

## 搭建zookeeper环境

1.在搭建zookeeper环境前，一定要配置jdk环境，此处不赘述。

```
[root@iZwz94p7rlsw8kv682gfshZ local]# java -version
java version "1.8.0_191"
Java(TM) SE Runtime Environment (build 1.8.0_191-b12)
Java HotSpot(TM) 64-Bit Server VM (build 25.191-b12, mixed mode)
```

2.首先我从[zookeeper官网](#)上下载zookeeper.通过FileZilla上传到我的阿里服务器上,如下图：

```
drwx----- 3 admin admin      4096 Dec 10 13:49 admin
-rw-r--r--  1 root  root    191753373 Dec 10 19:04 jdk-8u191-linux-x64.tar.gz
drwxr-x---  9 root  root      4096 Aug 24  2017 staragent
drwxr-x---  5 www   www      4096 Dec 10 13:49 www
-rw-r--r--  1 root  root    35042811 Dec 10 17:25 zookeeper.tar.gz
[root@iZwz94p7rlsw8kv682gfshZ home]#
```

3.然后解压zookeeper,命令：tar -zxvf zookeeper.tar.gz ,如下图：

```
drwx----- 3 admin admin      4096 Dec 10 13:49 admin
-rw-r--r--  1 root  root    191753373 Dec 10 19:04 jdk-8u191-linux-x64.tar.gz
drwxr-x---  9 root  root      4096 Aug 24  2017 staragent
drwxr-x---  5 www   www      4096 Dec 10 13:49 www
drwxr-xr-x 10 mysql mysql    4096 Mar 23  2017 zookeeper-3.4.10
-rw-r--r--  1 root  root    35042811 Dec 10 17:25 zookeeper.tar.gz
```

4.更改zookeeper-3.4.10为zookeeper,命令：mv zookeeper-3.4.10/ zookeeper , 如下图：

```
drwx----- 3 admin admin      4096 Dec 10 13:49 admin
-rw-r--r--  1 root  root    191753373 Dec 10 19:04 jdk-8u191-linux-x64.tar.gz
drwxr-x---  9 root  root      4096 Aug 24  2017 staragent
drwxr-x---  5 www   www      4096 Dec 10 13:49 www
drwxr-xr-x 10 mysql mysql    4096 Mar 23  2017 zookeeper
-rw-r--r--  1 root  root    35042811 Dec 10 17:25 zookeeper.tar.gz
```

5.将zookeeper移动到/usr/local目录下，命令：mv zookeeper /usr/local，如下图：

```
[root@iZwz94p7rlsw8kv682gfshZ local]# ll
total 88
drwxr-xr-x  6 root  root  4096 Dec 26 00:19 aegis
drwxr-xr-x 15 root  root  4096 Aug  4 2017 apache
drwxr-xr-x  2 root  root  4096 Nov  5 2016 bin
drwxr-xr-x 10 root  root  4096 Dec 10 13:48 cloudmonitor
drwxr-xr-x  2 root  root  4096 Nov  5 2016 etc
drwxr-xr-x  2 root  root  4096 Nov  5 2016 games
drwxr-xr-x  2 root  root  4096 Nov  5 2016 include
drwxr-xr-x  7  10  143 4096 Oct  6 20:55 jdk8
drwxr-xr-x  2 root  root  4096 Aug 24 2017 lib
drwxr-xr-x  3 root  root  4096 Aug 25 2017 lib64
drwxr-xr-x  2 root  root  4096 Nov  5 2016 libexec
drwxr-xr-x  3 root  root  4096 Aug 24 2017 libmemcached
drwxr-xr-x 10 mysql mysql 4096 Aug  8 2017 mysql
drwxr-xr-x 10 root  root  4096 Aug  9 2017 php56
dr-x----- 7 root  root  4096 Aug 30 2017 sasagent
drwxr-xr-x  2 root  root  4096 Nov  5 2016 sbin
drwxr-xr-x  6 root  root  4096 Dec 10 13:47 share
drwxr-xr-x  2 root  root  4096 Nov  5 2016 src
drwxr-xr-x 11 mysql mysql 4096 Dec 10 17:27 zookeeper
```

