

如何利用容器技术提高编码生产力

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RANCHER



容器与Docker的发展

容器的发展

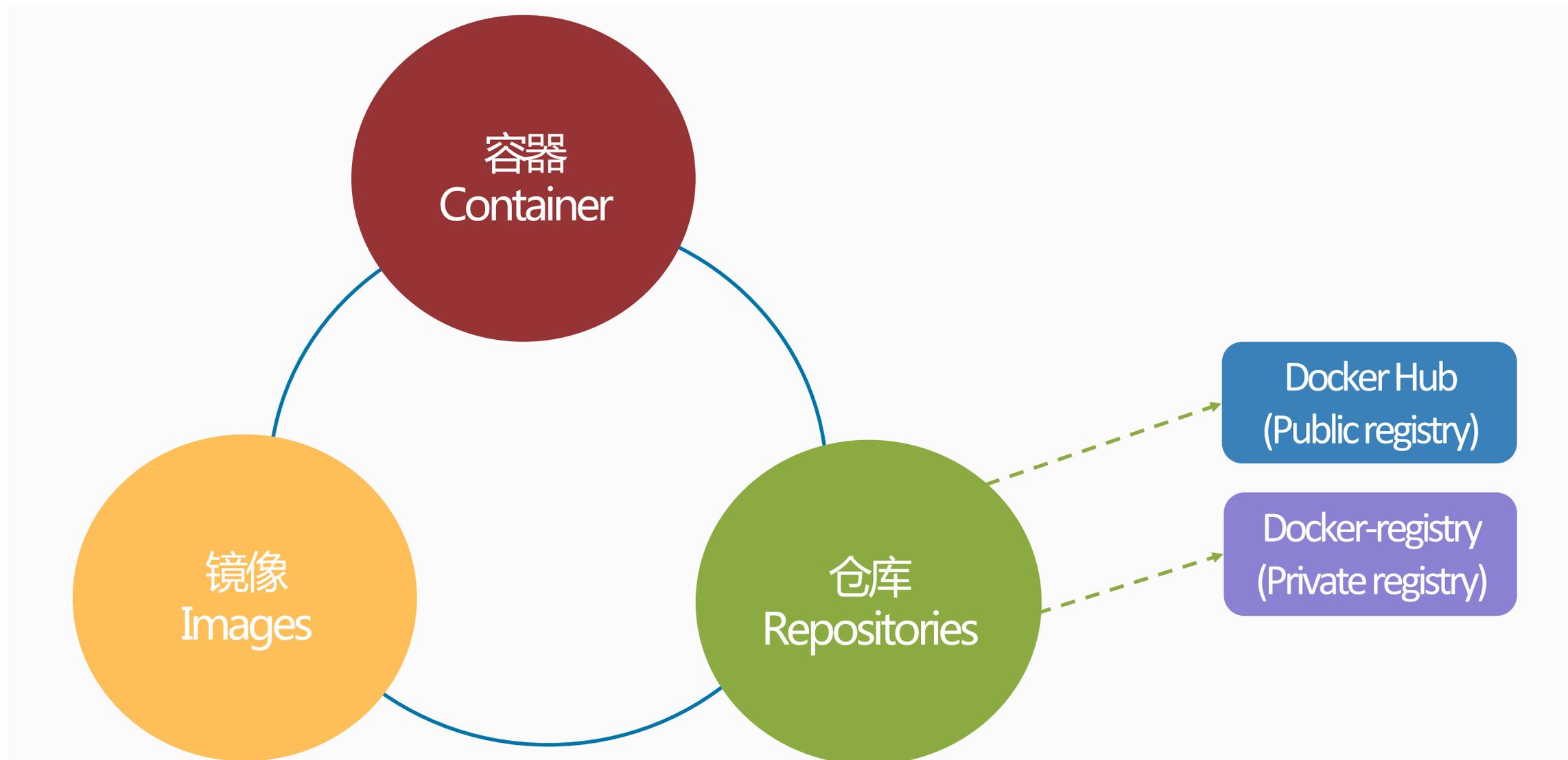
- Docker基于容器技术的轻量级虚拟化解决方案
- Docker是容器引擎，把Linux的cgroup、namespace等容器底层技术进行封装抽象，为用户提供了创建和管理容器的方法（包括命令行和API）
- Docker 是一个开源项目，诞生于 2013 年初，基于 Google 公司推出的 Go 语言实现
- 微软，红帽Linux，IBM，Oracle等主流IT厂商已经在自己的产品里增加对 Docker的支持。
- Google 每周启动超过20亿个容器进行业务服务，于上个世纪90年代已经开始大规模使用容器技术

