MBeanCmd

User's guide

v2.2

MBeanCmd: User's guide

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Chapter 1. Introduction

MBeanCmd is a command-line tool written in Java for interacting with MBeans on target J2EE servers.

It can :

- Send commands to :
  - Any number of MBeans
  - On any number of target J2EE servers
  - In a periodical way
- Receive the result of that command, for example the CPU usage rate measured by the JVM MBean
- Use this result to :
  - Display it directly on the console
  - Output it to a text file
  - Display it on a graph
  - Push it to a JASMINe Event Switch

It does not depend on any J2EE package. The various outputs (for example, file, graph and JASMINe Event Switch) can be combined.

Chapter 2. MBeans and your J2EE server

2.1. What is an MBean ?

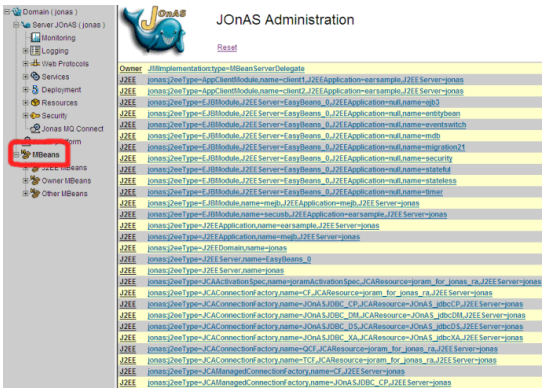
MBeans are managed beans, i.e. Java objects that represent resources to be managed. An MBean has a management interface consisting of:

- Named and typed attributes that can be read and/or written
- Named and typed operations that can be invoked
- Typed notifications that can be emitted by the MBean

For example, an MBean representing an application's configuration could have attributes representing the different configuration parameters, such as a cache size.

2.2. MBeans in JOnAS

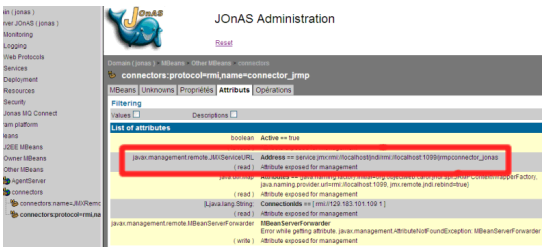
Getting to the list of available MBeans in a JOnAS server is pretty straightforward, thanks to the JOnAS Administration console accessible at the `http://<hostname>:<httpport>/jonasAdmin/` URL: simply click on the **MBeans** node in the management tree on the left frame, and the list of currently deployed MBeans will appear.



Moreover, the list of available MBeans may be obtained using a MBeanCmd command. See Section 3.10, “The mbean command”.

2.3. Connecting to MBeans on a J2EE server

Note that to access the MBeans remotely, one need to use a **connector**. A connector makes the MBean server remotely accessible through a given protocol (the standard connector is the **RMI Connector**). To get the list of the available connectors in a JOnAS server, click on **Other MBeans - connectors**. In the **Attibutes** tab of a connector you can see its Address given as a JMX Service URL `service:jmx:rmi://<hostname>/jndi/rmi://<hostname>:<rmiport>/<connectorname>`.


JOnAS Administration
Reset
connectors:protocol=rmi,name=connector_irmp
MBeans
Unknowns
Propriétés
Attributs
Opérations
Filtering
Values
Descriptions
List of attributes
boolean
Active == true
javax.management.remote.JMXServiceURL
Address == service:jmx:rmi://localhost/jndi/rmi://localhost:1099/jrmpconnector_jonas
(read)
Attribute exposed for management
(read)
Attribute exposed for management
[Ljava.lang.String;
ConnectionIds == [rmi://129.183.101.109 1]
(read)
Attribute exposed for management
javax.management.remote.MBeanServerForwarder
MBeanServerForwarder
(write)
Attribute exposed for management

Chapter 3. Using MBeanCmd

3.1. Getting help

To launch MBeanCmd, just go to the folder where mbean.jar is present and launch :

```
java -jar mbean.jar
```

Since no option has been specified, this will simply display the help with the list of available commands.

To display the help for a command, say **poll**, type in:

```
java -jar mbean.jar help poll
```

Note

Note that the help file for poll is quite large: it includes the usage options and the DTD to use to display a graph.

3.2. Defining targets

To use MBeanCmd for capturing statistics periodically (**stat** and **poll** commands) or to get a thread dump from a JOnAS server (**dump** command), you first need to define which server(s) you're targeting. This can be done in two ways:

- If you're targeting only one server, define **jasmine.jmx.url** system property with value set to the target's JMX connector URL.