6.在zookeeper的conf目录下，将zoo\_sample.cfg改名为zoo.cfg, 可以用这个命令：cp zoo\_sample.cfg zoo.cfg，复制一份，以防在修改配置过程中失误。

7.查看zoo.cfg,命令：vim zoo.cfg,如下图：

```
# The number of milliseconds of each tick
tickTime=2000
# The number of ticks that the initial
# synchronization phase can take
initLimit=10
# The number of ticks that can pass between
# sending a request and getting an acknowledgement
syncLimit=5
# the directory where the snapshot is stored.
# do not use /tmp for storage, /tmp here is just
# example sake.
dataDir=/usr/local/zookeeper/data
# the port at which the clients will connect
clientPort=2181
# the maximum number of client connections.
# increase this if you need to handle more clients
#maxClientCnxns=60
#
# Be sure to read the maintenance section of the
# administrator guide before turning on autopurge.
#
# http://zookeeper.apache.org/doc/current/zookeeperAdmin.html#sc_maintenance
#
# The number of snapshots to retain in dataDir
#autopurge.snapRetainCount=3
# Purge task interval in hours
# Set to "0" to disable auto purge feature
#autopurge.purgeInterval=1
```

- 1).**tickTime**: zookeeper服务器之间或客户端与服务器之间维持心跳的时间间隔，也就是每个tickTime时间就会发送一个心跳，tickTime以毫秒为单位
- 2).**initLimit**: 集群中的follower服务器与leader服务器之间初始化连接时能容忍的最多心跳数
- 3).**syncLimit**: 集群中的follower服务器与leader服务器之间请求和应答之间容忍的最多心跳数

4).**dataDir**: 存储zookeeper的快照文件，pid文件，默认为/tmp/zookeeper,建议在zookeeper安装目录下创建data目录，将dataDir配置为/usr/local/zookeeper/data，如下图：

```
[root@iZwz94p7rlsw8kv682gfshZ zookeeper]# ls -l
total 1592
drwxr-xr-x 2 mysql mysql 4096 Dec 10 18:33 bin
-rw-rw-r-- 1 mysql mysql 84725 Mar 23 2017 build.xml
drwxr-xr-x 2 mysql mysql 4096 Jan 22 14:55 conf
drwxr-xr-x 10 mysql mysql 4096 Mar 23 2017 contrib
drwxr-xr-x 3 root root 4096 Jan 22 14:55 data
drwxr-xr-x 2 mysql mysql 4096 Mar 23 2017 dist-maven
drwxr-xr-x 6 mysql mysql 4096 Mar 23 2017 docs
-rw-rw-r-- 1 mysql mysql 1709 Mar 23 2017 ivysettings.xml
-rw-rw-r-- 1 mysql mysql 5691 Mar 23 2017 ivy.xml
drwxr-xr-x 4 mysql mysql 4096 Mar 23 2017 lib
-rw-rw-r-- 1 mysql mysql 11938 Mar 23 2017 LICENSE.txt
-rw-rw-r-- 1 mysql mysql 3132 Mar 23 2017 NOTICE.txt
-rw-rw-r-- 1 mysql mysql 1770 Mar 23 2017 README_packaging.txt
-rw-rw-r-- 1 mysql mysql 1585 Mar 23 2017 README.txt
drwxr-xr-x 5 mysql mysql 4096 Mar 23 2017 recipes
drwxr-xr-x 8 mysql mysql 4096 Mar 23 2017 src
```

5).**clientPort**: 客户端连接zookeeper的端口，即zookeeper对外的服务端口，默认为2181

8.进入zookeeper的bin目录下启动zookeeper，命令：./zkServer.sh start

```
[root@iZwz94p7rlsw8kv682gfshZ bin]# ./zkServer.sh start
ZooKeeper JMX enabled by default
Using config: /usr/local/zookeeper/bin/./conf/zoo.cfg
Starting zookeeper ... already running as process 2188.
```

