

# JMETER - MONITOR TEST PLAN

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In this chapter, we will discuss how to create a Test Plan using JMeter to monitor web servers. The uses of monitor tests are as follows –

- Monitors are useful for a stress testing and system management.
- Used with stress testing, the monitor provides additional information about server performance.
- Monitors make it easier to see the relationship between server performance and response time on the client side.
- As a system administration tool, the monitor provides an easy way to monitor multiple servers from one console.

We need Tomcat 5 or above for monitoring. For our test purpose, we will monitor Tomcat 7.0.42 server. You can test any servlet container that supports Java Management Extension *JMX*. Let us write a test case to monitor the Tomcat server. Let us first set up our tomcat server.

## Setup Tomcat Server

We start with opening the Tomcat service status. To do this, edit the configuration file for users, **<TOMCAT\_HOME>/conf/tomcat-users.xml**. This file contains a tomcat-users section *commented* as shown –

```
<tomcat-users>
<!--
  <role rolename="tomcat"/>
  <role rolename="role1"/>
  <user username="tomcat" password="tomcat" roles="tomcat"/>
  <user username="both" password="tomcat" roles="tomcat,role1"/>
  <user username="role1" password="tomcat" roles="role1"/>
-->
</tomcat-users>
```

We need to change this section to add the admin roles, manager, manager-gui and assign the user "admin". The revised file is as follows –

```
<tomcat-users>
  <role rolename="manager-gui"/>
  <role rolename="manager-script"/>
  <role rolename="manager-jmx"/>
  <role rolename="manager-status"/>
  <user username="admin" password="admin" roles="manager-gui,manager-script,manager-jmx,manager-status"/>
</tomcat-users>
```

Now start the tomcat server **<TOMCAT\_HOME>/bin/startup.sh** for Linux and **<TOMCAT\_HOME>/bin/startup.bat** for windows. Once started, check that the Tomcat supervision works by entering the following link in your browser –

```
http://localhost:8080/manager/status?XML=true
```

An authentication window appears in the browser. Enter the tomcat login and password associated *inourcaseitisadmin*. Then, the browser shows the execution status of Tomcat as below –



Tomcat Status					
JVM: free:131314688 total:211877888 max:900398104					
Memory Pools					
Name:	PS Eden Space	Type:	Heap memory	Initial:	15794176
		Committed:	157810688	Maximum:	311492608
		Used:	43453600		
Name:	PS Old Gen	Type:	Heap memory	Initial:	42205184
		Committed:	42205184	Maximum:	675282944
		Used:	25253280		
Name:	PS Survivor Space	Type:	Heap memory	Initial:	2621440
		Committed:	11862016	Maximum:	11862016
		Used:	11856320		
Name:	Code Cache	Type:	Non-heap memory	Initial:	2555904
		Committed:	2752512	Maximum:	50331648
		Used:	2553536		
Name:	PS Perm Gen	Type:	Non-heap memory	Initial:	21757952
		Committed:	26673152	Maximum:	85963232
		Used:	26522120		
Connector -- "ajp-bio-8009"					
threadInfo	maxThreads:200	currentThreadCount:0	currentThreadsBusy:0		
requestInfo	maxTime:0	processingTime:0	requestCount:0	errorCount:0	bytesReceived:0 bytesSent:0
Stage Time B Sent B Recv Client VHost Request					
Connector -- "http-bio-8080"					
threadInfo	maxThreads:200	currentThreadCount:4	currentThreadsBusy:1		
requestInfo	maxTime:420	processingTime:522	requestCount:2	errorCount:1	bytesReceived:0 bytesSent:4118
Stage Time B Sent B Recv Client VHost Request					
S	2	0	0	127.0.0.1	localhost GET /manager/status?XML=true HTTP/1.1

From the above screenshot, we can note a few things –

- In the URL, note that `XML = true notthecasesensitivity` allows a clean display of the supervisory Tomcat necessary for the JMeter functioning.
- Also note that there are default two connectors. The AJP connector used in general coupled with the `mod_jk` Apache HTTPD front module and the HTTP connector which is commonly used connector for direct access to Tomcat via port 8080.