- 类比传统的航运基础设施

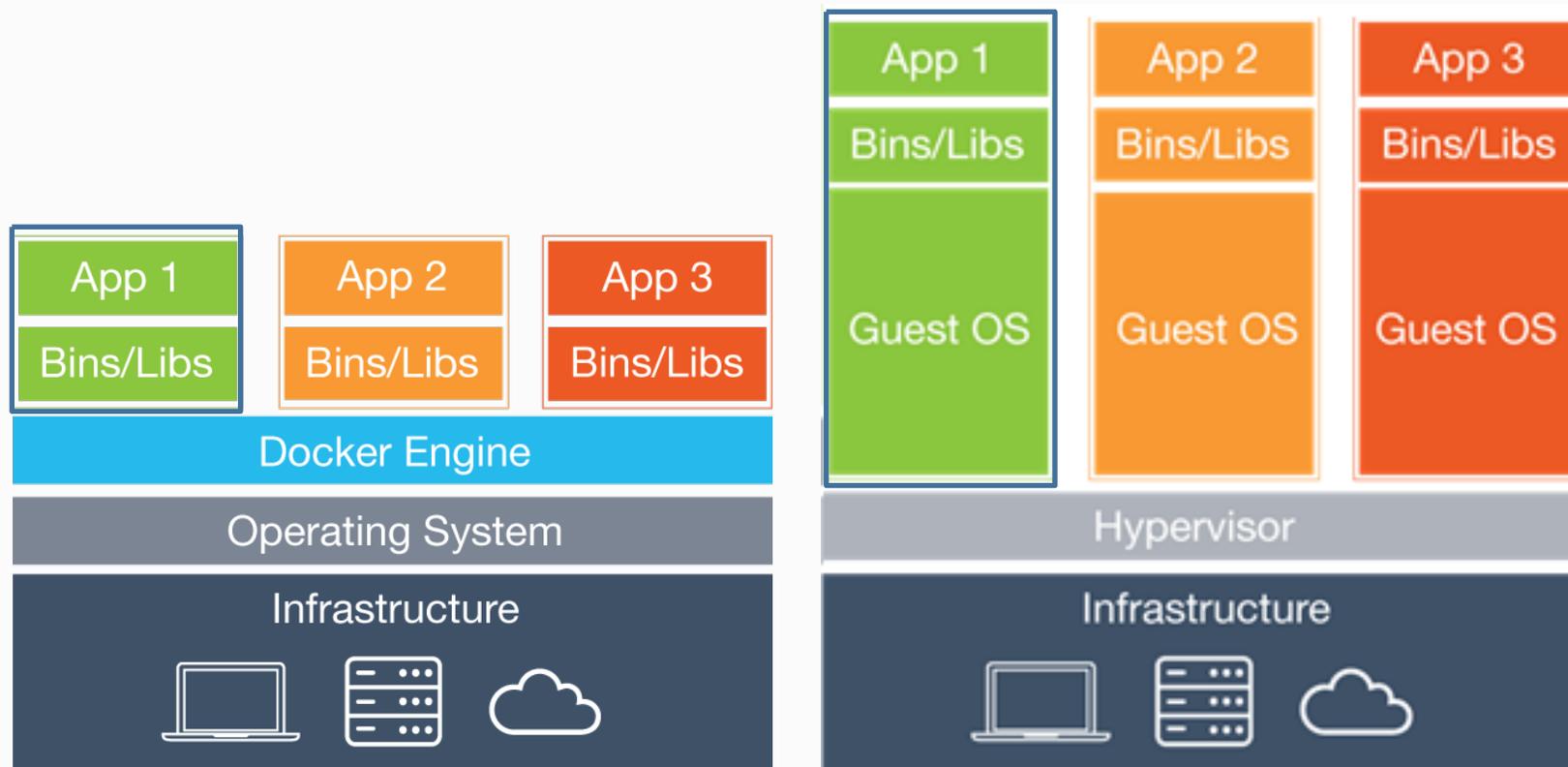
- 集装箱 => 容器
- 货物 => 应用
- 集装箱拖船 => 云服务器
- 集装箱吊车 => 容器编排工具
- 集装箱仓库 => 镜像仓库
- 拖车 => 镜像发布工具