9.查看zookeeper进程，命令：ps -ef | grep zookeeper

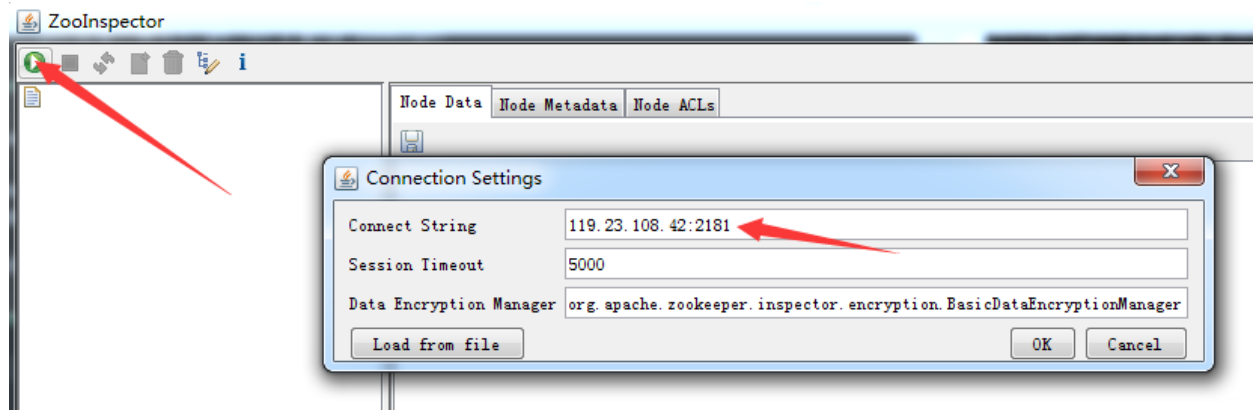
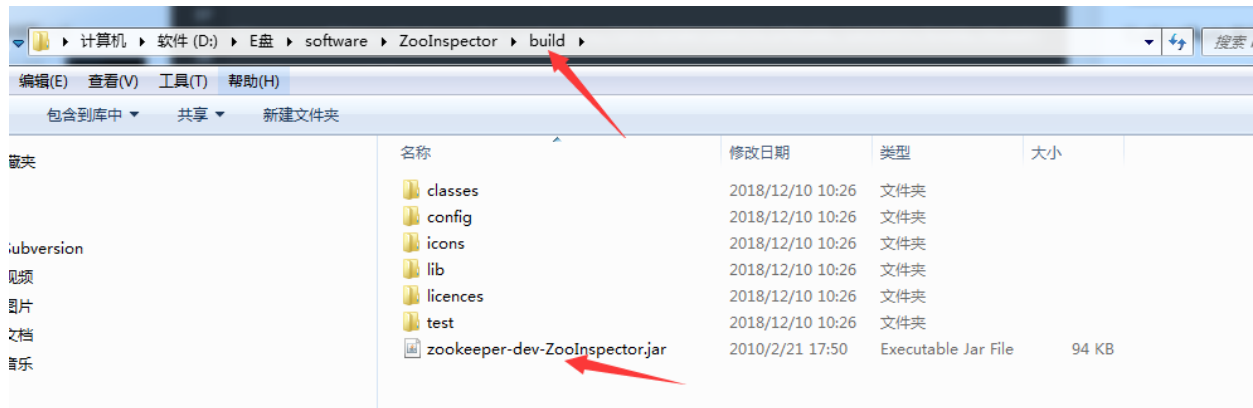
```
[root@iZwz94p7rlsw8kv682gfshZ bin]# ps -ef | grep zookeeper
root      2188      1  0 2018 ?        00:38:26 /usr/local/jdk8/bin/java -Dzookeeper.log.dir=. -Dzookeeper.root.logger=INFO,CONSOLE -cp
/usr/local/zookeeper/bin/./build/classes:/usr/local/zookeeper/bin/./build/lib/*.jar:/usr/local/zookeeper/bin/./lib/slf4j-log4j12-1.6.
1.jar:/usr/local/zookeeper/bin/./lib/slf4j-api-1.6.1.jar:/usr/local/zookeeper/bin/./lib/netty-3.10.5.Final.jar:/usr/local/zookeeper/bi
n/./lib/log4j-1.2.16.jar:/usr/local/zookeeper/bin/./lib/jline-0.9.94.jar:/usr/local/zookeeper/bin/./zookeeper-3.4.10.jar:/usr/local/z
ookeeper/bin/./src/java/lib/*.jar:/usr/local/zookeeper/bin/./conf:.%JAVA_HOME%/lib/dt.jar:%JAVA_HOME%/lib/tools.jar -Dcom.sun.managem
ent.jmxremote -Dcom.sun.management.jmxremote.local.only=false org.apache.zookeeper.server.quorum.QuorumPeerMain /usr/local/zookeeper/bin
/./conf/zoo.cfg
root      22596 21595  0 15:06 pts/1    00:00:00 grep  --color=auto zookeeper
```