## Write JMeter Test Plan

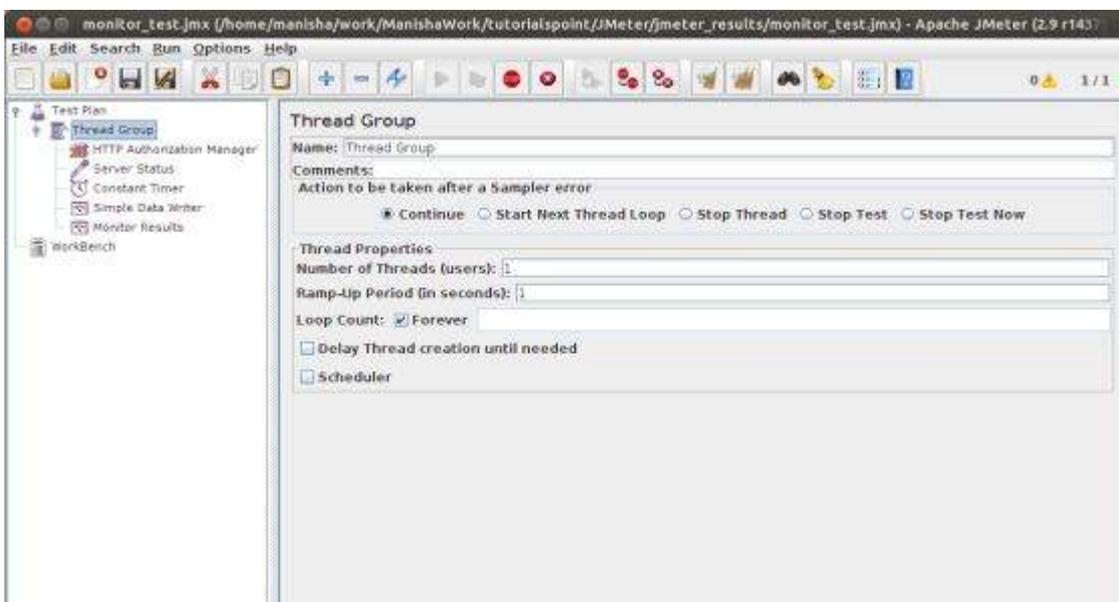
Let us monitor the Tomcat server by writing a test plan –

### Rename Test Plan

- Open the JMeter window by clicking `/home/manisha/apache-jmeter2.9/bin/jmeter.sh`.
- Click the Test Plan node.
- Add a thread group as explained in the next step.