  We recommend to avoid this way if the result is pushed into JASMINe Monitoring.

- If you're targeting multiple servers, create a file called **probe-config.xml** in the current folder. This file contains a target entry for each server. A target entry contains the following attributes:

  - **url**, JMX url address of a connector for the target.
  - **id**, the target's name.
  - **user**, the user name to access the target using a secured jmx connector.
  - **password**, the password to access the target using a secured jmx connector.

  For example:

```
       <?xml version='1.0' encoding='ISO-8859-1' ?>
         <probe-config xmlns="org.ow2.jasmine.monitoring.mbeancmd:probe-config">
           <target url="service:jmx:rmi:///jndi/rmi://localhost:1199/
jrmpconnector_jasmine-monitoring" id="myself"/>
           <target url="service:jmx:rmi:///jndi/rmi://localhost:1099/
jrmpconnector_jasmine" id="jonas"/>
           <target url="service:jmx:rmi://localhost:37659/jndi/rmi://localhost:2063/
jrmpconnector_master" id="master" user="monitor" password="jonas"/>
         </probe-config>
```

```
```

Example 3.1. -target option use

```
poll ... -target master myself
```

```
poll ... -target all
```

The "all" target stands for all the targets defined by the configuration file plus the jasmine.jmx.url property.

Note

For several commands (as **poll -cpusun**), the targeted servers need to be launched with the system property **com.sun.management.jmxremote**, in order to enable the monitoring of this JVM by JMX.

3.3. Defining outputs

An output is a destination for the statistics obtained by **stat** and **poll** commands.

The following output types may be used in a command:

- -console : Causes the output to be redirected to standard output.
- -f FILE : Causes the output to be redirected to FILE.
- -graph XML_DEF : Displays graphs according to the XML definitions specified by the XML_DEF file. Output is also printed on the console.
- -jasmine URL : Causes the output to be redirected toward JASMINe Monitoring.

  The URL has the following format: **tcp://host:port/MBeanCmd**.

  where *port* is the value of the MBeanCmd port defined by the JASMINe Monitoring configuration.

  The default value is*18564*.

All the options may be combined. Default is "-console".

3.4. The Poll command

Command allowing to periodically poll target servers and generate statistic indicators on several categories of resources of a Java EE Server.

poll [-p period] [-s separator] bean [OUTPUT] [TARGET]

poll [-dtd]

- -p period : Sets the poll period in seconds. Default value is 10s.
- -s separator : Sets the separator used to delimit the obtained monitoring data. Default is ";"
- bean : Allows to focus the polling on a category of indicators. It must be one of the followings
  - -server : Prints overall statistics.

- -http : Prints statistics on HTTP/AJP connectors (one line per connector).
- -tx : Prints statistics on transactions.
- -cpusun : Prints statistics on the CPU usage.
- -ds FILTER : Prints statistics on datasources.
- -jcacf FILTER : Prints statistics on JCA connection factories.
- -slb FILTER : Prints statistics on stateless session EJBs.
- -sfb FILTER : Prints statistics on stateful session EJBs.
- -ent FILTER : Prints statistics on entity beans.
- -servlet FILTER : Prints statistics on servlets.
- -joramq FILTER : Prints statistics on JORAM queues. The domain in FILTER shall be joramClient.

- TARGET

  See Section 3.2, “Defining targets”

- OUTPUT

  See Section 3.3, “Defining outputs”

- -dtd : prints out the XML DTD for the graphs.

You can find in the table bellow the list of indicators provided for each poll option along with the name of the used MBeans.

Table 3.1. Polled MBeans and obtained indicators

Option	MBeans and resulted indicators
-tx	***:j2eeType=JTAResource,*** => pending (for current transactions), commit, rollback, timedOut
	processed => txRate, commitRatio, currentCommitRatio
-http	***:type=Manager,*** => sessions (for active sessions), sessionCount
	:type=GlobalRequestProcessor, => requests, errors, maxTime, bytesSent, bytesReceived
	:type=ThreadPool, => pending (for current number of busy threads)
	processed => rate (for http requests rate), meanTime (of processing time per request), bytesReveivedRate, byteSentRate
-ds	***:j2eeType=JDBCDataSource,*** => servedOpen, jdbcMaxConnPool, currentOpen, busyMax, waitersHighRecent, waitingHighRecent, rejectedOpen, connectionLeaks
	processed => servedRate, meanWaitTime
-ent	***:j2eeType=EntityBean,*** => cacheSize, poolSize, maxCacheSize, minPoolSize, usedInTx, usedOutTx, unusedReady, markedRemoved, pkNumber, passivated
-slb	***:j2eeType=StatelessSessionBean,*** => cacheSize, poolSize, minPoolSize, maxCacheSize, sessionTimeOut, totalProcessingTime, numberOfCalls