- 集装箱：变革了人类整个生产流程体系，地球变平

- Docker：变革IT领域的软件交付方式，鸿沟变浅



Docker容器与传统VM的区别



- 容器以应用为中心！轻量、安全并且快捷

Docker vs 虚拟机

- Docker启动和停止可以在秒级实现，这相比传统的虚拟机方式要快的多。
- Docker对系统资源需求很少，一台主机上可以同时运行数千个Docker容器。
- Docker通过类似Git的操作来方便用户获取、分发和更新应用镜像，指令简明，学习成本较低。
- Docker通过Dockerfile配置文件来支持灵活的自动化创建和部署机制，提高工作效率。
- Docker除了运行其中的应用之外，基本不消耗额外的系统资源，保证应用性能的同时，尽量减小系统开销。传统虚拟机方式运行N个不同的应用就要启动N个虚拟机（每个虚拟机需要单独分配独占的内存、磁盘等资源），而Docker只需要启动N个隔离的容器，并将应用放到容器内即可。

Docker 的应用场景

- 作为服务使用
 - Web 应用服务
 - 微服务架构使用
- 构建 DevOps 流程，实现 CI/CD，运维的自动化
- 构建私有的 PAAS 平台，降低开发成本，提升效率
- 企业级 AppStore，统一的后端系统分发平台
- 其他应用场景
 - 跑一次性/定时任务
 - 科学计算/大数据分析服务
 - 金融和游戏等

容器的使用现状

65%

use Docker to deliver development agility.

48%

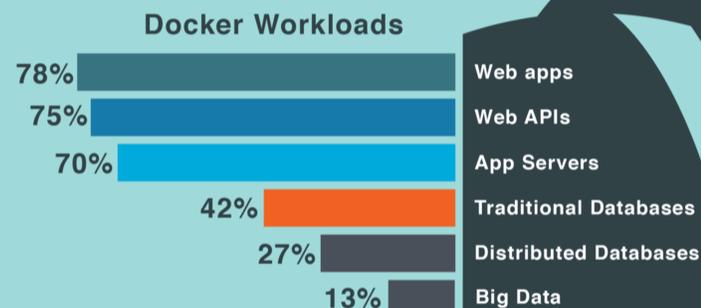
use Docker to control app environments.

41%

use Docker to achieve app portability.

90%

use Docker for apps in development.



58%

use Docker for apps in production.



90%

plan dev environments around Docker.



80%

plan DevOps around Docker.



