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Tomcat Server Load-Balancing Using Multiple Tomcat Server Instances in Ubuntu

August 27, 2014 Madura Dissanayake

Hello, in here I'm going to describe how to configure load balancing among multiple Apache tomcat servers, before write this article I searched on web and found many solutions but nothing worked correctly, getting some errors. So then somehow I managed to set up tomcat server load balancing. So here are the steps that I followed to configure load balancing on tomcat servers.

Before configure multiple server load balancing, you have to install and configure multiple tomcat server instances correctly, that has been described on my previous blog post about ["How to configure multiple tomcat server instances"](#)

After completing setup multiple tomcat server instances, let go through via those steps.

1. install apache tomcat server with libapache

```
$ sudo apt-get install apache2 libapache2-mod-jk
```

2. open /etc/libapache2-mod-jk/workers.properties and edit the file with following configurations.

```
$ sudo nano /etc/libapache2-mod-jk/workers.properties
```

```
workers.tomcat_home=/usr/share/tomcat7
workers.java_home=/usr/lib/jvm/java-7-openjdk-amd64
ps=/
worker.list=loadbalancer
worker.worker_a.port=8010
worker.worker_a.host=localhost
worker.worker_a.type=ajp13

worker.worker_b.port=8011
worker.worker_b.host=localhost
worker.worker_b.type=ajp13

worker.worker_c.port=8012
worker.worker_c.host=localhost
worker.worker_c.type=ajp13

worker.worker_a.lbfactor=1
worker.worker_b.lbfactor=1
worker.worker_c.lbfactor=1
worker.loadbalancer.type=lb
worker.loadbalancer.balance_workers=worker1,worker2,worker3
worker.loadbalancer.sticky_session=1
worker.status.type=status
```

3. Go to the **“/etc/apache2/mods-available/jk.conf”** and change the necessary configuration.

```
JkMount /*.cfm loadbalancer
JkMount /*.cfc loadbalancer
JkMount /*.do loadbalancer
JkMount /*.jsp loadbalancer
JkMount /*.cfchart loadbalancer
JkMount /*.cfm/* loadbalancer
JkMount /*.cfml/* loadbalancer

JkMountCopy all
JkLogFile /var/log/apache2/mod_jk.log
```

4. Go to the **/etc/apache2/sites-available/** and copy the default file to the same location and edit for following changes.

```
$ sudo cp /etc/apache2/sites-available/default /etc/apache2/sites-available/loadbalance.com
```

```
<VirtualHost *:80>
    ServerAdmin admin@mysite.com
    DocumentRoot "/var/www/mysite/"
    DirectoryIndex index.cfm index.html
    ServerName mysite.com
    ServerAlias www.mysite.com
    ErrorLog ${APACHE_LOG_DIR}/mysite.error.log
    CustomLog ${APACHE_LOG_DIR}/mysite.access.log Combined
</VirtualHost>
```

5. Then enable the tomcat default instances.

```
$ sudo a2ensiteloadbalance.com
$ sudo service apache2 restart
```

6. Then go to the tomcat server.xml file in each instances are available. And add the "jvmRoute" for each server.xml files.

```
$ sudo nano ../conf/server.xml
<Engine name="Catalina" defaultHost="localhost" jvmRoute="worker_a">
<Engine name="Catalina" defaultHost="localhost" jvmRoute="worker_b">
<Engine name="Catalina" defaultHost="localhost" jvmRoute="worker_c">
```

7. Now, Tomcat server load-balancing is done. Try to load the URL : <http://localhost> , then You will see the tomcat home page. In here You can see load-balancing and session management using sample java application.

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Configure VisualVM on Ubuntu 14.10

February 11, 2015 Madura Dissanayake

VisualVM is a kind of data gathering software for application which are running under the Java Virtual Machines (JVM). This retrieve information related to the Java application, like heap size, heap dumps, RAM utilisation, CPU utilisation, thread count and so on. There is an special interface that they use for getting information from application ends and gathered information is analysed and displayed on the VisualVM dashboard. Remote application also can be monitored via VisualVM. Specially user can get snapshot of heat dumps also.