Option	MBeans and resulted indicators
	processed => callsRate, totalProcessingTimeReq
-sfb	***:j2eeType=StatefulSessionBean,*** => cacheSize, poolSize, minPoolSize, maxCacheSize, sessionTimeOut, totalProcessingTime, numberOfCalls
	processed => callsRate, totalProcessingTimeReq
-servlet	***:j2eeType=Servlet,*** => requestCount, errorCount, maxTime, minTime
	processed => requestRate, errorRate, procTimeReq
-cpusun	**java.lang:type=OperatingSystem** => processCpuTime
	processed => currentCpuTime, currentCpuLoad

Example 3.2. Result format for poll -tx

```
time;date;sname;server;domain;mbean;cmdid;txRate;pending;commit;rollback;timedOut;commitRatio;currentCommitRati
```

```
1292575217080;2010/12/17
 09:40:17;target_jmx_url;serverName;domainName;jonas:J2EEServer=serverName,j2eeType=JTAResource,name=JTAResourc
```

Where target_jmx_url has the following format service:jmx:rmi:///jndi/rmi://host:port/jrmpconnector_serverName. In case of a JOnAS server, the serverName and the domainName are configuration parameters defined in jonas.properties file or using -n option for the serverName and using -Ddomain.name.

Example 3.3. Poll command examples

```
poll -ds "*:j2eeType=JDBCDataSource,*"
```

```
poll -slb "*:j2eeType=StatelessSessionBean,J2EEApplication=myApp,*"
```

```
poll -sfb "*:j2eeType=StatefulSessionBean,J2EEApplication=myApp,*"
```

```
poll -ent "*:j2eeType=EntityBean,J2EEApplication=myApp,*"
```

```
poll -servlet "*:j2eeType=Servlet,J2EEApplication=myApp,*"
```

```
poll -joramq "joramclient:type=Queue,*"
```

3.5. The Stat command

Command allowing to periodically poll MBeans on target servers.

stat [-p period] [-r period] [-s separator] [-name filter] [-a attribute_list] [-rate attribute_list] [-delta attribute_list] [-slope attribute_pair_list] [OUTPUT] [TARGET]

- -p period : Sets the period in seconds. Default value is 10
- -r period : Sets the the period for rebuilding the list of MBeans to poll. Default value is 300
- -s separator : Sets the separator to delimit the obtained monitoring data. Default is ";"
- -name filter : Defines the MBeans to poll. FILTER may be an exact match of a MBean or contains wildcards according to the JMX conventions.

  Example : stat -name "joramClient:type=queue,*"

- -a attribute_list : Sets the list of attributes to poll. If no attribute is specified, the attribute list is guessed from the first queried MBean.
- -rate attribute_list : Option allowing to calculate the rate from the given attributes (dX/dT).
- -delta attribute_list : Option allowing to calculate the delta from the given attributes (dX).
- -slope attribute_pair_list : Option allowing to calculate the slope from the given attributes (dX/dY). A pair number of attributes must be specified here, since they will be interpreted 2 by 2.
- TARGET

  See Section 3.2, “Defining targets”
- OUTPUT

  See Section 3.3, “Defining outputs”

3.6. The JDBC Connections command

jdbcconnections [-o file] [-d duration] [-n datasource-name] [TARGET]

- -o -output-file <filename>: Print the result in the given file.
- -d -duration-filter <duration>: Filter connection opened for more than <duration-filter> seconds.
- -n -datasource-name <name>: ObjectName of the DataSource to be observed.
- TARGET

  See Section 3.2, “Defining targets”

Unless specified by the jasmine.jmx.url property, the default target is :

- service:jmx:rmi:///jndi/rmi://localhost:1099/jrmpconnector_jonas

Example 3.4. JDBC Connection status

- from resource service

```
java -jar mbeancmd.jar jdbcconnections -n
 jonas:j2eeType=JCAConnectionFactory,name=jdbc_1,JCAResource=db_access_jdbc1,J2EEServer=jonas
```

- from dbm service

```
java -jar mbeancmd.jar jdbcconnections -n
 jonas:j2eeType=JDBCDataSource,name=HSQL1,JDBCResource=JDBCResource,J2EEServer=jonas
```

Note

If the target server has secured jmx, the MBeanCmd client must have read-write permission.

