

1.概念

Marathon可以通过Constraints来控制其app在何处运行

我们可以通过Marathon的[REST API](#)或者[Marathon gem](#)(marathon client)来设置app的constraints配置。

Constraints由三个部分组成：

字段名(field name), 操作(operator), 可选参数(optional parameter)

其中字段名(field name)可以为mesos的一个slave的hostname或者Mesos slave的attribute。

2.实战

接下来我们结合实战，来介绍下Marathon Constrains的用法

Slave IP	Attribute
192.168.100.27	无
192.168.100.30	rack_id:rack-1
192.168.100.31	rack_id:rack-1
192.168.100.32	rack_id:rack-2

字段名

Hostname字段

hostname 匹配slave的hostnames。

hostname支持所有的operator

Attribute字段

attribute 匹配Mesos slave的attributes字段。我们可以通过在mesos节点上运行mesos-slave --help来学习如何设置mesos slave的attributes。

操作

UNIQUE operator

UNIQUE tells Marathon to enforce uniqueness of the attribute across all of an app's tasks.

```
$ curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id": "dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [
        { "containerPort": 80, "hostPort": 0, "protocol": "tcp"}
      ]
    }
  },
  "constraints": [["hostname", "UNIQUE"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 5
}'
```

field name = hostname, operator = UNIQUE, 在每个slave上只起一个instance。

由于我们申请了5个nginx instance, 而我们Mesos集群节点只有4个slave, 所以我们在Marathon的管理界面上看到app dataman为Deploying状态。

Cluster: Test
Server: 192.168.100.31:5050
Version: 0.22.0
Built: a week ago by core
Started: 46 minutes ago
Elected: 46 minutes ago

[LOG](#)

Slaves

Activated 4

Active Tasks

ID	Name	State	Started ▼	Host	
dataman.9cee63aa-f8c2-11e4-9dcd-2e6c0af28b40	dataman	RUNNING	2 minutes ago	192.168.100.30	Sandbox
dataman.9ceeffed-f8c2-11e4-9dcd-2e6c0af28b40	dataman	RUNNING	2 minutes ago	192.168.100.27	Sandbox
dataman.9cee8abb-f8c2-11e4-9dcd-2e6c0af28b40	dataman	RUNNING	2 minutes ago	192.168.100.32	Sandbox
dataman.9ceed8dc-f8c2-11e4-9dcd-2e6c0af28b40	dataman	RUNNING	2 minutes ago	192.168.100.31	Sandbox

CLUSTER operator

CLUSTER allows you to run all of your app's tasks on slaves that share a certain attribute. This is useful for example if you have apps with special hardware needs, or if you want to run them on the same rack for low latency.

```
$ curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id": "dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [
        { "containerPort": 80, "hostPort": 0, "protocol": "tcp" }
      ]
    }
  },
  "constraints": [["rack_id", "CLUSTER", "rack-1"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 5
}
```

```
}'
```

CLUSTER允许我们将app发布到Mesos特定的slave节点上。如果你的app对物理机的硬件有要求，那么这个特性就很有用了。

我们可以看到marathon将我们的app都发布到了rack-1节点上去了。

Mesos Frameworks Slaves Offers Test

Master 20150512-233453-526690496-5050-18049

Cluster: Test
Server: 192.168.100.31:5050
Version: 0.22.0
Built: a week ago by core
Started: 52 minutes ago
Elected: 52 minutes ago

LOG

Slaves

Activated 4

Deactivated 0

Active Tasks

Find...

ID	Name	State	Started ▼	Host	
dataman.4ce710a2-f8c3-11e4-9dc3-2e6c0af28b40	dataman	RUNNING	3 minutes ago	192.168.100.30	Sandbox
dataman.49525120-f8c3-11e4-9dc3-2e6c0af28b40	dataman	RUNNING	3 minutes ago	192.168.100.31	Sandbox
dataman.49531471-f8c3-11e4-9dc3-2e6c0af28b40	dataman	RUNNING	3 minutes ago	192.168.100.30	Sandbox
dataman.45be2dde-f8c3-11e4-9dc3-2e6c0af28b40	dataman	RUNNING	3 minutes ago	192.168.100.30	Sandbox
dataman.45bf183f-f8c3-11e4-9dc3-2e6c0af28b40	dataman	RUNNING	3 minutes ago	192.168.100.31	Sandbox

```
$curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id": "dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [{
        "containerPort": 80, "hostPort": 0, "protocol": "tcp"
      }]
    }
  },
  "constraints": [["hostname", "CLUSTER", "192.168.100.27"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 2
}'
```

我们还可以指定field name为hostname，并将optional parameter指定为我们希望app运行的slave的hostname。

这样我们将2个dataman的instance发布到了192.168.100.27这台slave上。

MeSOS

Frameworks

Slaves

Offers

Test

Master

20150512-233556-509913280-5050-6594

Cluster: Test

Server: 192.168.100.30:5050

Version: 0.22.0

Built: a week ago by core

Started: 14 hours ago

Elected: 12 minutes ago

LOG

Slaves

Activated

4

Deactivated

0

Tasks

Staged

0

Active Tasks

Find...