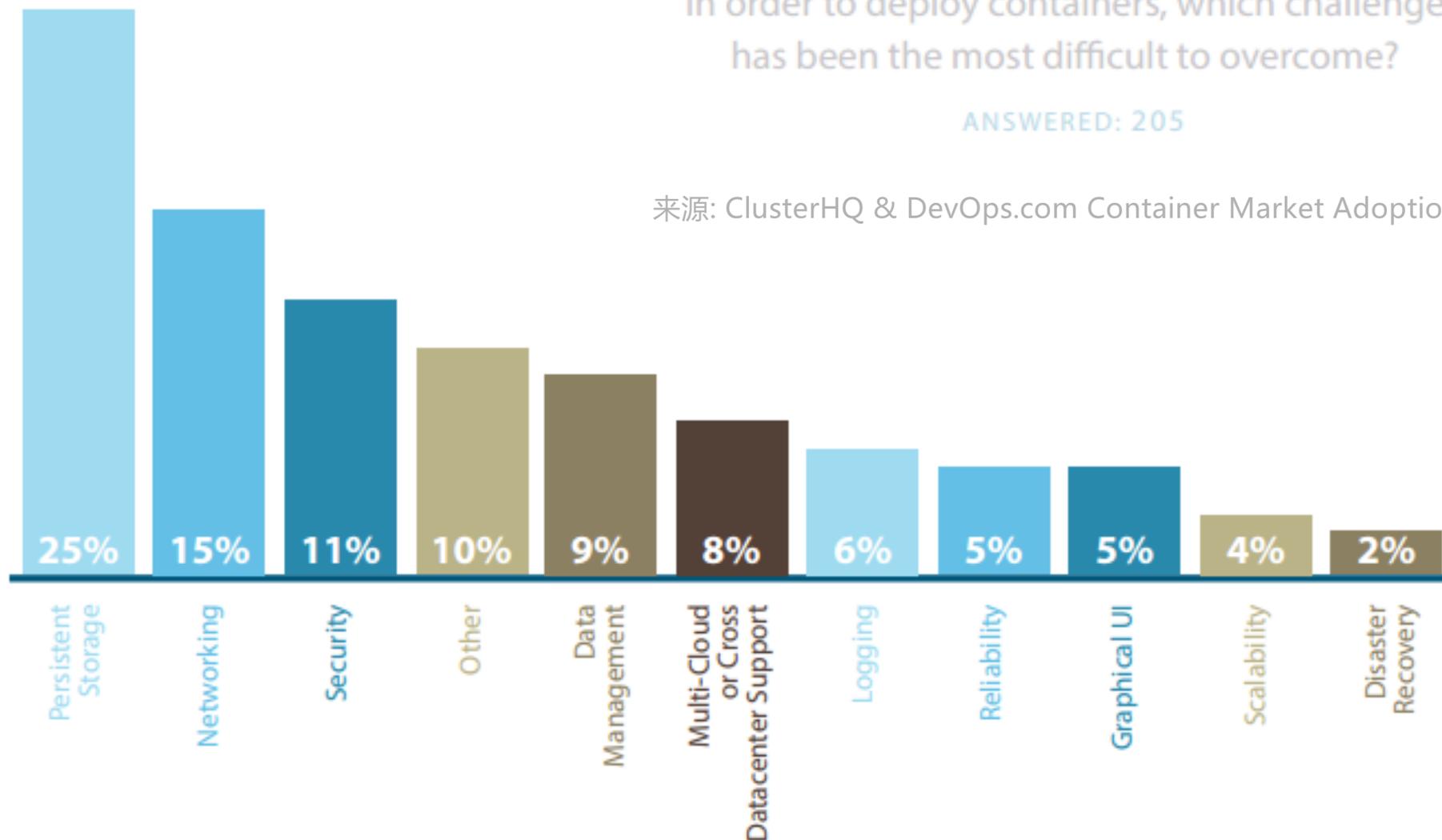
Rancher容器云平台

在生产环境运行容器面临的问题

In order to deploy containers, which challenge has been the most difficult to overcome?

ANSWERED: 205

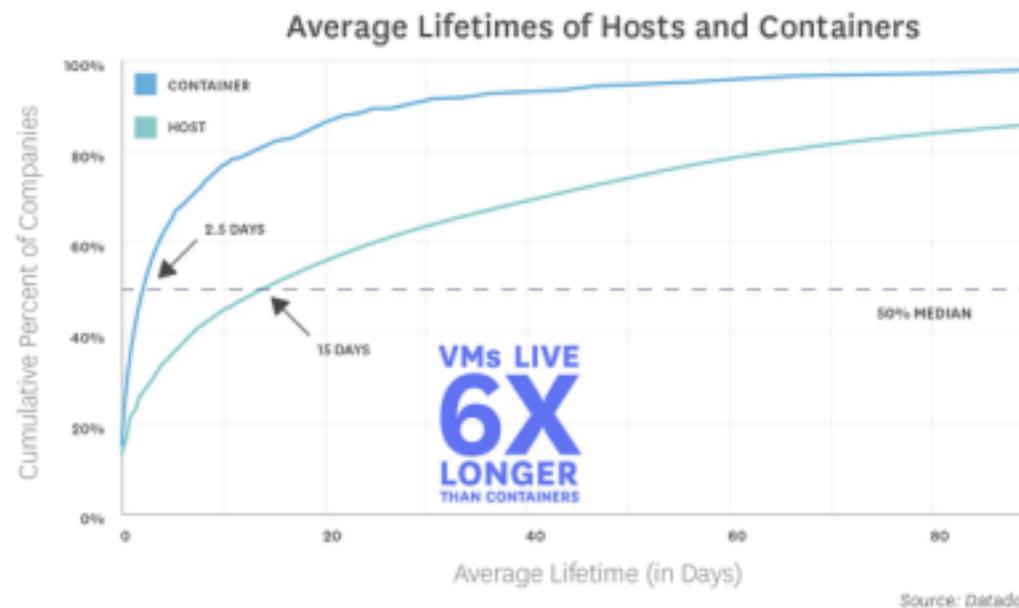
来源: ClusterHQ & DevOps.com Container Market Adoption 2016



在生产环境运行容器仍然是一个挑战

↑ 工具数量 + ↑ 变化 =
↑ 复杂度

| | |
|----------------|------------------------------------|
| App Catalog | Helm, ... |
| Orchestration | Compose, Kubernetes, Marathon, ... |
| Scheduling | Swarm, Kubernetes, Mesos, ... |
| Monitoring | cAdvisor, Sysdig, Datadog, ... |
| Access Control | LDAP, AD, GitHub, ... |
| Registry | DockerHub, Quay.io, ... |
| Engine | Docker, Rkt, ... |
| Security | Notary, Vault, ... |
| Network | VXLAN, IPSEC, HAProxy, ... |
| Storage | Ceph, Gluster, Swift, ... |
| Distributed DB | Etc, Consul, MongoDB, ... |