10.进入zookeeper的bin目录下关闭zookeeper,命令：./zkServer.sh stop

## zookeeper图形化界面: 点击即可下载

<https://github.com/apache/zookeeper/tree/b79af153d0f98a4f3f3516910ed47234d7b3d74e/src/contrib/zooinspector>

进入build目录下，双击zookeeper-dev-ZooInspector.jar,如下图：



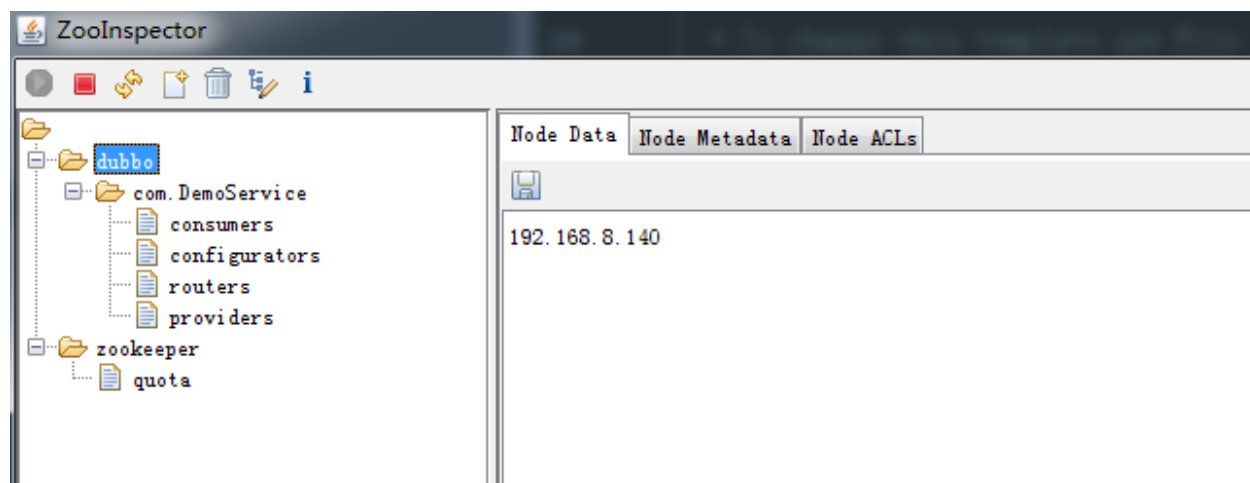
此处119.23.108.42为我的服务器地址,2181为zookeeper/conf目录下的zoo.cfg文件里clientPort的值

```

# The number of milliseconds of each tick
tickTime=2000
# The number of ticks that the initial
# synchronization phase can take
initLimit=10
# The number of ticks that can pass between
# sending a request and getting an acknowledgement
syncLimit=5
# the directory where the snapshot is stored.
# do not use /tmp for storage, /tmp here is just
# example sake.
dataDir=/usr/local/zookeeper/data
# the port at which the clients will connect
clientPort=2181
# the maximum number of client connections.
# increase this if you need to handle more clients
#maxClientCnxns=60
#
# Be sure to read the maintenance section of the
# administrator guide before turning on autopurge.
#
# http://zookeeper.apache.org/doc/current/zookeeperAdmin.html#sc_maintenance
#
# The number of snapshots to retain in dataDir
#autopurge.snapRetainCount=3
# Purge task interval in hours
# Set to "0" to disable auto purge feature
#autopurge.purgeInterval=1
~
~
~
~