ID	Name	State	Started ▼	Host	
dataman.24c3db8b-f92c-11e4-ba5a-b278f321b365	dataman	RUNNING	21 minutes ago	192.168.100.27	Sandbox
dataman.21333aba-f92c-11e4-ba5a-b278f321b365	dataman	RUNNING	21 minutes ago	192.168.100.27	Sandbox

Completed Tasks

ID	Name	State	Started ▼	Stopped	Host	
No completed tasks.						

GROUP_BY operator

GROUP_BY can be used to distribute tasks evenly across racks or datacenters for high availability.

```
$curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id":"dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [{
        "containerPort": 80, "hostPort": 0, "protocol": "tcp"
      }]
    }
  },
  "constraints": [["rack_id", "GROUP_BY"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 6
}'
```

GROUP_BY帮我们将instance均匀的分布到不同的机架上，保证了高可用性。可以看到rack-1和rack-2上的instance个数均为3个。

Mesos Frameworks Slaves Offers Test

Master 20150512-233556-509913280-5050-6594

Cluster: Test
Server: 192.168.100.30:5050
Version: 0.22.0
Built: a week ago by core
Started: 15 hours ago
Elected: an hour ago

LOG

Slaves

Activated 4
Deactivated 0

Active Tasks

Find...

ID	Name	State	Started ▼	Host	
dataman.32c2c427-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	14 minutes ago	192.168.100.32	Sandbox
dataman.2f2f1616-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	14 minutes ago	192.168.100.30	Sandbox
dataman.2f2ec7f5-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	14 minutes ago	192.168.100.32	Sandbox
dataman.2b9acbc4-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	15 minutes ago	192.168.100.30	Sandbox
dataman.2b9a7da3-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	15 minutes ago	192.168.100.32	Sandbox
dataman.2b9a5692-f937-11e4-ba5a-b278f321b365	dataman	RUNNING	15 minutes ago	192.168.100.31	Sandbox

LIKE operator

LIKE accepts a regular expression as parameter, and allows you to run your tasks only on the slaves whose field values match the regular expression.

```
curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id": "dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [{
        "containerPort": 80, "hostPort": 0, "protocol": "tcp"
      }]
    }
  },
  "constraints": [["rack_id", "LIKE", "rack-[1-2]"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 6
}'
```

LIKE操作可以将我们的instance发布到我们希望的slave上，匹配正则表达式。

注意：LIKE操作必须带上parameter。

Mesos
Frameworks
Slaves
Offers
Test

Master 20150512-233556-509913280-5050-6594

Cluster: Test
Server: 192.168.100.30:5050
Version: 0.22.0
Built: a week ago by core
Started: 15 hours ago
Elected: 2 hours ago

LOG

Slaves

Activated 4
Deactivated 0

Active Tasks

Find...

ID	Name	State	Started ▼	Host	
dataman.72e50abb-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.30	Sandbox
dataman.72e531cc-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.31	Sandbox
dataman.72e57fed-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.32	Sandbox
dataman.6f513599-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.32	Sandbox
dataman.6f5183ba-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.30	Sandbox
dataman.6f50e778-f93a-11e4-ba5a-b278f321b365	dataman	RUNNING	8 minutes ago	192.168.100.31	Sandbox

UNLIKE operator

Just like **LIKE** operator, but only run tasks on slaves whose field values don't match the regular expression.

```
curl -v -X POST http://192.168.100.30:8080/v2/apps \
-H Content-Type:application/json -d '{
  "id": "dataman",
  "container": {
    "type": "DOCKER",
    "docker": {
      "image": "192.168.100.13:5000/fchen/mynginx",
      "network": "BRIDGE",
      "portMappings": [{
        "containerPort": 80, "hostPort": 0, "protocol": "tcp"
      }]
    }
  },
  "constraints": [["rack_id", "UNLIKE", "rack-[2,3]"]],
  "cmd": "/usr/sbin/nginx -c /etc/nginx/nginx.conf",
  "cpus": 0.1,
  "mem": 128.0,
  "instances": 6
}'
```

同LIKE操作，UNLIKE不将instance发布到匹配的slave上，参数匹配正则表达式。

Master20150512-233556-509913280-5050-6594

Cluster: Test
Server: 192.168.100.30:5050
Version: 0.22.0
Built: a week ago by core
Started: 15 hours ago
Elected: 2 hours ago

LOG

Slaves

Activated	4
Deactivated	0

Active Tasks

▼

Find...

ID	Name	State	Started ▼	Host	
dataman.56130ad3-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	just now	192.168.100.27	Sandbox
dataman.557a4d42-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	just now	192.168.100.30	Sandbox
dataman.557a2631-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	just now	192.168.100.31	Sandbox
dataman.527ec080-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	a minute ago	192.168.100.27	Sandbox
dataman.51e629fe-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	a minute ago	192.168.100.30	Sandbox
dataman.51e6c63f-f93c-11e4-ba5a-b278f321b365	dataman	RUNNING	a minute ago	192.168.100.31	Sandbox