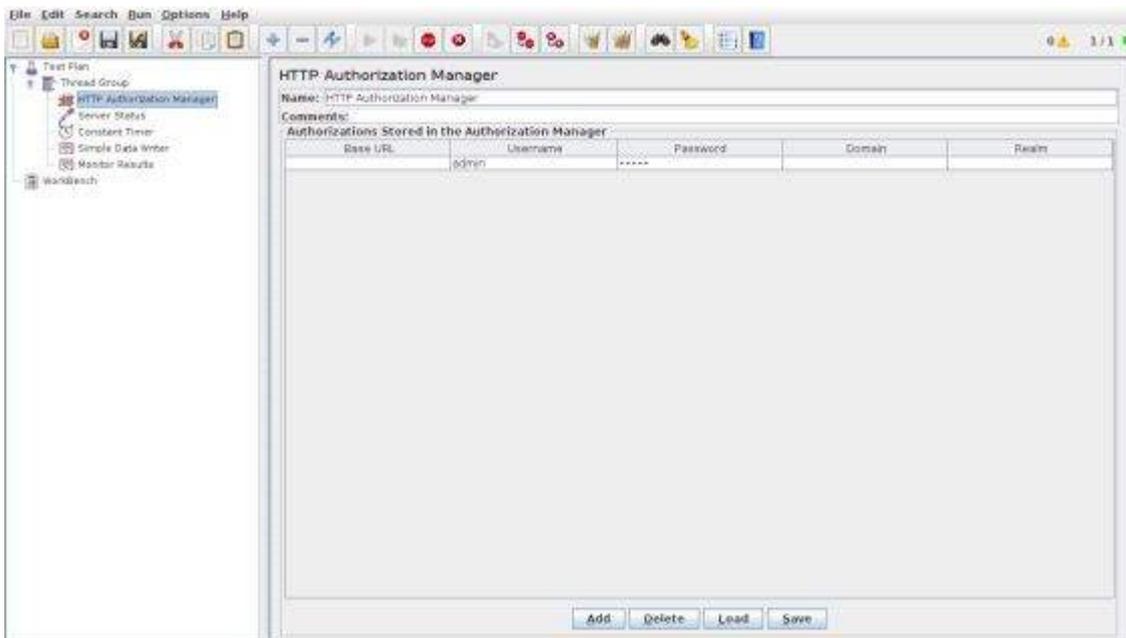
### Add Thread Group

- Right-click on **Test Plan > Add > ThreadsUsers > Thread Group**. Thread Group will get added under the Test Plan node.
- Change the loop count to forever *orsomelargenumber* so that enough samples are generated.



## HTTP Authorization Manager

- Add HTTP Authorization Manager to the Thread Group element by selecting Add > Config element > HTTP Authorization Manager. This element manages authentication requested by the browser to see the Tomcat server status.
- Select the HTTP Authorization Manager.
- Edit the following details –
  - **Username** – admin dependingontheconfigurationintomcat – users.xmlfile
  - **Password** – admin dependingontheconfigurationinthetomcatusers.xmlfile
  - The other fields are left empty.

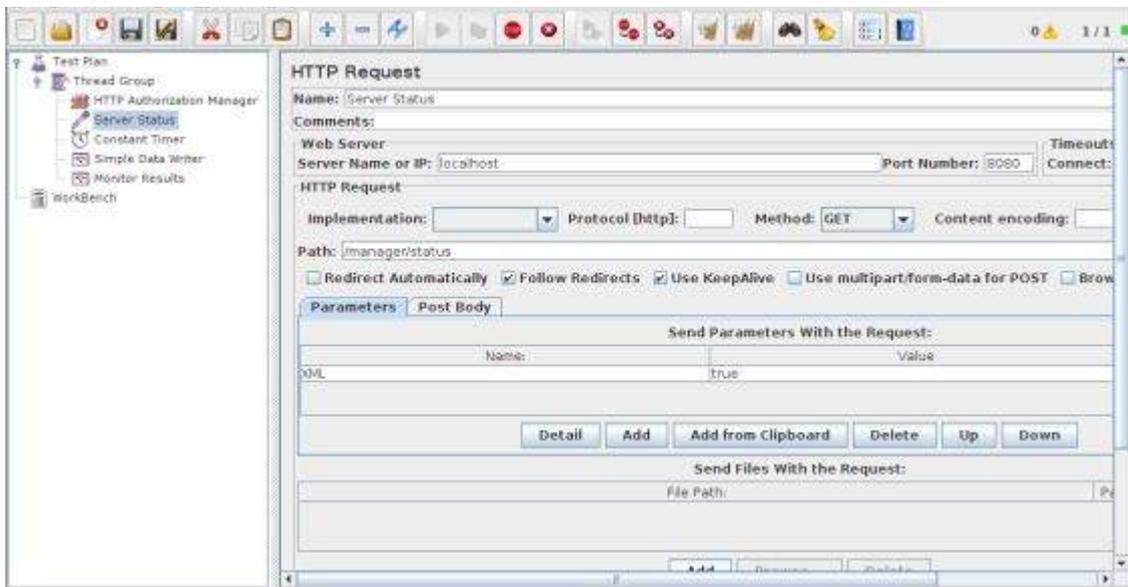


## Add Sampler-HTTP Request

Now that we have defined our users, it is time to define the tasks that they will be performing. We add HTTP Request element.