3.7. The Dump command

dump [-f file] [-l] [TARGET]

- -f, -file filename : Prints thread stack dump in a given file "filename"
- -l, -log :Prints thread stack dump in JOnAS log file (level: info)

  Example : dump -f /home/username/threaddump.txt
- TARGET

  See Section 3.2, “Defining targets”

3.8. The Snap command

snap -name FILTER -a attributes [-s attributes] [-delta [time_interval]] [-z] [-m up | down] [TARGET]

This command is useful to figure out what is going on on a set of JOnAS (or JVM instances). Use this command if you have no preconceived idea of what instance does what. It enables for example to pinpoint which servlets of which JOnAS instances are intensively requested, which EJBs take the most processing time, which instances have an intense transactionnel activity, which JVM have a high workload to do (many active threads). it can be used to audit a production site before setting up further stat or poll commands.

- -name FILTER : a mbean pattern, as defined by the JMX Specification. Example: to collect data on servlets, specify the FILTER as "*:j2eeType=Servlet,*".
- -a atributes : the names of the attributes to collect.
- -s atributes : the names of the attributes used for sorting the output. If absent, the first attribute of the -a option is used for sorting. If several attributes are supplied, they will be successively (and independently) used, and the command will print as many reports as "sort" attributes spefified by the -s option.

Example 3.5. The Snap -s option

On a "freshly started" JOnAS instance, where an administrator has connected to through the jonasAdmin console, the following command :

```
snap -name "*:j2eeType=Servlet,*" -a requestCount processingTime
```

produces the following output :

```
requestCount;source;mbean
27;j01;jasmine01:j2eeType=Servlet,name=default,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
3;j01;jasmine01:j2eeType=Servlet,name=action,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.welcomeContent_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.index_jsp,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.frameright_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
```

whereas the following command :

```
snap -name "*:j2eeType=Servlet,*" -a requestCount processingTime -s requestCount
 processingTime
```

produces the following output (it first prints a list of mbeans by decreasing requestCount, then by decreasing processingTime):

```
requestCount;source;mbean
27;j01;jasmine01:j2eeType=Servlet,name=default,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
3;j01;jasmine01:j2eeType=Servlet,name=action,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.welcomeContent_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.index_jsp,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
1;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.frameright_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01

processingTime;source;mbean
2494;j01;jasmine01:j2eeType=Servlet,name=action,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
370;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.index_jsp,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
100;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.welcomeContent_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
70;j01;jasmine01:j2eeType=Servlet,name=default,WebModule=//localhost/
jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
60;j01;jasmine01:j2eeType=Servlet,name=org.apache.jsp.frameright_jsp,WebModule=//
localhost/jonasAdmin,J2EEApplication=none,J2EEServer=jasmine01
```

- -delta [time_interval] : this option affects the snap behaviour. The command takes a baseline snapshot, then wait for time_interval seconds (default is 60 seconds), then takes a current snapshot. Then it computes the differences between the current and baseline snapshots, and orders according to the differences rather than the current values.

Example 3.6. The Snap -d option

Assume that within a slice of one minute, only the earsample application has been used. The following command :

```
snap -name "*:j2eeType=Servlet,*" -a requestCount processingTime -s requestCount
 processingTime -delta
```

produces the following output :

```
requestCount;source;mbean
                    84.0;j01;jasmine01:j2eeType=Servlet,name=default,WebModule=//
localhost/earsample,J2EEApplication=earsample,J2EEServer=jasmine01
                    19.0;j01;jasmine01:j2eeType=Servlet,name=Op,WebModule=//localhost/
earsample,J2EEApplication=earsample,J2EEServer=jasmine01

                    processingTime;source;mbean
                    1012.0;j01;jasmine01:j2eeType=Servlet,name=Op,WebModule=//localhost/
earsample,J2EEApplication=earsample,J2EEServer=jasmine01
                    30.0;j01;jasmine01:j2eeType=Servlet,name=default,WebModule=//
localhost/earsample,J2EEApplication=earsample,J2EEServer=jasmine01
```

- -z : the snap command does not print zero value, unless this option is set.
- -m up | down : set the ordering mode: by increasing values (up), or by decreasing values (down). Default mode is down.
- TARGET

  See Section 3.2, “Defining targets”

3.9. The Scan command

scan -a attributes [-i path] [-current | -delta | -stat] [-z] [-m up | down] [-s separator]

This command serves the same purpose as the snap command, but unlike snap, it is for offline usage. It processes the output of the poll or stat command, either from the standard input or from a file. The first line of the input (or file) is interpreted as a header of semicolon (";") separated field (or attribute) names. Subsequent lines are parsed and field values are retrieved from their position.