↑ 密度 + ↓ 生命周期 =
↑ 波动



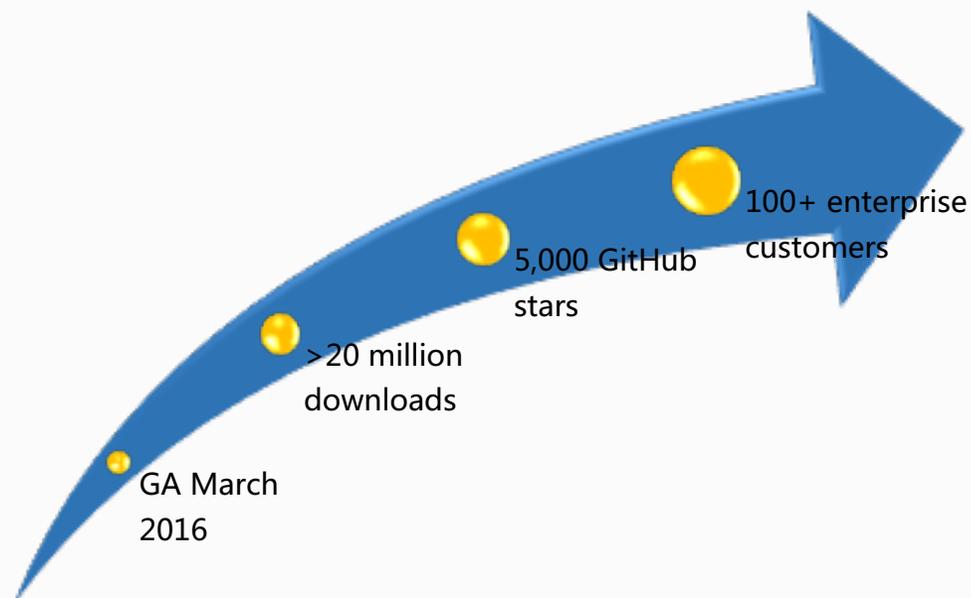
The most complete
container management
platform



A simplified Linux
distribution built from
containers, for
containers



An open source
project for
microservices-based
distributed block
storage

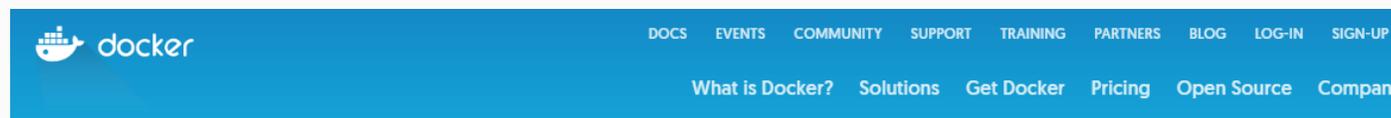


- Rancher Labs成立于2014年，总部位于加州的Cupertino，同时在亚利桑那州的Phoenix和中国设立研发中心
- 核心团队曾创立Cloud.com，并推出了CloudStack，历经从VM到容器的完整技术演进过程
- Rancher专注于提供容器云解决方案，已拥有大量成功案例

- Rancher Labs是开放容器联盟 (Open Container Initiative, OCI)的创始成员和云原生计算基金会(Cloud Native Computing Foundation)的成员



- Rancher Labs首席架构师 Darren Shepherd是 Docker 管理咨询委员会 (Docker Governance Advisory Board, DGAB) 全球四位顶级个人贡献者之一



Docker Governance Advisory Board: June 2015 Version

The DGAB is made up of 16 individual who represent the ecosystem, contributors and community of the Docker Project.

Docker

- Michael Crosby
- Steve Francia
- Stephen Day
- Arnaud Porterie

Individual

- Andrew Tianon Page
- Aleksa Sarai
- Harald Albers
- Darren Shepherd

Corporate Contributors

- Jeff Borek (IBM)
- Dan Walsh (RedHat)
- Ahmet Alp Balkan (Microsoft)
- Rohit Jnagal (Google)

Users

- Nicola Paolucci (Atlassian)
- Burke Libbey (Shopify)
- Meghdoot Bhattacharya (PayPal)
- Tapabrata Pal (Capital One)

Rancher编排 - 从基础设施到应用



应用展现

| | | | | | | | |
|--|--|--|---|--|--|--|---|
| Alfresco An ECM and BPM platform. View Details | Apache Kafka (Experimental) Kafka cluster View Details | Apache Zookeeper (Experimental) Zookeeper cluster View Details | ascinema-org Ascinema is a free and open source solution for recording terminal sessions and sharing View Details | Bind9 Domain Name Server Bind9 DNS server, compatible with the "DNS Update (RFC2136)" View Details | Cloud9 (Experimental) Cloud 9 SDK View Details | CloudFlare DNS Rancher External DNS service powered by CloudFlare View Details | concrete5 Concrete5.7 CMS for building easy and beautiful websites View Details |
|--|--|--|---|--|--|--|---|