- Right click the mouse button to get the Add menu.
- Select Add > Sampler > HTTP Request.
- Then, select the HTTP Request element in the tree.
- Edit the following properties as in the image below –
- The following details are entered in this element –
  - **Name** – Server Status
  - **Server Name or IP** – localhost
  - **Port** – 8080
  - **Path** – /manager/status
  - **Parameters** – Add a request parameter named "XML" in uppercase. Give it a value of "true" in lowercase.
  - **Optional Tasks** – Check "Use as Monitor" at the bottom of the sampler.

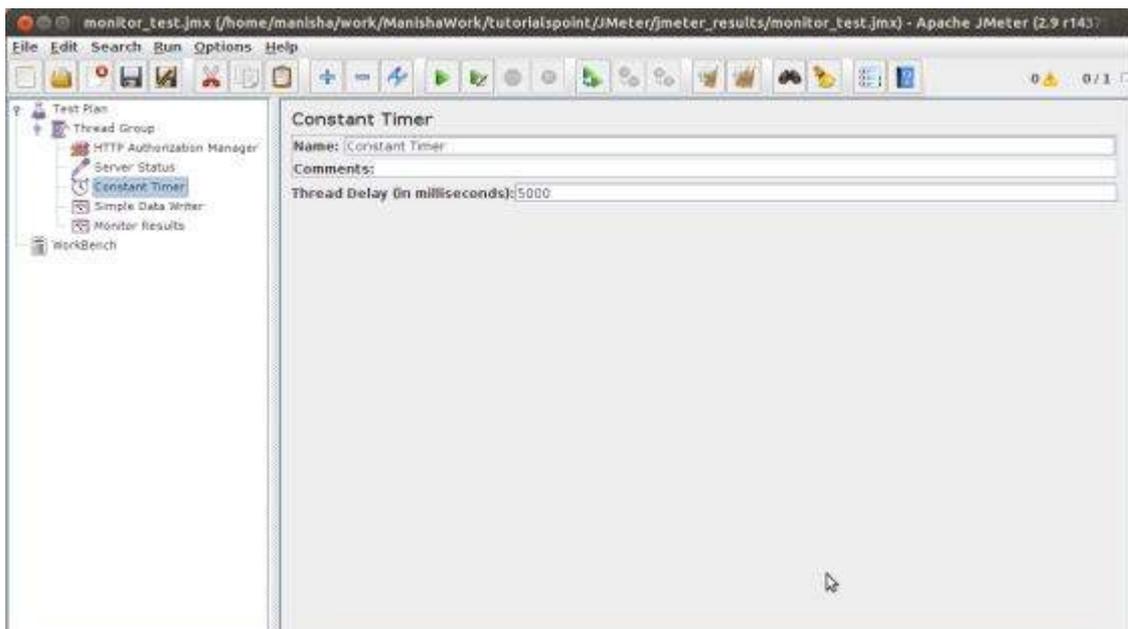




## Add a Constant Timer

To request the status of the server periodically, add a Constant Timer which will allow a time interval between each request. Add a timer to this thread group by selecting Add > Timer > Constant Timer.

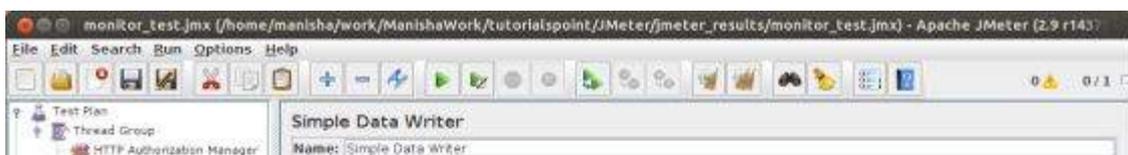
Enter 5000 milliseconds in the *Thread Delay* box. In general, using intervals shorter than 5 seconds may add stress to your server. Find out what is an acceptable interval before you deploy the monitor in your production environment.



