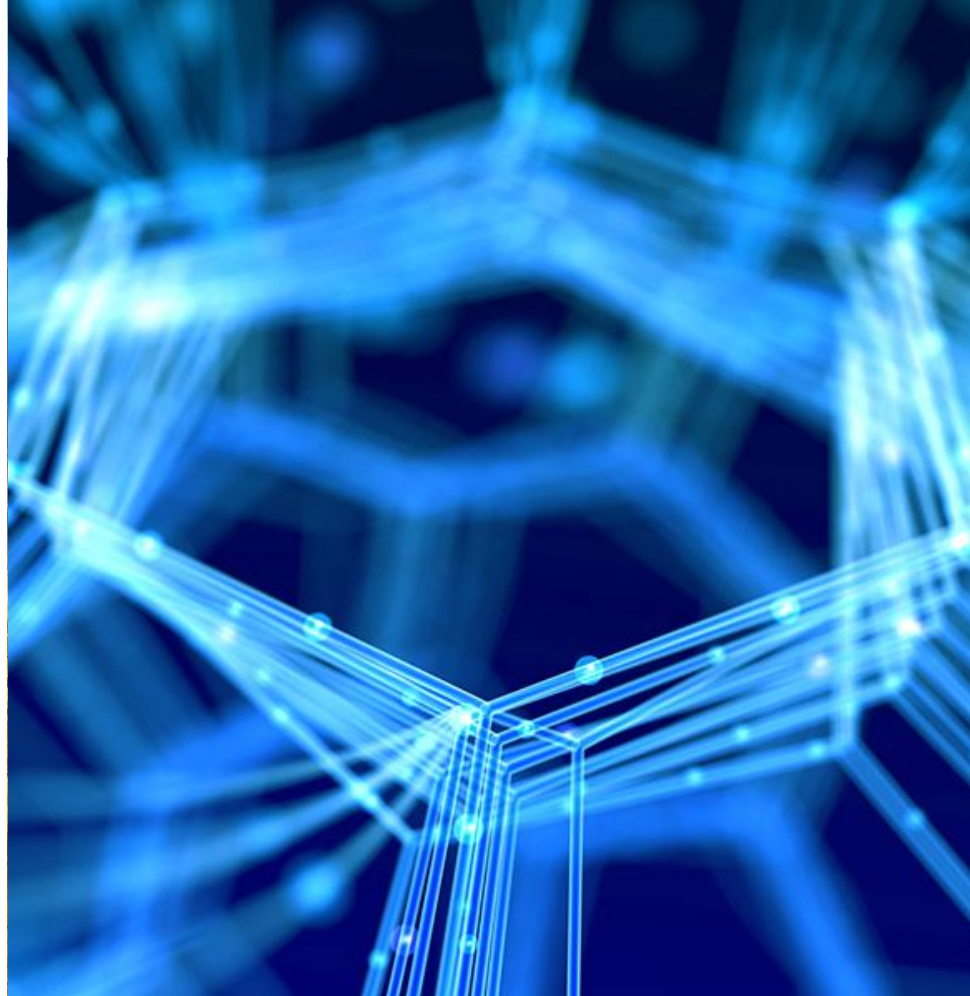minimesos

The experimentation and testing tool for Apache Mesos

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Container Solutions

#MesosCon
NORTH AMERICA

ContainerSolutions

About Me

- Senior software engineer at Container Solutions Amsterdam

- R&D in the Docker, Mesos and Programmable infrastructure ecosystem

- Creator of minimesos

minimesos

@Frank_Scholten

frankscholten

Outline

- What is minimesos?

- Basic Features

- Limitations

- Demo

- Advanced Features

- Wrap up

minimesos

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What is minimesos?

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What is minimesos?