A metric corresponds to a record in the input (that is, a line). it is identified by the source (that represents a JVM instance), a mbean name within the source, and comprises of a set of attributes (or fields). The source is the "sname" field, the mbean is the "mbean" field. Timestamp are retrieved from the "time" field.

- -a atributes : the names of the attributes (or field) to collect.
- -i path : forces scan to process a file rather than the standard input.
- -s separator : forces scan to use the supplied field separator instead of the default one (semicolon ";").
- -z : the scan command does not print zero value, unless this option is set.
- -m up | down : set the ordering mode: by increasing values (up), or by decreasing values (down). Default mode is down.
- -current : The command processes the input and retains the most recent values for each metric. This option is useful when attributes are counters.
- -delta : the command builds a baseline from the first values retrieved from the input, then scan the input and retains the most recent values, then computes the variation from the baseline. this option is useful when attributes are counters.

- -stat : Processes the input and computes statistics for each attribute. Sort on mean values. Computed statistics are:
  - the average value for the whole scan.
  - the average value of non null values.
  - the minimal non null value.
  - the maximal value.
  - the time interval of the scan.
  - the time where values are not null during the scan.
  - the ratio between both times (<=1).

  This option is useful for both counter and gauges attributes.

Note

The -current, -delta and -stat options are mutually exclusive.

Example 3.7. The Scan command

The following command

```
scan -i tx.log -a commit
```

produces the following output:

```
commit;range;source;mbean
 56996.0;4.8;jonas01;jonas01:J2EEServer=jonas01,j2eeType=JTAResource,name=JTAResource
 24546.0;4.4;jonas02;jonas02:J2EEServer=jonas02,j2eeType=JTAResource,name=JTAResource
 5758.0;3.8;jonas03;jonas03:J2EEServer=jonas03,j2eeType=JTAResource,name=JTAResource
```

Example 3.8. The Scan command : -delta option

The following command (with the -delta option)

```
scan -i tx.log -a commit -delta
```

produces the following output:

```
commit;range;source;mbean
 47199.0;4.7;jonas01;jonas01:J2EEServer=jonas01,j2eeType=JTAResource,name=JTAResource
 4095.0;3.6;jonas02;jonas02:J2EEServer=jonas02,j2eeType=JTAResource,name=JTAResource
```

jonas03 is no more listed, as no transaction has been committed on it while the tx.log file was recorded.

3.10. The mbean command

This command offers a low level interface to access MBeans. It is dedicated to expert administrators.

mbean [-v] -name FILTER -ACCESS [ACCESS-OPTS] [TARGET]

- -v : Produces a verbose output.
- -name FILTER : Defines the MBeans to access. The FILTER may be an exact match of a MBean name (OBJECT_NAME), or may contains wildcards according to the JMX conventions.

  Example : mbean -name "jonas:j2eeType=JVM,*" -query
- -ACCESS [ACCESS-OPTS] : Defines the type of access. Examples of access types are: -query and -info. Note that the -info access needs an exact matching OBJECT_NAME.

  You may get details on all the access types and corresponding options by using the help command

  ```
  help mbean
  ```
- TARGET

  See Section 3.2, “Defining targets”

Example 3.9. MBean command examples

Suppose that administrator needs to access the **JVM** MBean in a JOnAS server named **jonas5**.

```
mbean -name "*:j2eeType=JVM,*" -query
```

```
mbean -name "jonas:j2eeType=JVM,name=jonas5,J2EEServer=jonas5" -info
```

```
mbean -name "jonas:j2eeType=JVM,name=jonas5,J2EEServer=jonas5" -get allThreadsCount
```

3.11. The WildStat command

wildstat [-p period] [-r period] [-s separator] BEAN [-a attributes] [-c config] [-q query] [OUTPUT] [TARGET]

This command allows you to launch an MBeanCmd command using the features offers by WildCAT [http://wildcat.ow2.org]. WildCAT permits to build a hierarchical context in which you can organize datas and query for operations like aggregation and filtering.

Note

This command is only available in the distribution `mbeancmd-wildstat`. This is due to a licence limitation of Esper [http://esper.codehaus.org/], the Complex Event Processing engine on which WildCAT is based.