编排调度

| | | | |
|------------|----------------|-----------|-----------|
| Cattle | kubernetes | Mesos | Swarm |
|------------|----------------|-----------|-----------|

基础架构服务

| | | | | | | |
|------------|------------------|----------------|---------------|-----|---------------------|-------------|
| Monitoring | Reliable Storage | Load Balancing | Network (SDN) | DNS | Database RDBMS, K/V | And More... |
|------------|------------------|----------------|---------------|-----|---------------------|-------------|

基础架构

| | | | | | | | |
|----------------|----------------|----------------|-----------|------------------|------------|---------------|-------------|
| Bare Metal | Aliyun ECS | AMAZON EC2 | Azure | DigitalOcean | packet | rackspace | vSphere |
|----------------|----------------|----------------|-----------|------------------|------------|---------------|-------------|



功能完备的企业级容器管理平台

Application Catalog



User Mgmt

RBAC
AD/LDAP
SAML

Container Orchestration and Scheduling



Ops Mgmt

CI/CD
Registries
Monitoring

Infrastructure Services

Storage

Networking

Security

DNS/LB

Multi-tenant Environments

Environment 1



Environment 2



..... ..

Environment N



Rancher企业级应用商店

The screenshot displays the Rancher Catalog Library interface. At the top, there is a navigation bar with tabs for Dev-Lab, STACKS, CATALOG, INFRASTRUCTURE, ADMIN, and API. Below the navigation bar, the main content area is titled "Catalog: Library" and features a search bar and a category dropdown menu. The library contains 18 application cards, each with a logo, name, description, and a "View Details" button. The cards are arranged in a 3x6 grid. A category dropdown menu is open on the right side, listing various categories such as All, Agile, Applications, Big Data, Blogging, Chat, Clustering, Continuous Integration, Databases, ECM, EDM, ELK, Enterprise Portal, Entertainment, ERP, Git, Kanban, Load Balancing, Logging, Monitoring, Networking, Rancher Services, Repository, Security, Storage, and Versioning.

| Application Name | Description |
|----------------------------|--|
| Alfresco | An ECM and BPM platform. |
| Apache Kafka | (Experimental) Kafka cluster |
| Apache Zookeeper | (Experimental) Zookeeper cluster |
| ascinema-org | Ascinema is a free and open source solution for recording terminal sessions and sharing them on the web. |
| CloudFlare DNS | Rancher External DNS service powered by CloudFlare |
| Consul Cluster | Consul cluster |
| Consul-Registrator | Consul agent with Registrator for Service Auto Configuration |
| Convoy GlusterFS | Docker Volume Manager for GlusterFS Volumes |
| Convoy NFS | Docker Volume Manager for NFS-backed Volumes |
| Datadog | Real-time performance tracking and visualization of your container-based application deployment |
| DNSSimple DNS | Rancher External DNS service powered by DNSimple |
| Drone | Drone CI Server |
| Drone Rancher Node Manager | |
| ECR Credential Updater | |
| Elasticsearch | |
| Elasticsearch 2.x | |
| Etc | |
| F5 BIG-IP Balancer | |

The screenshot shows the Rancher UI interface. At the top, under the 'Networking' section, there are three cards for 'RANCHER IPSEC' and 'RANCHER VXLAN'. The first IPSEC card is marked 'Certified' and has 'Edit Config' and 'Disable' buttons. The second IPSEC card has an 'Enable' button. The VXLAN card has an 'Enable' button. Below this is the 'Add Environment' section. A text input field contains 'FLAT|'. Underneath, there are four environment template cards: 'Cattle', 'FLAT' (highlighted with a red box and a green checkmark), 'Kubernetes', and 'Mesos'. Below the templates, it says 'Orchestration: Cattle', 'Framework: Healthcheck Service, Network Services, S...', and 'Networking: Rancher Flat Networking'.