```

连接上以后界面展示结果，如下图：



## 如何在dubbo中使用zookeeper

1.在pom.xml中引入如下依赖：

```

<dependency>
    <groupId>org.apache.zookeeper</groupId>
    <artifactId>zookeeper</artifactId>
    <version>3.4.13</version>

```

```

        <type>pom</type>
    </dependency>
    <!--zookeeper的客户端，dubbod的版本是2.6以后就用这个客户端-->
    <dependency>
        <groupId>org.apache.curator</groupId>
        <artifactId>curator-framework</artifactId>
        <version>4.0.1</version>
    </dependency>

```

2.这里讲dubbo依赖贴出来

```

<dependency>
    <groupId>com.alibaba</groupId>
    <artifactId>dubbo</artifactId>
    <version>2.6.2</version>
</dependency>

```

3.bug解决，其实我在做项目的时候引入了如下依赖：

```

<!--zookeeper的客户端，dubbod的版本是2.5以前就用这个客户端-->
<dependency>
    <groupId>com.101tec</groupId>
    <artifactId>zkclient</artifactId>
    <version>0.10</version>
</dependency>

<dependency>
<groupId>org.apache.zookeeper</groupId>
<artifactId>zookeeper</artifactId>
<version>3.4.6</version>
</dependency>

```

然后再启动项目的时候报如下错：

```

"C:\Program Files\Java\jdk1.8.0_171\bin\java" ...
log4j:WARN No appenders could be found for logger (org.springframework.context.support.ClassPathXmlApplicationContext).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
Exception in thread "main" java.lang.NoClassDefFoundError: org/apache/curator/RetryPolicy
    at com.alibaba.dubbo.remoting.zookeeper.curator.CuratorZookeeperTransporter.connect(CuratorZookeeperTransporter.java:27)
    at com.alibaba.dubbo.remoting.zookeeper.ZookeeperTransporter$Adaptive.connect(ZookeeperTransporter$Adaptive.java)
    at com.alibaba.dubbo.registry.zookeeper.ZookeeperRegistry.<init>(ZookeeperRegistry.java:69)
    at com.alibaba.dubbo.registry.zookeeper.ZookeeperRegistryFactory.createRegistry(ZookeeperRegistryFactory.java:38)
    at com.alibaba.dubbo.registry.support.AbstractRegistryFactory.getRegistry(AbstractRegistryFactory.java:96)
    at com.alibaba.dubbo.registry.RegistryFactory$Adaptive.getRegistry(RegistryFactory$Adaptive.java)
    at com.alibaba.dubbo.registry.integration.RegistryProtocol.getRegistry(RegistryProtocol.java:202)

```

错误就一目了然，所以在dubbo项目中配置zookeeper时一定要谨慎！！！！

## zookeeper集群搭建

1.集群中只要超过半数的机器是正常工作的，那么整个集群对外就是可用的；

2.也就是说如有有两个zookeeper，那么只要有一台故障了，zookeeper就不能用了，因为1没有过半，所以2个zookeeper不是高可用的，因为不能容忍任何1台发生故障；