- -p period : Sets the period in seconds.
- -r period : Sets the the period for rebuilding the list of mbeans to poll. Default refresh period is 300 seconds.
- -s separator : Sets the separator. Default is ";".
- BEAN

  -name filter : Defines the mbeans to poll. `filter` may be an exact match of a mbean or contains wildcards according to the JMX conventions.
- -a attributes : Sets the list of attributes to poll. If no attribute is specified, the attribute list is guessed from the first queried mbean.

- -c config : Sets the configuration file for WildCAT.
- -q query : Sets an Event Query to aggregate or filter results. Notice that aggregated fields have to be the name prefixed by "my". default : select * from org.ow2.jasmine.event.attribute.JasmineAttributeChangedEvent

Note

the query language is EPL (Esper Processing Language). You can find documentation on it here [http://esper.codehaus.org/esper-2.3.0/doc/reference/en/html_single/index.html#epl_clauses].

- OUTPUT

  The command prints statistics into stdout, unless the -f or -jasmine option is set. The -f, -graph and -jasmine options are not exclusive.

  - -export : export the result in the WildCAT context defined in de configuration file (cf. -c option). The result will be sent in `self://jasmine/mbeancmd#wildstat`.
  - -f FILE : Causes the output to be redirected to FILE.
  - -graph XML_DEF : Displays graphs according to the XML definitions specified by the XML_DEF file.
  - -jasmine URL : Causes the output to be redirected to the JASMINe Event Switch located at URL.

- TARGET

  See Section 3.2, “Defining targets”

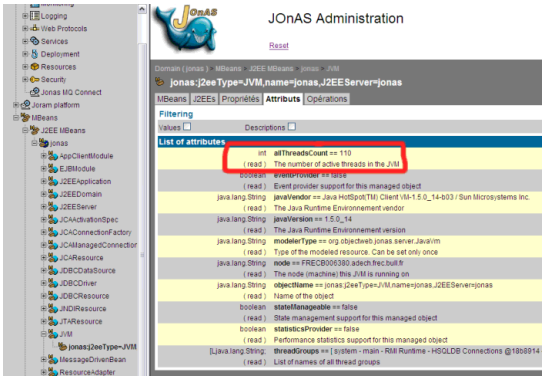
Example 3.10. The WildStat command examples

wildstat -p 10 -r 300 -name "joramClient:type=queue,*" -c standalone.properties -q "select * from org.ow2.jasmine.event.attribute.JasmineAttributeChangedEvent(value>=100)" -target all -jasmine vm://JasmineEventDispatcher

wildstat -q "select domain, server, objectName, probe, sname, avg(cast(value,int)) as value from org.ow2.jasmine.event.attribute.JasmineAttributeChangedEvent.win:time(10 sec) group by domain, server, objectName, probe, sname"

3.12. Example: output the number of threads

If we browse the JOnAS Administration interface, we see that the JVM J2EE Bean (called in our case **jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas**) has an attribute called **allThreadsCount** (The number of active threads in the JVM).



We'll now output this information on different mediums.

3.12.1. On the console

We know that:

- We'll be targeting only one server
- The IP address of the targeted server is 129.183.101.109
- The JOnAS Administration interface tells the JRMP MBean connector is on service:jmx:rmi:///jndi/rmi://localhost:1099/jrmpconnector_jonas
- We want a refresh period of 1 second

Therefore, the command to launch is:

```
java -Djasmine.jmx.url=service:jmx:rmi:///jndi/rmi://129.183.101.109:1099/
jrmpconnector_jonas -jar mbean.jar stat -p 1 -name "*:j2eeType=JVM,*" -a allThreadsCount
```

This displays the following output:

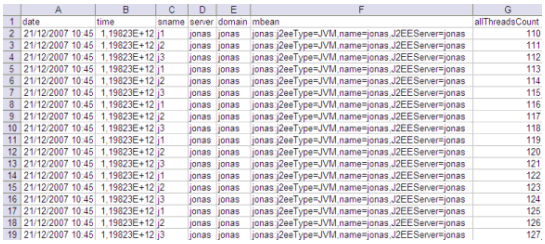
```
date;time;sname;server;domain;mbean;allThreadsCount
2007/12/21
 11:03:22;1198231402118;jonas;jonas;jonas;jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas;125
2007/12/21
 11:03:23;1198231403194;jonas;jonas;jonas;jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas;126
2007/12/21
 11:03:24;1198231404254;jonas;jonas;jonas;jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas;123
2007/12/21
 11:03:25;1198231405313;jonas;jonas;jonas;jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas;130
2007/12/21
 11:03:26;1198231406373;jonas;jonas;jonas;jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas;126
[etc]
```