- Experimentation and testing tool for Apache Mesos

- Instant Mesos cluster on your laptop

- CLI and Java API
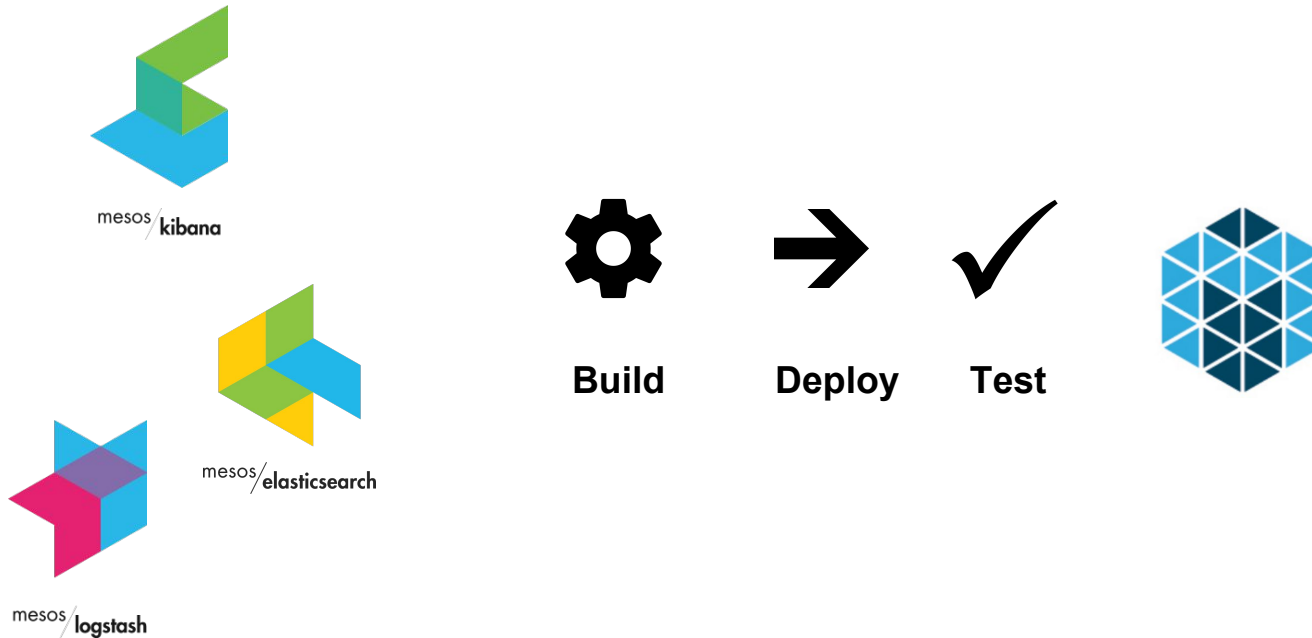
- Runs in Docker

- Sponsored by

The story behind minimesos

- CS contributed to **MANTL** by CISCO

- The Mesos ELK stack on Mesos is a core piece

- Developing & testing distributed systems is hard...