Follow the steps to install VisualVM on Ubuntu server.

```
# sudo apt-get install visualvm
# which viaualvm
# java -version
```

You can check the java is up & running up using the commands given above. And for testing purpose, I'm here using a Java testing application in the same host. Let's open the visualVM and configure it to get the information of running applications.

```
# visualvm
```

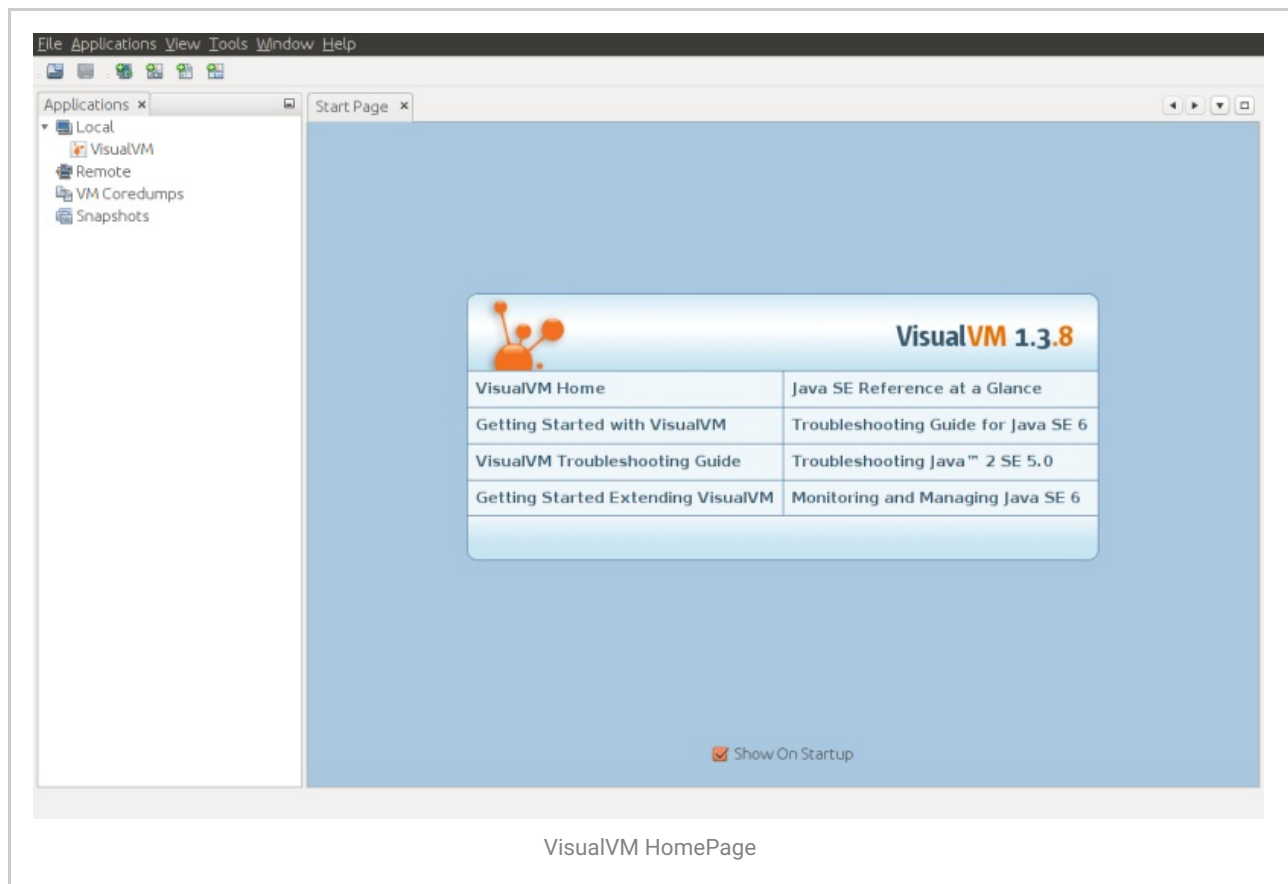
if you need any help related to visualVM you can us,

```
# visualvm - -help
```

After open the VisualVM, then you will see the terms and condition that should be accepted. Please accept it and go ahead.