基于CNI网络框架

- IPsec
- Vxlan
- 扁平网络
- Calico
- Macvlan

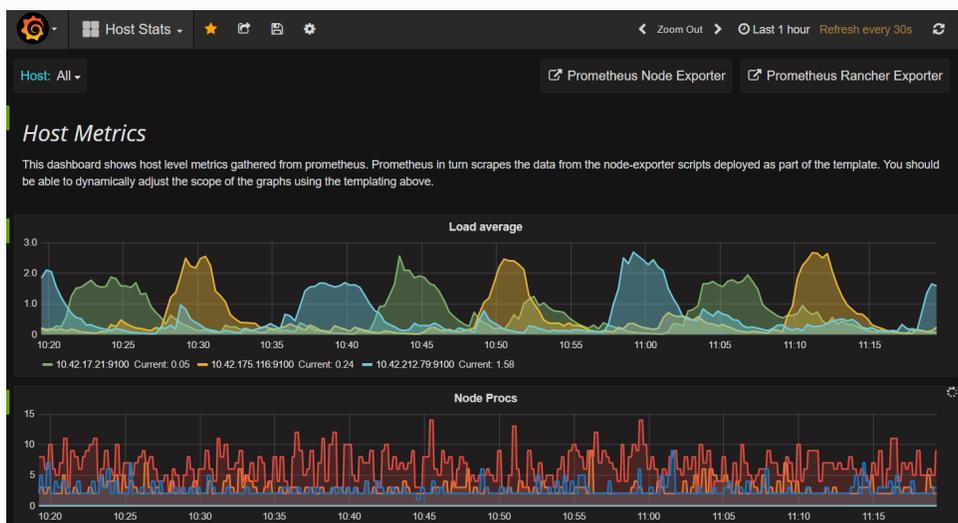
The screenshot shows a GitHub repository page for 'leodotcloud / test-calico-catalog-item'. The page shows the commit history for the 'calico' directory. The current commit is 'leodotcloud Switching back to host_ports:true'. Below the commit message, there are two files listed: 'docker-compose.yml' with the description 'Converting to map instead of array for environment' and 'rancher-compose.yml' with the description 'Switching back to host_ports:true'.

容器持久化数据

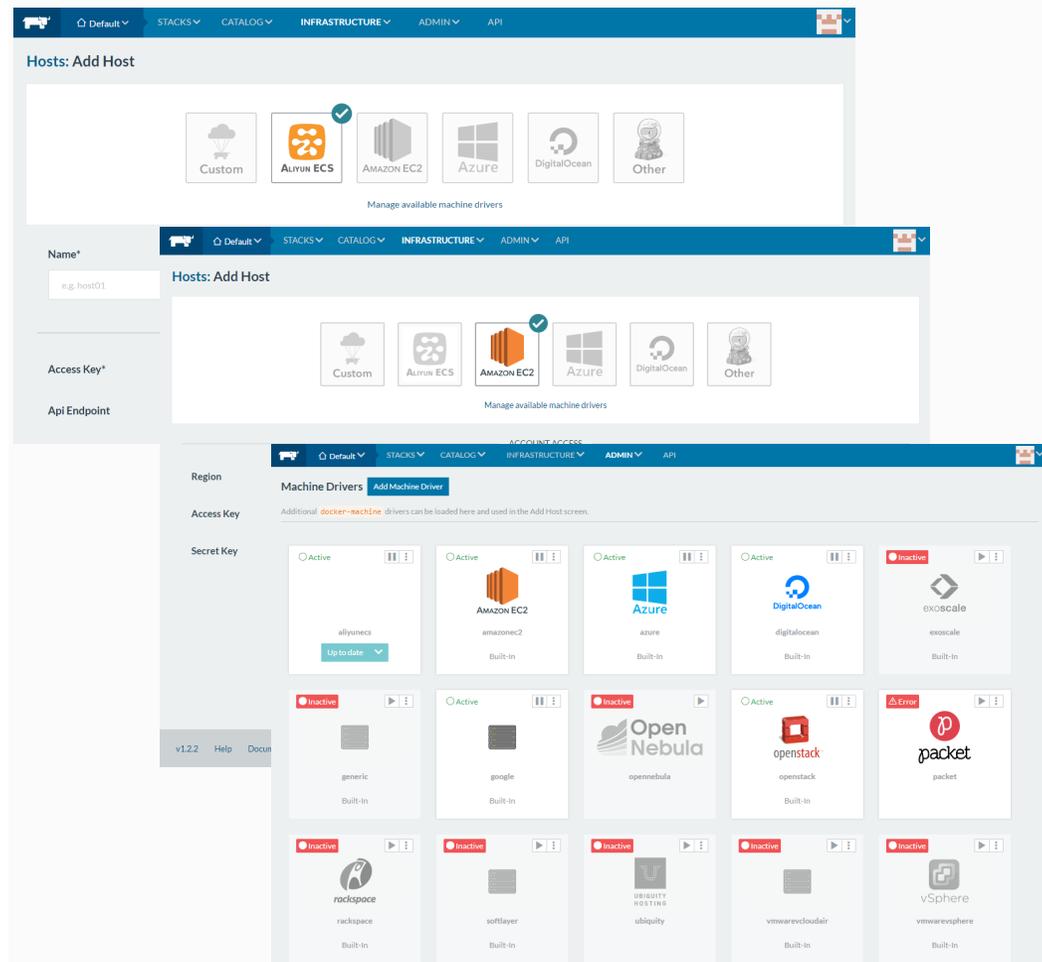
The screenshot displays the Rancher storage plugin library interface. It features several storage options:

