &controllers.RepositoryController{}, "get:GetRepositoryImages"),
                beego.NSRouter("/:namespace/:repo_name/tags", &controllers.RepositoryController{}, "get:GetRepositoryTags"),
                beego.NSRouter("/:namespace/:repo_name", &controllers.RepositoryController{}, "put:PutRepository"),
        ),

        beego.NSNamespace("/images",
                beego.NSRouter("/:image_id/ancestry", &controllers.ImageController{}, "get:GetImageAncestry"),
                beego.NSRouter("/:image_id/json", &controllers.ImageController{}, "get:GetImageJSON"),
                beego.NSRouter("/:image_id/layer", &controllers.ImageController{}, "get:GetImageLayer"),
                beego.NSRouter("/:image_id/json", &controllers.ImageController{}, "put:PutImageJson"),
                beego.NSRouter("/:image_id/layer", &controllers.ImageController{}, "put:PutImageLayer"),
                beego.NSRouter("/:image_id/checksum", &controllers.ImageController{}, "put:PutChecksum"),
        ),
)
```

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Docker Remote API -> Image & Container

1. POST /images/create
2. GET /images/(name)/history
3. POST /images/(name)/insert
4. GET /images/(name)/json
5. GET /images/json
6. POST /images/(name)/push
7. DELETE /images/(name)
8. GET /images/search
9. POST /images/(name)/tag

1. POST /containers/(id)/attach
2. GET /containers/(id)/changes
3. POST /containers/(id)/copy
4. POST /containers/create
5. GET /containers/(id)/export
6. GET /containers/(id)/json
7. POST /containers/(id)/kill
8. GET /containers/json
9. GET /containers/(id)/logs
10. POST /containers/(id)/pause
11. DELETE /containers/(id)
12. POST /containers/(id)/restart
13. POST /containers/(id)/start
14. POST /containers/(id)/stop
15. GET /containers/(id)/top
16. POST /containers/(id)/unpause
17. POST /containers/(id)/wait

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What’s Dockerfile ?

```
# VERSION 0.1
# DOCKER-VERSION  0.7.3
# AUTHOR:         Sam Alba <sam@docker.com>
# DESCRIPTION:    Image with docker-registry project and dependecies
# TO_BUILD:       docker build -rm -t registry .
# TO_RUN:         docker run -p 5000:5000 registry

# Latest Ubuntu LTS
from    ubuntu:14.04
# Update
run apt-get update
run apt-get -y upgrade
# Install pip
run apt-get -y install python-pip
# Install deps for backports.lzma (python2 requires it)
run apt-get -y install python-dev liblzma-dev libevent1-dev
add . /docker-registry
add ./config/boto.cfg /etc/boto.cfg
# Install core
run pip install /docker-registry/depends/docker-registry-core
# Install registry
run pip install file:///docker-registry#egg=docker-registry[bugsnag]
env DOCKER_REGISTRY_CONFIG /docker-registry/config/config_sample.yml
env SETTINGS_FLAVOR dev
expose 5000
cmd exec docker-registry
```

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OpenSource Projects Base Docker

1.PaaS : Tsuru/Octohost/Deis/StackDock/Flynn/tusum/Dokku/Spin-Docker/Peas/Tutum
2.Private Registry: quay.io/orchard/docker.cn
3.OS: CoreOS/Atomic
4.CI: Drone/Shippable
5.Book: dockerbook.com
6.Kubernetes

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End & Thanks