After you agreed to the license agreement you will be displayed the VisualVM home page. In this home page you can see the options that you are having on VisualVm. In the Left side all the options are available. The image given below shows the sample home page of VisualVM.



To test an application, here I'm going to run a test application which contains a digital clock. Download the application using the following link.

<https://www.evernote.com/shard/s565/sh/3ebfc539-ebda-47e8-a2fe-82dcdbaa16a8/996543f83e4a7c0e/res/3828d431-438b-4ee9-9571-e1574ec774ad/demo.zip>

Download this file and extract, then run the testing java application on a terminal, then you will see the Digital clock on a particular application window.

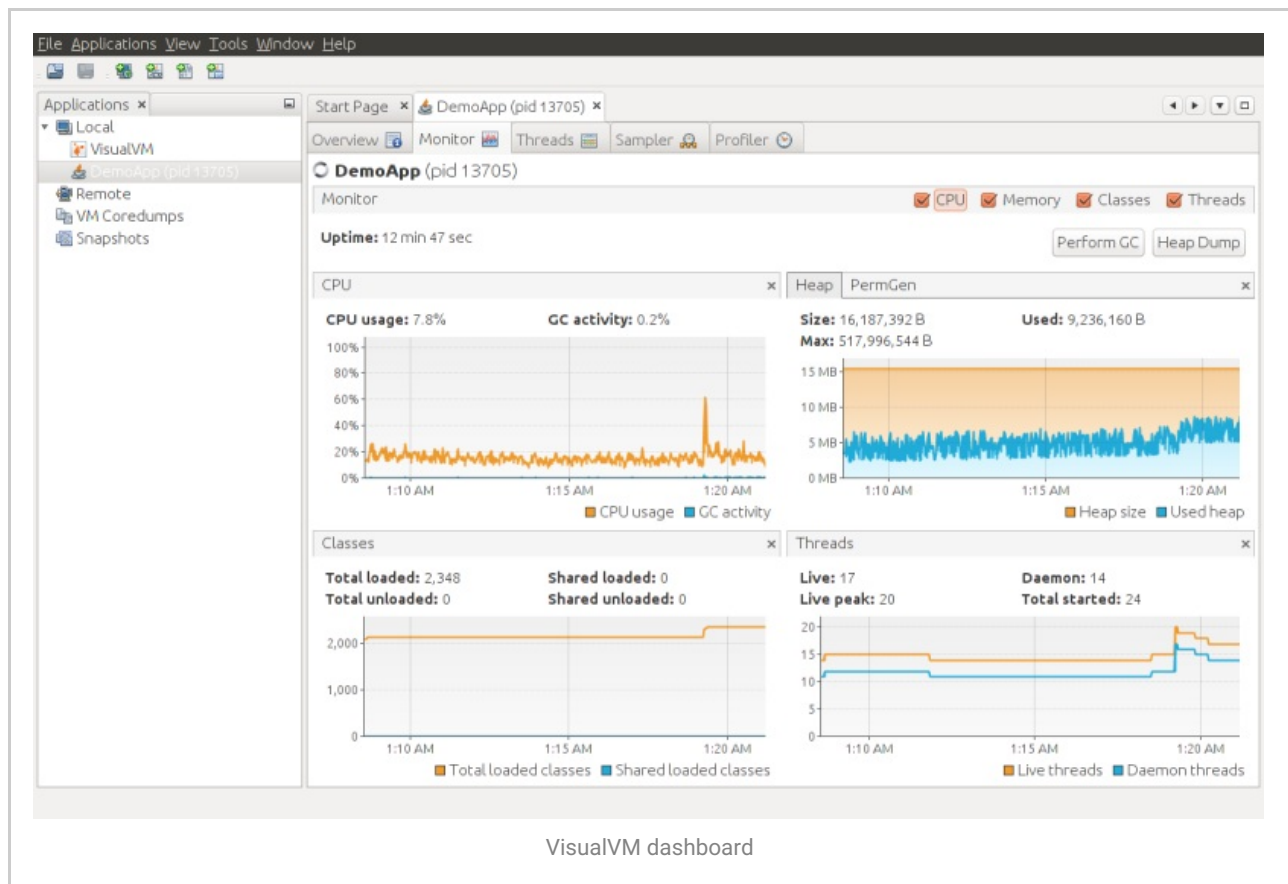
```
# sudo unzip demo.zip
```

```
# cd src/
```

```
# javac DemoApp.java
```

```
# java DemoApp
```