3.同理有3个zookeeper,1个故障了，还剩下2个，过半了，所以3个zookeeper才是高可用的，因为能容忍1台发生故障；

4.如果是4台？5台？6台呢？那么分布式能容忍1,2,2（一般用奇数台zookeeper）投票机制

## 搭建集群

1.复制3个zookeeper

```
drwxr-xr-x 11 mysql mysql 4096 Dec 10 17:27 zookeeper
drwxr-xr-x 11 root root 4096 Dec 11 15:31 zookeeper_1
drwxr-xr-x 11 root root 4096 Dec 11 15:31 zookeeper_2
drwxr-xr-x 11 root root 4096 Dec 11 15:31 zookeeper_3
```

2.修改配置文件

vim /zookeeper\_1/conf/zoo.cfg

```
dataDir=/usr/local/zookeeper_1/data
clientPort=2181
```

```
server.1=localhost:2888:3888
server.2=localhost:2889:3889
server.3=localhost:2890:3890
```

其中2888端口号是zookeeper服务之间通信的端口，3888是zookeeper与其他应用程序通信的端口

3.在对应的dataDir指向的目录下创建myid,里面保存1，对应上面server.1的1，其他依次

```
[root@iZwz94p7rlsw8kv682gfshZ data]# ll
total 8
-rw-r--r-- 1 root root 2 Dec 11 15:40 myid
drwxr-xr-x 2 root root 4096 Dec 11 17:33 version-2
[root@iZwz94p7rlsw8kv682gfshZ data]# cat myid
1
[root@iZwz94p7rlsw8kv682gfshZ data]#
```

4.启动3个zookeeper

cd zookeeper\_1/bin,然后执行 ./zkServer.sh start

```
[root@iZwz94p7rlsw8kv682gfshZ bin]# ./zkServer.sh start
ZooKeeper JMX enabled by default
Using config: /usr/local/zookeeper_2/bin/./conf/zoo.cfg
Starting zookeeper ... STARTED
[root@iZwz94p7rlsw8kv682gfshZ bin]#
```

5.查看进程



```
[root@iZw94p7rlsw8kv682gfshZ bin]# ps -ef | grep zookeeper
root      4365      1  0 15:53 pts/0    00:00:01 /usr/local/jdk8/bin/java -Dzookeeper.log.dir=. -Dzookeeper.root.logger=INFO,CONSOLE -cp
/usr/local/zookeeper_1/bin/../build/classes:/usr/local/zookeeper_1/bin/../build/lib/*.jar:/usr/local/zookeeper_1/bin/../lib/slf4j-log4j1
2-1.6.1.jar:/usr/local/zookeeper_1/bin/../lib/slf4j-api-1.6.1.jar:/usr/local/zookeeper_1/bin/../lib/netty-3.10.5.Final.jar:/usr/local/zoo
keeper_1/bin/../lib/log4j-1.2.16.jar:/usr/local/zookeeper_1/bin/../lib/jline-0.9.94.jar:/usr/local/zookeeper_1/bin/../zookeeper-3.4.10.
jar:/usr/local/zookeeper_1/bin/../src/java/lib/*.jar:/usr/local/zookeeper_1/bin/../conf:.$JAVA_HOME%/lib/dt.jar:$JAVA_HOME%/lib/tools.j
ar -Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.local.only=false org.apache.zookeeper.server.quorum.QuorumPeerMain /usr
/local/zookeeper_1/bin/../conf/zoo.cfg
root      4426      1  2 15:54 pts/1    00:00:00 /usr/local/jdk8/bin/java -Dzookeeper.log.dir=. -Dzookeeper.root.logger=INFO,CONSOLE -cp
/usr/local/zookeeper_2/bin/../build/classes:/usr/local/zookeeper_2/bin/../build/lib/*.jar:/usr/local/zookeeper_2/bin/../lib/slf4j-log4j1
2-1.6.1.jar:/usr/local/zookeeper_2/bin/../lib/slf4j-api-1.6.1.jar:/usr/local/zookeeper_2/bin/../lib/netty-3.10.5.Final.jar:/usr/local/zoo
keeper_2/bin/../lib/log4j-1.2.16.jar:/usr/local/zookeeper_2/bin/../lib/jline-0.9.94.jar:/usr/local/zookeeper_2/bin/../zookeeper-3.4.10.
jar:/usr/local/zookeeper_2/bin/../src/java/lib/*.jar:/usr/local/zookeeper_2/bin/../conf:.$JAVA_HOME%/lib/dt.jar:$JAVA_HOME%/lib/tools.j
ar -Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.local.only=false org.apache.zookeeper.server.quorum.QuorumPeerMain /usr
/local/zookeeper_2/bin/../conf/zoo.cfg
root      4540      1 12 15:55 pts/2    00:00:00 /usr/local/jdk8/bin/java -Dzookeeper.log.dir=. -Dzookeeper.root.logger=INFO,CONSOLE -cp
/usr/local/zookeeper_3/bin/../build/classes:/usr/local/zookeeper_3/bin/../build/lib/*.jar:/usr/local/zookeeper_3/bin/../lib/slf4j-log4j1
2-1.6.1.jar:/usr/local/zookeeper_3/bin/../lib/slf4j-api-1.6.1.jar:/usr/local/zookeeper_3/bin/../lib/netty-3.10.5.Final.jar:/usr/local/zoo
keeper_3/bin/../lib/log4j-1.2.16.jar:/usr/local/zookeeper_3/bin/../lib/jline-0.9.94.jar:/usr/local/zookeeper_3/bin/../zookeeper-3.4.10.
jar:/usr/local/zookeeper_3/bin/../src/java/lib/*.jar:/usr/local/zookeeper_3/bin/../conf:.$JAVA_HOME%/lib/dt.jar:$JAVA_HOME%/lib/tools.j
ar -Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.local.only=false org.apache.zookeeper.server.quorum.QuorumPeerMain /usr
/local/zookeeper_3/bin/../conf/zoo.cfg
root      4575    3390  0 15:55 pts/0    00:00:00 grep --color=auto zookeeper
```