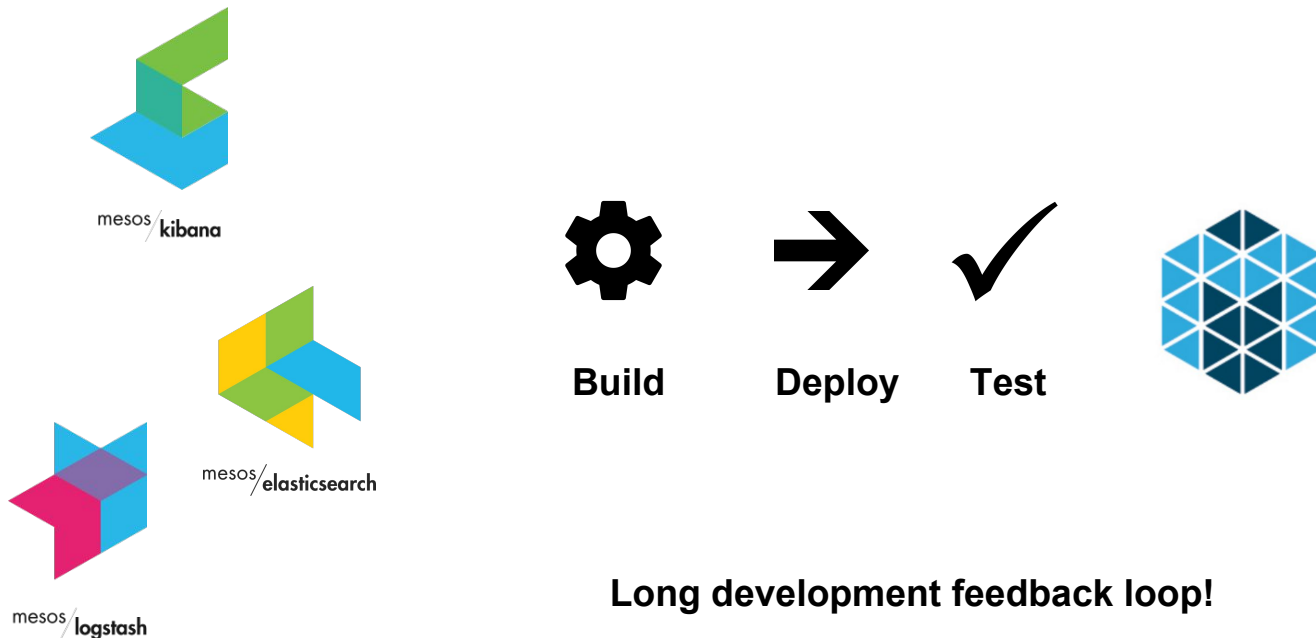**http://container-solutions.com/orchestrated-machine-containerpilot-minimesos-travelling-orchestration**

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Mesos framework development

mesos/kibana

mesos/elasticsearch

mesos/logstash

Build → **Test** ✓

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Mesos framework development

mesos/kibana

mesos/elasticsearch

mesos/logstash

Build → **Test**

Long development feedback loop!

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Mesos framework development

mesos/kibana

mesos/elasticsearch

mesos/logstash

Build, run and test using minimesos locally

✓

JUnit

minimesos

Deploy ➜

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minimesos architecture

Linux box or Docker Machine VM

cli — JCommander

minimesos — Docker Java | Awaitility | Unirest | Groovy DSL

minimesosFile — Agent | Master | [image] | MARATHON
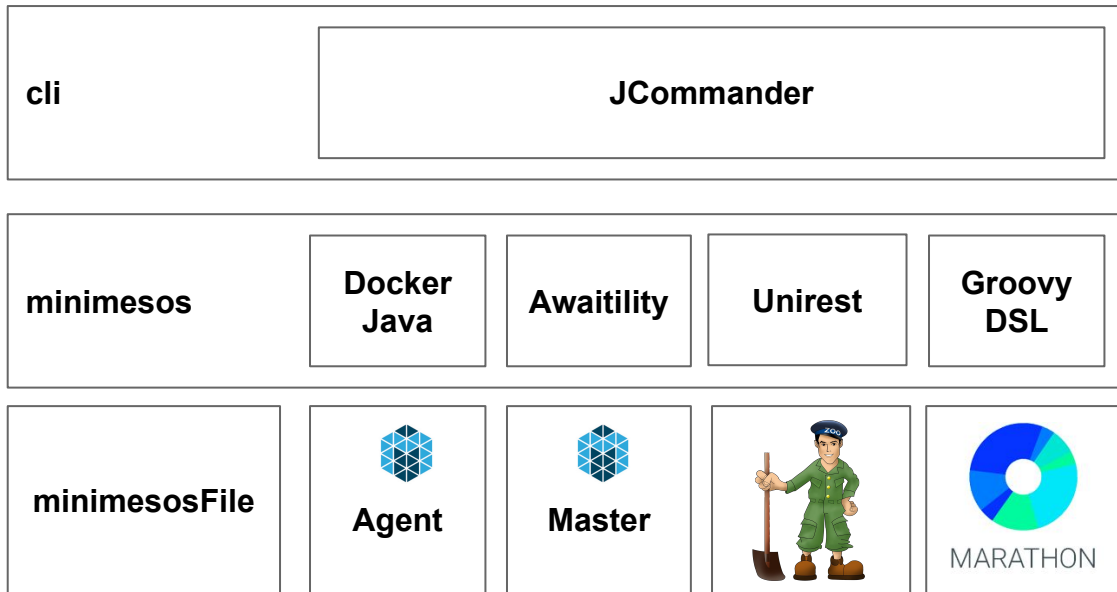
Additional services — Consul | Weave Scope | Registrator
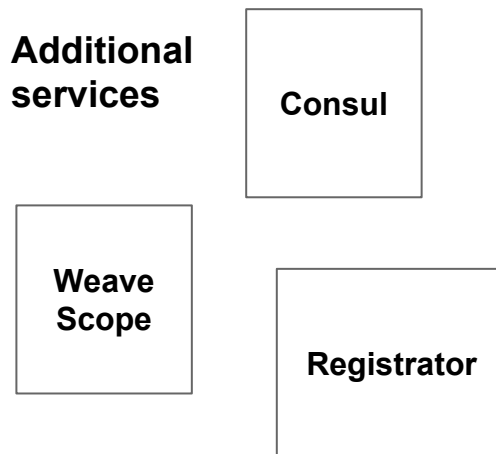
Basic Features