## Add Listener

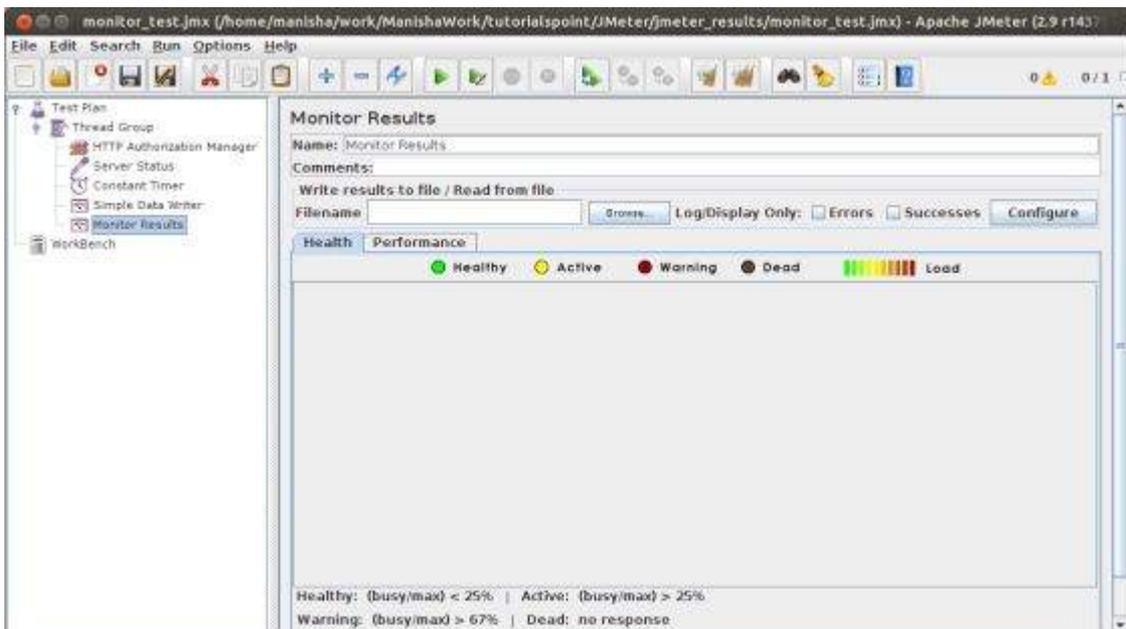
The final element you need to add to your Test Plan is a Listener. We add two types of listeners. One that stores results in a file and second that shows the graphical view of the results.

- Select the thread group element.
- Add a Simple Data Writer listener Add > Listener > Simple Data Writer.
- Specify a directory and filename of the output file *inourcase, itis/home/manisha/work/sample.csv*





- Let us add another listener by selecting the test plan element Add > Listener > Monitor Results.