- Rancher NFS:** A Docker volume plugin for NFS, supported for NFS v4. It is marked as 'Certified' and 'Already Deployed'.
- Rancher EBS:** A Docker volume plugin for Amazon EBS, provided by Rancher Labs. It includes 'Edit Config' and 'Disable' buttons.
- Portworx:** A volume plugin for Portworx Elastic Data Fabric, providing scale-out persistent storage for containers. It includes 'Edit Config' and 'Disable' buttons.
- NetApp:** Three options are shown: NetApp E-Series, NetApp ONTAP NAS, and NetApp ONTAP SAN. Each is a volume plugin for its respective storage type and includes an 'Enable' button.

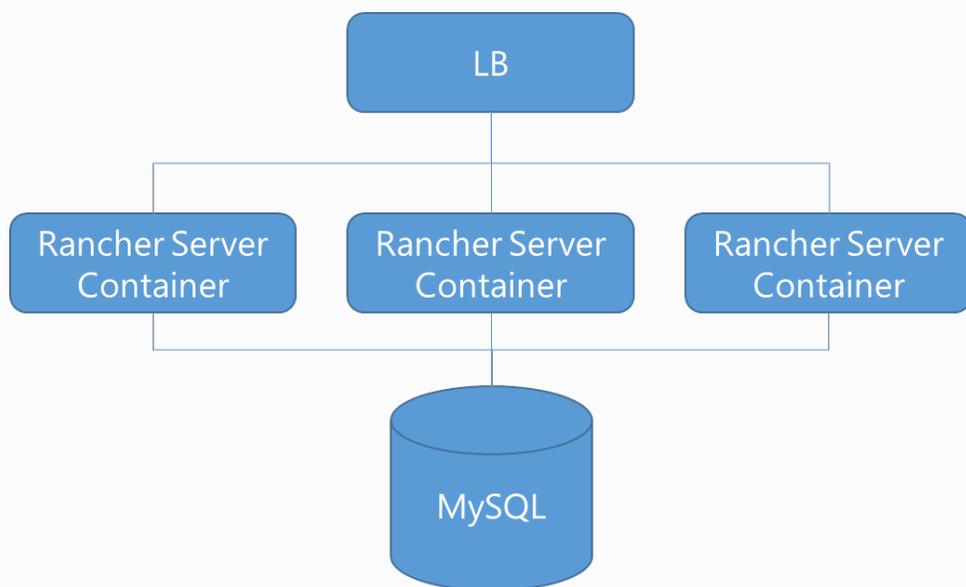
- 支持Docker Volume Plugin
- 支持K8S Persistent Volume
- 提供官方NFS插件
- 对接GlusterFS、Ceph等插件
- 对接Openstack Cinder
- 对接NetApp、EMC
- 对接portworx



- 支持不同级别，包括集群、主机、应用、容器等的监控
- 支持监控的汇聚展示
- 可以集成Prometheus、Zabbix、Datadog监控系统



- 内置Machine Service集成Docker Machine驱动
- 可实现与绝大多数公有云和私有云的自动化对接，包括阿里云、AWS中国、Azure中国、青云等



- 支持单机和HA部署，HA部署基于HazelCast，元数据存储于MySQL
- 基于健康检查策略自动触发应用高可用迁移或管理员手工触发
- Service Log支持对容器的所有相关操作进行记录，包括迁移事件

代码开源 – 欢迎大家的参与

This screenshot shows the GitHub repository page for `rancher/rancher`. The repository is described as "A Platform for Operating Docker in Production" with a link to <http://rancher.com>. It has 654 commits, 7 branches, 488 releases, and 25 contributors. The repository is licensed under Apache-2.0. The file list includes `.github`, `agent`, `docs`, `scripts`, `server`, `tests/server`, `.gitignore`, `.wrap-docker-args`, `Dockerfile`, `LICENSE`, `README.md`, and `version`.

This screenshot shows the GitHub repository page for `rancher/os`. The repository is described as "Tiny Linux distro that runs the entire OS as Docker containers" with a link to <http://docs.rancher.com/os/>. It has 1,464 commits, 13 branches, 84 releases, and 29 contributors. The repository is licensed under Apache-2.0. The file list includes `.github`, `assets`, `cmd`, `compose`, `config`, `dfs`, `docker`, `docs`, `hostname`, `images`, `init`, and `netconf`.

<http://github.com/rancher>

谢谢!



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