minimesos CLI

- Initialize `minimesosFile`

  ```
  $ minimesos init
  ```

- Start the cluster

  ```
  $ minimesos up
  ```

- Print Mesos state

  ```
  $ minimesos state
  ```

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minimesos CLI

- Print tasks

```
$ minimesos ps
```

- Installing a Marathon app

```
$ minimesos install --marathonFile apps/app.json
```

- Print cluster info

```
$ minimesos info
```

- Destroy the cluster

```
$ minimesos destroy
```

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minimesosFile

- Cluster-wide properties

```
minimesos {

    clusterName = "test"

    loggingLevel = "INFO"

    mapAgentSandboxVolume = true

    mesosVersion = "0.25"

    timeout = 60

    ...

}
```

minimesosFile

- Configure agent resources and other processes

```
agent {

    resources {

        cpu {

            role = "*"

            value = 2

        }

        disk {

            role = "*"

            value = 20000

        }
        ...

    }
```

minimesos Java API

```java
@ClassRule
public static final MesosClusterTestRule RULE = MesosClusterTestRule.fromFile("src/test/resources/configFiles/minimesosFile-mesosClusterTest");


public static MesosCluster CLUSTER = RULE.getMesosCluster();


@Test
public void mesosClusterCanBeStarted() throws Exception {

  MesosMaster master = CLUSTER.getMaster();

  JSONObject stateInfo = master.getStateInfoJSON();

  assertEquals(3, stateInfo.getInt("activated_slaves"));

}
```