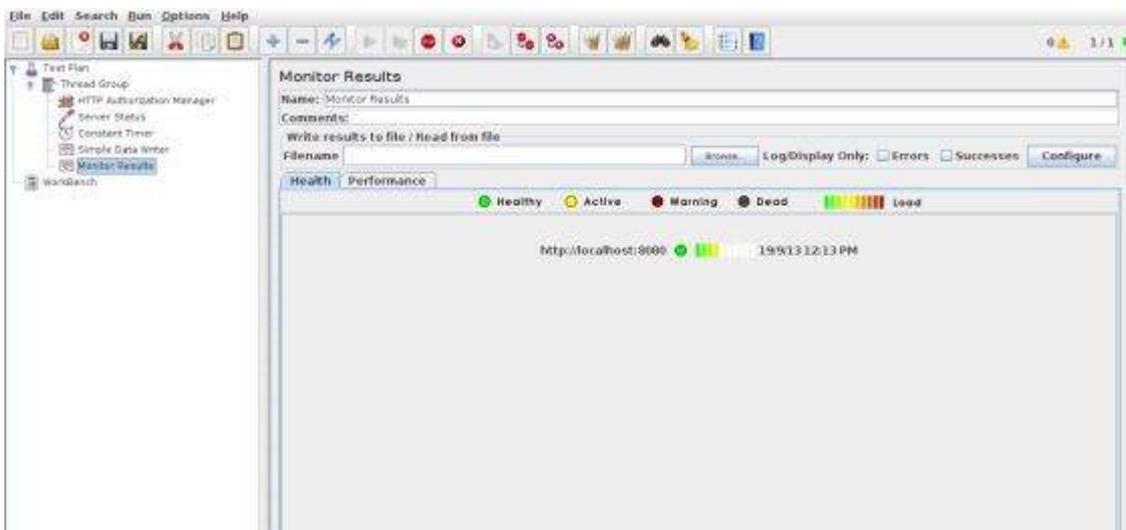


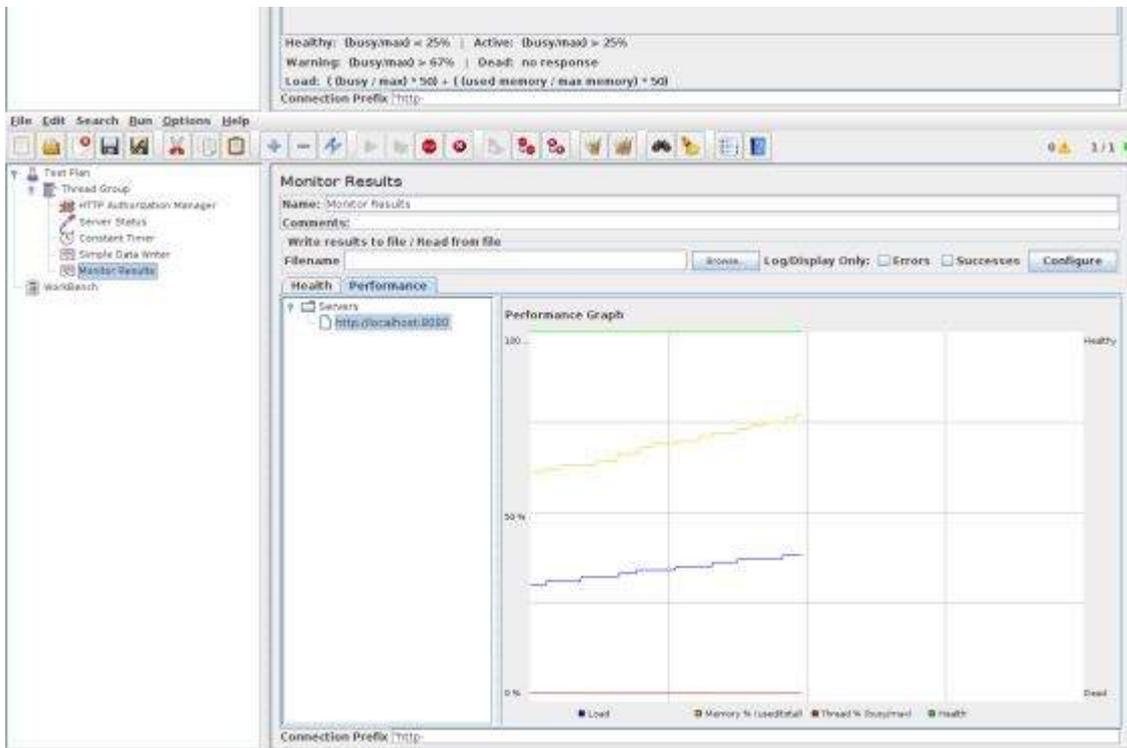
## Run the Test Plan

Now save the above test plan as *monitor\_test.jmx*. Execute this test plan using Run > Start option.

## View the Output

Results will be saved in */home/manisha/work/sample.csv* file. You can also see a graphical result in the Monitor result listener as in the image below.





Note the graph has captions on both sides of the graph. On the left is percent and the right is dead/healthy. If the memory line spikes up and down rapidly, it could indicate memory thrashing. In those situations, it is a good idea to profile the application with Borland Optimizelt or JProbe. What you want to see is a regular pattern for load, memory and threads. Any erratic behavior usually indicates poor performance or a bug of some sort.

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