On that output, you'll notice that:

- The first row of data contains the list of attributes
- All other rows contain the sampled data using the format specified in the first row

3.12.2. On a spreadsheet

Since any spreadsheet software can read comma separated values, it is rather trivial to import data captured by MBeanCmd into a spreadsheet: just copy and paste the console output:



	A	B	C	D	E	F	G
1	date	time	sname	server	domain	mbean	allThreadsCount
2	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	110
3	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	111
4	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	112
5	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	113
6	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	114
7	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	115
8	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	116
9	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	117
10	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	118
11	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	119
12	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	120
13	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	121
14	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	122
15	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	123
16	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	124
17	21/12/2007 10:45	1,19823E+12	j1	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	125
18	21/12/2007 10:45	1,19823E+12	j2	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	126
19	21/12/2007 10:45	1,19823E+12	j3	jonas	jonas	jonas:j2eeType=JVM,name=jonas,J2EEServer=jonas	127

3.12.3. In a graph

The **-graph** option can be used to display the sampled data in a graph. The XML DTD of a graph can be accessed by typing:

```
java -jar mbean.jar help stat
```

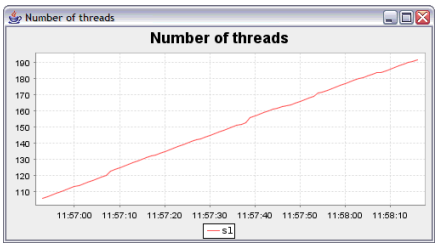
or

```
java -jar mbean.jar help poll
```

To display the number of threads in a simple graph, the following **graph.xml** file can be used:

```
java -Djasmine.jmx.url=service:jmx:rmi:///jndi/rmi://129.183.101.109:1099/
jrmpconnector_jonas -jar mbean.jar stat -p 1 -graph graph.xml -name "*:j2eeType=JVM,*" -a
 allThreadsCount
```

Which will display the following graph:



Note that you can also display multiple series on one graph.

Chapter 4. MGen - a configuration generator for MBeanCmd

4.1. Pre-Requisites

We will assume that we want to monitor a JOnAS cluster, and that we have got a working compiled version of MBeanCmd in the following path : `$MGEN_ROOT/../dist/mbean.jar`.

4.2. MGen setup

4.2.1. Tree structure

```
.
|-- build-components.xml
|-- build.xml
|-- mgen-conf.xml
|-- output
|   |-- dist
|   |   `-- mbean.jar
|   |-- graphs
|   |   `-- cpusun.xml
|   |-- jmxurls.properties
|   |-- monitoring.cmd
|   |-- monitoring.sh
|   |-- reports
|   `-- scripts
|       |-- cpusun.cmd
|       |-- cpusun.sh
|       |-- mbeancmd.cmd
|       `-- mbeancmd.sh
|-- styles
|   |-- mgen-ant.xsl
|   |-- mgen-graph.xsl
|   |-- mgen-jmxurl.xsl
|   |-- mgen-script-unix-monitoring.xsl
|   |-- mgen-script-unix.xsl
|   |-- mgen-script-win-monitoring.xsl
|   `-- mgen-script-win.xsl
`-- templates
    |-- mbeancmd.cmd
    `-- mbeancmd.sh
```

Here stands the tree structure of the "mgen" repertory.

- The mgen-conf.xml file enables you to set the details you want to monitor. In the following example, the CPU load is switched on.

```
<?xml version='1.0' encoding='ISO-8859-1' ?>
<mgen-conf>
  <global>
    <vars>
      <var id="APPCTX">/sampleCluster2</var>
      <var id="J2EEAPP">sampleCluster2</var>
      <var id="DSAPP">jdbc_1</var>
    </vars>

    <components>
      <component id="cpusun">
        <cmd-unix>poll -cpusun</cmd-unix>
        <cmd-win>poll -cpusun</cmd-win>
        <series>
          <serie id="currentCpuLoad" title="currentCpuLoad" col="currentCpuLoad"
 type="double"/>
        </series>
        <graphs>
          <graph id="g1" title="CPU Load">
            <serie id="currentCpuLoad"/>
          </graph>
        </graphs>
```

```
      </component>
    </components>
  </global>

  <servers>
    <server>
      <name>jonas</name>
      <host>localhost</host>
      <port>1099</port>
      <protocol>jrmp</protocol>
    </server>
  </servers>
</mgen-conf>
```

The "components" section describes all the indicators we want to supervise. For each, the unix and windows MBeanCmd commands are described, as well as the description of the graph. The main part of the section is the "series" one, where we can define which indicators we want to monitor. Finaly, the "servers" section is where we setup on which JOnAS server we are going to do the monitoring.