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minimesos Java API

```java
@BeforeClass
public static void startScheduler() throws Exception {

    String ipAddress = CLUSTER.getMasterContainer().getIpAddress();

    LOGGER.info("Starting Scheduler, connected to " + ipAddress);
    SchedulerContainer scheduler = new SchedulerContainer(CONFIG.dockerClient, ipAddress);

    // Cluster now has responsibility to shut down container
    CLUSTER.addAndStartContainer(scheduler);

    LOGGER.info("Started Scheduler on " + scheduler.getIpAddress());
}

@Test
public void testNodeDiscoveryRest() {

    long timeout = 120;
    DockerContainersUtil util = new DockerContainersUtil(CONFIG.dockerClient);

    final Set<String> ipAddresses = new HashSet<>();
    Awaitility.await("9 expected executors did not come up").atMost(timeout, TimeUnit.SECONDS).until(() -> {
        ipAddresses.clear();
        ipAddresses.addAll(util.getContainers(false).filterByImage(Configuration.DEFAULT_EXECUTOR_IMAGE).getIpAddresses());
        return ipAddresses.size() == 9;
    });

    HelloWorldResponse helloWorldResponse = new HelloWorldResponse( ipAddresses, Arrays.asList(8080, 8081, 8082), timeout );
    assertTrue("Executors did not come up within " + timeout + " seconds", helloWorldResponse.isDiscoverySuccessful());

}
```
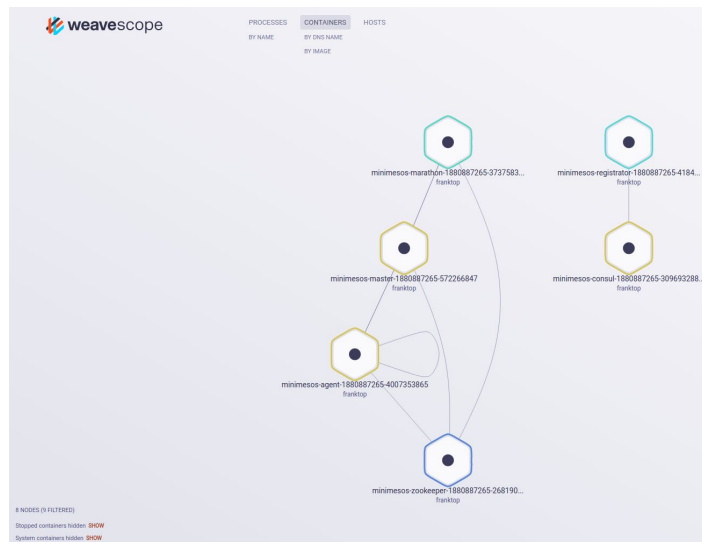
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Weave Scope

