

# Docker Volumes with BeeGFS

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Docker: Linux Containers to Optimise IT Infrastructure for HPC & BigData

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# [Agenda]

Introduction

Docker

Volumes

- Introduction

- Types

- Plugins

BeeGFS

- BeeGFS

- Dockerized stack

- BeeGFS plugin

Demo

Q&A

# [Introduction] Who am I?

CTO for RedCoolBeans

OpenBSD developer

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🐙, [in](#) [jasperla](#)

# [Introduction] RedCoolBeans

- ▶ Secure Docker stacks
- ▶ CargOS, Dockerlint, Crane

 RedCoolBeans

 @RedCoolBeans

 RedCoolBeans.com and CargOS.io

# [Docker] Adoption Hurdles

Two primary challenges:

- ▶ Networking

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Two primary challenges:

- ▶ Networking
- ▶ Storage

# [Docker] Networking

- ▶ Links
- ▶ Multi-host setups
  - ▶ *Ambassador pattern*

# [Docker] Networking (cont.)

Two “solutions”:

- ▶ Weave
- ▶ docker-compose

Docker 1.9 `network` subcommand



# [Docker] Data persistence

Containers are ephemeral, data is forever (sort of)

Not all containers are stateless

- ▶ Databases
- ▶ CMS uploads
- ▶ ...

## [Volumes] Purpose of volumes

- ▶ Store data outside of a container

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## [Volumes] Purpose of volumes

- ▶ Store data outside of a container
- ▶ Share data between containers
- ▶ Backup/replication
- ▶ Utilize external/clustered filesystems

## Data volumes

- ▶ `docker run -v /data:/data [...]`

## Data volume containers

- ▶ `docker run --volumes-from data-container [...]`

# [Volumes] Types of volumes

Data volumes on host (host volumes)

- ▶ `docker run -v /docker/db:/db [...]`

# [Volumes] Types of volumes (cont.)

## Data volumes

### Anonymous volume

- ▶ `docker run -v /data [...]`
- ▶ Data lifetime matches container's



# [Volumes] Types of volumes (cont.)

## Data volumes

### Anonymous volume

- ▶ `docker run -v /data [...]`
- ▶ Data lifetime matches container's

### Named volume

- ▶ `docker run -v datavolume:/data [...]`
- ▶ Data lifetime exceeds container's

# [Volumes] Types of volumes (cont.)

## Data volume containers

- ▶ `docker run --volumes-from data-container [...]`
- ▶ Store data in containers

## [Volumes] Security implications

- ▶ No restrictions on sharing
- ▶ SELinux-labeling
- ▶ Boot2docker *situation*

# [Volumes] Plugins

- ▶ `docker volume subcommand/API`
- ▶ Arbitrary backend provider
- ▶ Plugins for:
  - ▶ NFS, CIFS, EFS
  - ▶ GlusterFS, IPFS

# [Volumes] Plugins

- ▶ `docker volume subcommand/API`
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  - ▶ BeeGFS

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- ▶ Developed by Fraunhofer institute

# [BeeGFS] Overview

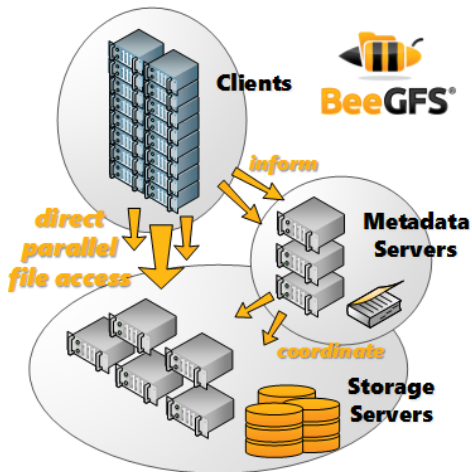


Figure: Architecture overview (source: beegfs.com)

# [Dockerized stack] Services

- ▶ Management
- ▶ Metadata
- ▶ Storage

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- ▶ Management
- ▶ Metadata
- ▶ Storage
- ▶ Client

# [Dockerized stack] Availability

- ▶ DockerHub
- ▶ `github.com/RedCoolBeans/docker-beegfs`

- ▶ `github.com/RedCoolBeans/docker-volume-beegfs`
- ▶ Available for:
  - ▶ RedHat (+CentOS, &c)
  - ▶ Debian (+Ubuntu, &c)

# [BeeGFS plugin] Requirements

- ▶ Docker 1.8
- ▶ Plugin service running
- ▶ Kernel module loaded
- ▶ BeeGFS share mounted

## [BeeGFS plugin] How does it work?

- ▶ Bridge to Docker API (docker volume)
- ▶ Maps volume name to on-disk name
- ▶ Checks underlying filesystem type



## [BeeGFS plugin] Use cases

- ▶ Multi-host Docker cluster
- ▶ Redudant storage
- ▶ (Live-)migration
- ▶ CI/CD

Demo

Questions?