After running the testing application, you will see the analytics of the application on the VisualVM dashboard. Locally running all the applications are added automatically to the VisualVM. Sample dashboard image is given below.



VisualVM dashboard

How to Add a Remote Host's Application

In order to create a connection with a remote Java Application, can be used JMX connection with the remote host. JMX is Java Management Framework, which is used to monitoring, or manage any java based application which running remotely or locally. So this is a best way to use to monitor remotely running Java Application.

In order to run a particular Java application using JMX you have to add several settings on commands.

1. `com.sun.management.jmxremote.port` :state which port is assigned to the Application.
2. `com.sun.management.jmxremote.ssl` : State the SSL certificate settings.
3. `com.sun.management.jmxremote.authenticate` : State the remote Authentication settings.

As an example, here the command that was used to open the DemoApp,

```
java -Dcom.sun.management.jmxremote.port=3333 -  
Dcom.sun.management.jmxremote.ssl=false -
```

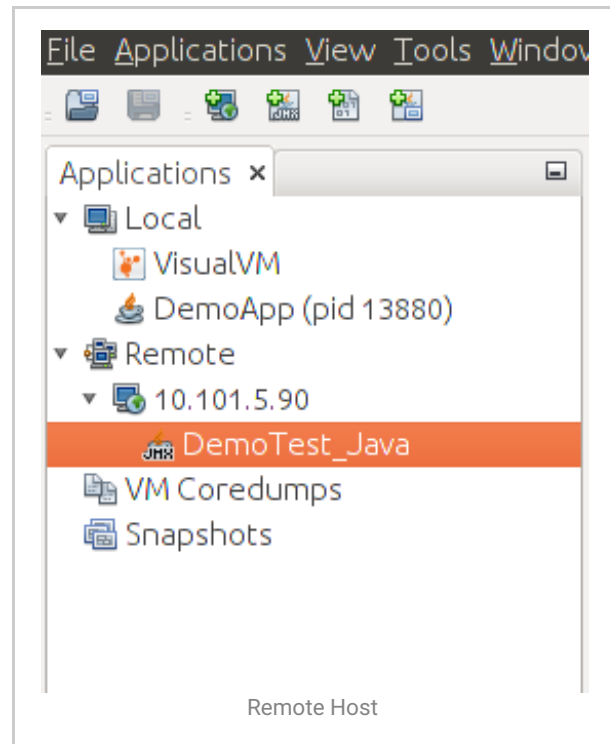
```
Dcom.sun.management.jmxremote.authenticate=false DemoApp
```