- Visualize containers

- Launched via Marathon

  on startup in `minimesosFile`

- Runs at http://localhost:4040

Demo

minimesos online demo

- Try out minimesos in a browser. Powered by **@teamkatacoda**

- Go to https://minimesos.org/try

- **NOTE** does not work with ad-blockers

minimesos installation

- `curl -sSL https://minimesos.org/install | sh`

- Initial pull of Docker images may take a few minutes

- For more info see http://www.minimesos.org

minimesos demo

- See containersolutions/mesoscon-2016-minimesos

- The `minimesosFile` contains a reference to `es.json` Marathon file
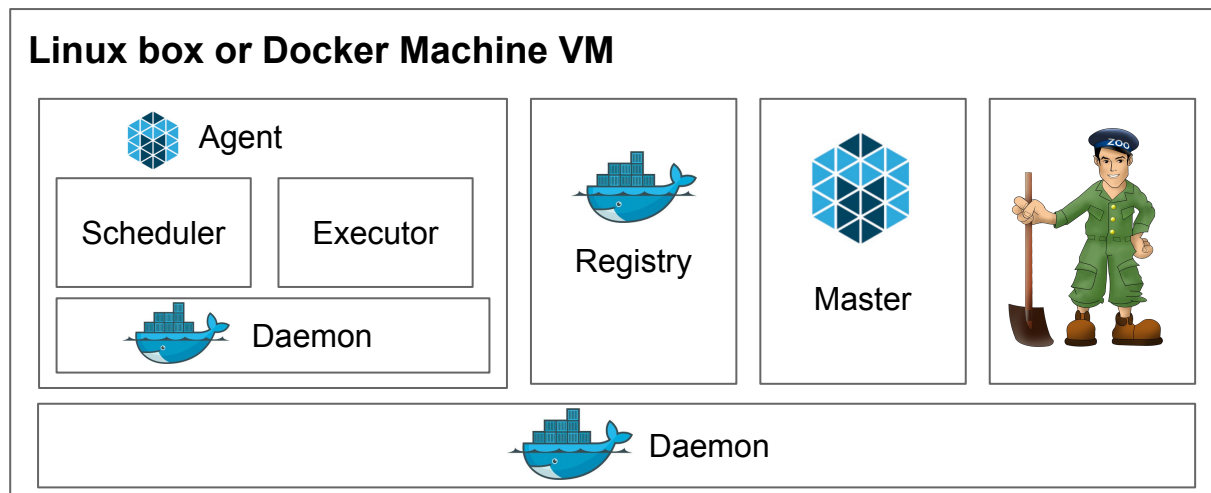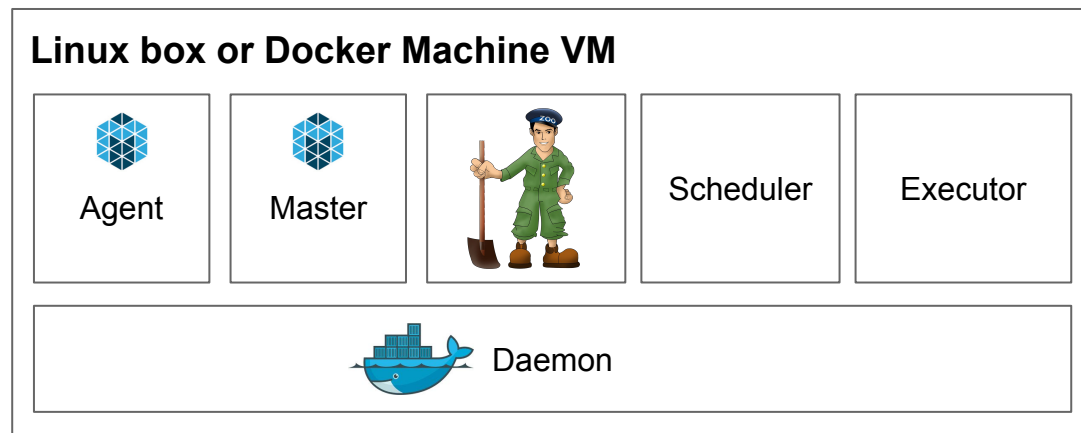
- Deploys on startup

Limitations

Limitations

- minimesos started out running Docker-inside-of-Docker

- But, sharing images between Docker daemons requires a registry

Limitations

- We now use run Docker-outside-of-Docker

- But this created a *different* problem...

Limitations

- Executors do not use Agent ports. Different network interface!

- 'Mesos Agents not routable' (from Marathon UI)
  https://github.com/ContainerSolutions/minimesos/issues/401

- minimesos containers write files as `root` on host instead of `$USER`

- 'Failures to write from containers to host'
  https://github.com/ContainerSolutions/minimesos/issues/426

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Limitations

- Only supports single Mesos Master and single Zookeeper

- 'Support Zookeeper ensemble' **https://github.com/ContainerSolutions/minimesos/issues/16**

- Only supports Java as testing API

- 'Support Python client'
  https://github.com/ContainerSolutions/minimesos/issues/264

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Improvements

- 'Support IP per container' - CNI & Project Calico

  https://github.com/ContainerSolutions/minimesos/issues/420

- 'Add user namespace requirement'

  https://github.com/ContainerSolutions/minimesos/issues/332

- 'REST API'

  https://github.com/ContainerSolutions/minimesos/issues/452

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Advanced Features

minimesos

Consul

- DNS service discovery

- Add Consul container to the `minimesosFile`

```
consul {

        imageName = "containersol/consul-server"

        imageTag = "0.6-1"

}
```