## 6.配置项目provider.xml配置

```
address="119.23.108.42:2181;119.23.108.42:2182;119.23.108.42:2183" />
```

## 7.我停掉一台zookeeper

```
[root@iZw94p7rlsw8kv682gfshZ bin]# ./zkServer.sh stop
ZooKeeper JMX enabled by default
Using config: /usr/local/zookeeper_1/bin/../conf/zoo.cfg
Stopping zookeeper ... STOPPED
[root@iZw94p7rlsw8kv682gfshZ bin]#
```

项目还是可以启动起来

```
Provider (1) Consumer (1)
"C:\Program Files\Java\jdk1.8.0_171\bin\java" ...
log4j:WARN No appenders could be found for logger (org.springframework.context.support.ClassPathXmlApplicationContext).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
hello huahua

Process finished with exit code 0
```

## 8.我再停掉一台zookeeper

项目报错，如下图，提示zookeeper连不上

```
"C:\Program Files\Java\jdk1.8.0_171\bin\java" ...
log4j:WARN No appenders could be found for logger (org.springframework.context.support.ClassPathXmlApplicationContext).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
Exception in thread "main" com.alibaba.dubbo.rpc.RpcException: Failed to invoke the method say in the service com.hh.DemoService. Tried 3 times of the providers [192.168.8.140:20880] (1/1) from the registry 119.23.10
at com.alibaba.dubbo.rpc.cluster.support.FailoverClusterInvoker.doInvoke(FailoverClusterInvoker.java:102)
at com.alibaba.dubbo.rpc.cluster.support.AbstractClusterInvoker.invoke(AbstractClusterInvoker.java:238)
at com.alibaba.dubbo.rpc.cluster.support.wrapper.MockClusterInvoker.invoke(MockClusterInvoker.java:75)
at com.alibaba.dubbo.rpc.proxy.InvokerInvocationHandler.invoke(InvokerInvocationHandler.java:52)
at com.alibaba.dubbo.common.bytecode.proxy0.say(proxy0.java)
```