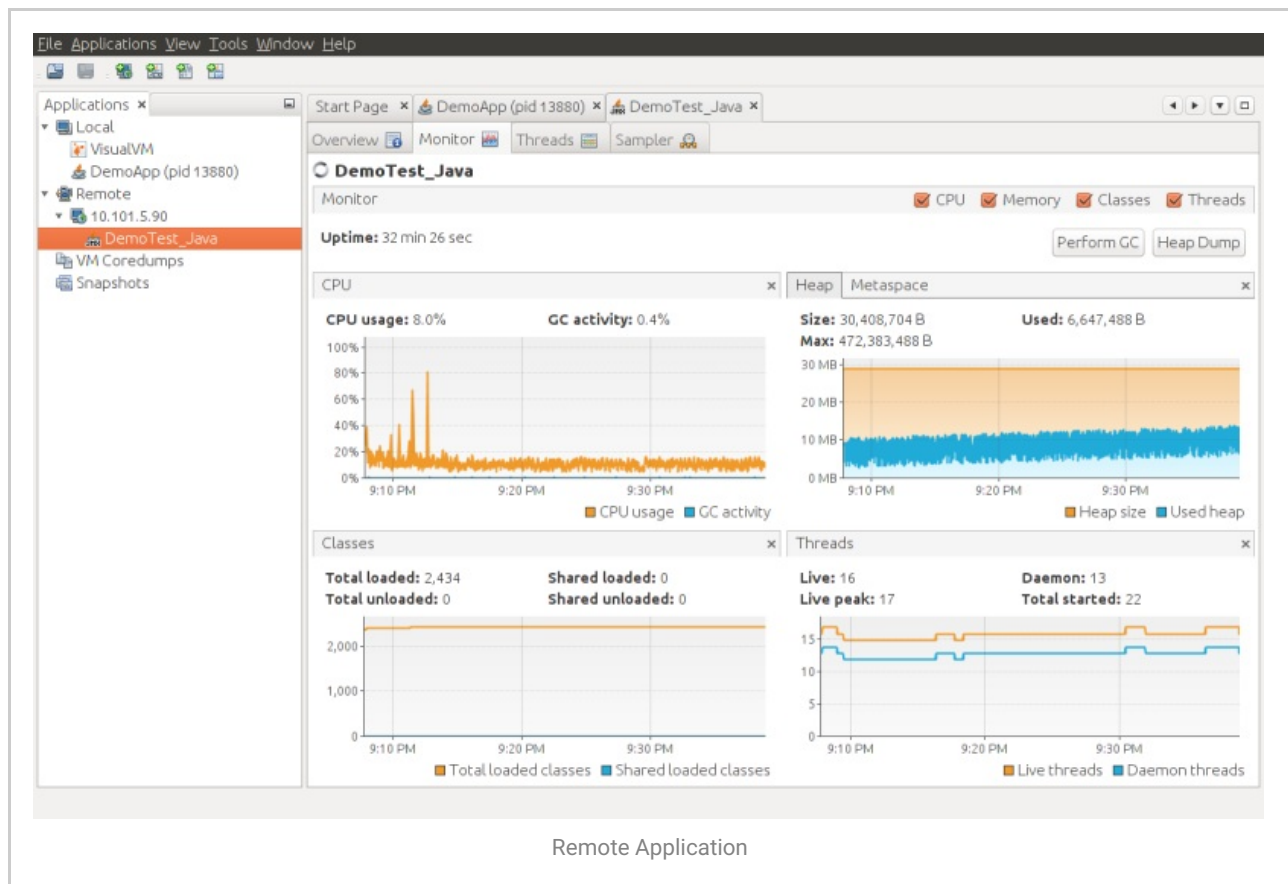
Before adding the remote application for VisualVM, user needs to add the remote host to the VisualVM dashboard. Go to the "Application" on left side and right-click on the "Remote Host", then click on "Add Remote Host", then you will be displayed window to add the remote

host.

After adding the remote host, you can add whatever the application which are running on added remote host. So right-click on the remote host name and select “Add JMX Connection”, then enter the remote host name and the port number which was assigned previously. After adding those things you can see the added application is displayed under the remote host (Image given below).

After you double-click on the Application, dashboard will be loaded and retrieve analytics and data according to the application weight. In following image you can see, both application are in same dashboard.





In Visual VM dashboard consist of the four tabs. The descriptions for each tabs are given below.

- Overview : Contains PID, Host name, arguments, heap dump, so on, this provides basic idea of the running application.
- Monitor : Processor consuming, memori consuming likewise utilisation detail.
- Threads : List of entire threads, state of threads, running time, and so on.
- Sampler : Sampling information, like CPU, memory.

Finally, I can state that VisualVM can be used to get analytics and mange Java based applications for maximum throughput.

Note : if you want to download this file as a PDF use the following Evernote Link, <https://www.evernote.com/shard/s565/sh/3ebfc539-ebda-47e8-a2fe-82dcdbaa16a8/996543f83e4a7c0e>

Thank You.

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