- Use `MINIMESOS_CONSUL_IP` as ENV or Marathon token
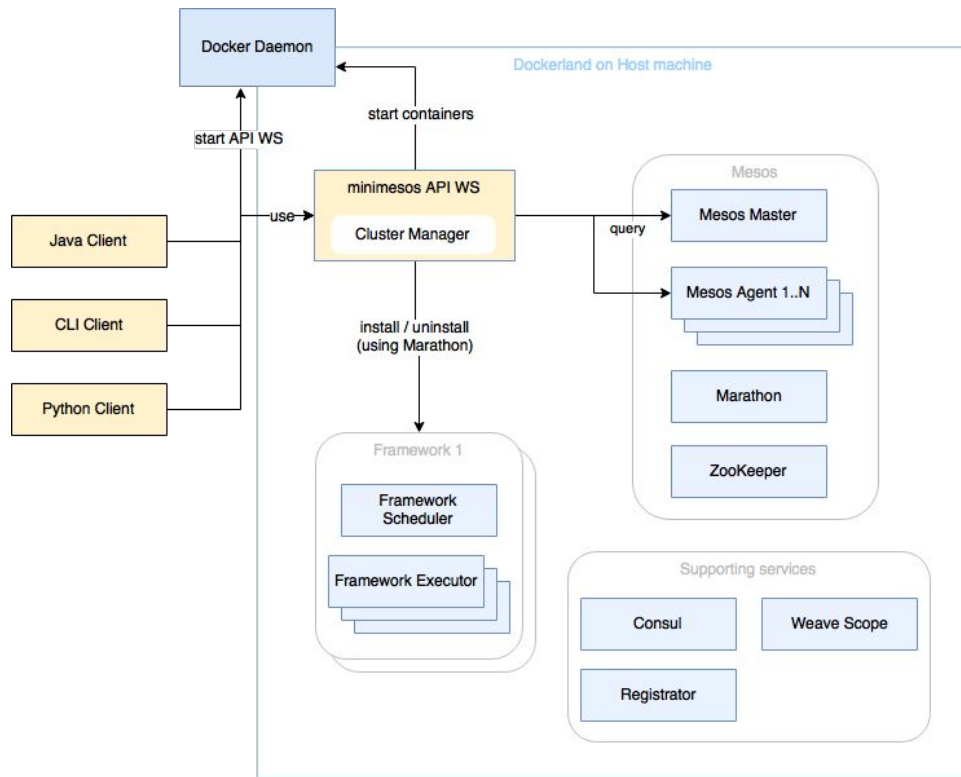
Registrator

- Auto registers containers to Consul

- Add Registrator container to the `minimesosFile`

```
registrator {

        imageName = "containersol/consul-server"

        imageTag = "0.6-1"

}
```

- Use `MINIMESOS_CONSUL_IP` as ENV or Marathon token

Scheduled for 0.10.0 - REST API

- One API per cluster

- Java + CLI part of minimesos
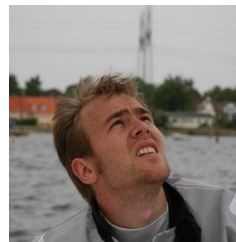
- Python client in separate repo

- More languages?

Related tools

- Mesos Starter - Spring boot starter for Mesos frameworks

  https://github.com/ContainerSolutions/mesos-starter

- Created and maintained by **@mwldk**

- Used by

Related tools

- Mesos Framework - Write a framework with a config file

  https://github.com/ContainerSolutions/mesosframework

- Created and maintained by **@drphilwinder**

- Used by

mesos/kibana

Related tools

- Mesos Maven plugin - Start & destroy minimesos from Maven

- Created and maintained by **@drphilwinder**

- See **@drphilwinder's** blog on all these tools

  http://container-solutions.com/mesos-framework-overview/

How to contribute to minimesos

- Found a bug or issue? Let us know

- PRs are appreciated!

- Your PR is auto built by Travis CI

Blog post by @sadovnikov at the CS blog

http://container-solutions.com/moved-ci-jenkins-travis

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Wrap up

Infraloop

INFRALOOP

Infraloop is a comprehensive development and testing platform that is integrated into IDEs, CI/CD pipelines and other tools.

Cloud Native Apps on Mesos and DC/OS

- Simple and easy Build, Test, Run cycle
- Full local development
- Orchestration tested locally
- Painless deployment to production

We love to get your thoughts and feedback! Check out **www.infraloop.com**

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Let's stay in touch

#MesosCon NORTH AMERICA — See you at the the hackaton! We are working on the REST API and available for Q&A

minimesos

http://minimesos.org

http://www.container-solutions.com

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Container Solutions is hiring!

Thank you!