- The "output" directory contains all the files generated by the ant script. In the "dist" directory stands the file mbean.jar, which is a simple copy of of the file `$MGEN_ROOT/../dist/mbean.jar`. The "graphs" directory contains the xml graph description files parsed by the grapher to make all the graphs we asked for. "monitoring.sh" script launch all the mbeancmd scripts contained in the "scripts" repertory. We can obviously lauch those scripts one by one.

- The "styles" repertory contains all the xsl files used for generating the configuration.

- The "templates" directory, where mbeancmd environment variables are contained.

4.2.2. Compile MGen

Nothing to be scared of, just run "ant" in a command line. This will ask us for the repertory name to put the result in (default is `./output/`). Generated files have been seen in the previous section.

4.3. mgen-conf.xml ... scheme summary of THE file

4.3.1. "vars" section

Here we can define some variables we may require in the next sections. Typically, the variable may be associated with the application context. Just take a look on the following example :

```
<?xml version='1.0' encoding='ISO-8859-1' ?>
<mgen-conf>
  <global>
    <vars>
      <var id="APPCTX">/sampleCluster2</var>
    </vars>

    [...]

    <components>
      <component id="session">
        <cmd-unix>stat -name *:type=Manager,path=$APPCTX,* -a name activeSessions
 sessionCounter expiredSessions</cmd-unix>
        <cmd-win>stat -name &amp;quot;*:type=Manager,path=%APPCTX%,*&amp;quot; -a name
 activeSessions sessionCounter expiredSessions</cmd-win>
        [..]
```

The variable APPCTX will be replaced by its value when the file will be parsed. We can define as many variables as we want to.

4.3.2. "components" section

This is where all the components we want to monitor are defined. Here is a good example of what a component description could be :

```
<component id="tx">
  <cmd-unix>poll -tx</cmd-unix>
  <cmd-win>poll -tx</cmd-win>

  <series>
    <serie id="txRate" title="Rate" col="txRate" type="double"/>
    <serie id="pending" title="Pending" col="pending" type="double"/>
    <serie id="commit" title="Commits" col="commit" type="double"/>
    <serie id="rollback" title="Rollbacks" col="rollback" type="double"/>
    <serie id="timedOut" title="Timeouts" col="timedOut" type="double"/>
    <serie id="commitRatio" title="Mean commit ratio" col="commitRatio" type="double"/>
    <serie id="currentCommitRatio" title="Current commit ratio" col="currentCommitRatio"
 type="double"/>
  </series>

  <graphs>
    <graph id="g1" title="Transactions en cours">
      <serie id="txRate"/>
      <serie id="pending"/>
    </graph>
    <graph id="g2" title="Rollbacks">
      <serie id="rollback"/>
      <serie id="timedOut"/>
    </graph>
    <graph id="g3" title="Commit ratio">
      <serie id="commitRatio"/>
      <serie id="currentCommitRatio"/>
    </graph>
    <graph id="g4" title="Nb Transactions">
      <serie id="commit"/>
    </graph>
  </graphs>
</component>
```

Each component is identified with a unique id. There are then three main parts :

- The first part is where the commands of MBeanCmd are set, both for unix and windows systems.
- The second part deals with the series to get from the option given to MBeanCmd. A serie should have an unique "id", a "title", a "col" name and finaly the type that will be set to expose the data.
- Finaly, the "graphs" section defines the graph we want to draw, according to the series set before. In this example, four graphs will be drawn.

4.3.3. "servers" section

This is the last section of the file, where the servers to connect on are set. The following example shows two JOnAS server connections, one with authentification and the other without. We can define the "name" of the node, the "host" and the "port" number as well as the "protocol" to use. "user" and "password" are to be used only if the JMX authentification is set.

```
<servers>
  <server>
    <name>node1</name>
    <host>localhost</host>
    <port>2002</port>
    <protocol>jrmp</protocol>
  </server>
  <server>
```

```
    <name>node2</name>
    <host>localhost</host>
    <port>2022</port>
    <protocol>jrmp</protocol>
    <user>jonas</user>
    <password>jonas</password>
  </server>
</servers>
```