MoSKito-Essential Configuration Guide

After reading this section, you will know...

... how to configure MoSKito with external configuration file, via ConfigureMe system.

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Since v2.x, MoSKito may be configured via external configuration file. This configuration is based on ConfigureMe - the state of the art JSON configuration framework.

MoSKito Config is build of different configuration objects, which makes it easier to change and maintain. Each object can be configured separately.

Below is a typical configuration, different sections of it will be discussed separately.

```
{
        "@thresholdsAlertsConfig": {
                "@notificationProviders": [
                        {
                                "className": "net.anotheria.moskito.core.threshold.alerts.
notificationprovider.LogFileNotificationProvider",
                                "parameter": "MoskitoAlert",
                                "guardedStatus": "GREEN"
                        },{
                                "className": "net.anotheria.moskito.core.threshold.alerts.
notificationprovider.MailNotificationProvider",
                                "parameter": "leon@leon-rosenberg.net",
                                "guardedStatus": "RED"
                        },{
                                "className": "net.anotheria.moskito.core.threshold.alerts.
notificationprovider.SysoutNotificationProvider",
                                "parameter": "",
                                "guardedStatus": "GREEN"
                        }
                ],
                "@alertHistoryConfig": {
                        "maxNumberOfItems": 500,
                        "toleratedNumberOfItems": 550
                }
        },
        "@accumulatorsConfig" : {
                "accumulationAmount": 500,
                "@accumulators": [
                        {
                                "name": "Configured SessionCount Cur 5m",
                                "producerName": "SessionCount",
                                "statName": "Sessions",
                                "valueName": "cur",
                                "intervalName": "5m",
                        }
                ]
 },
        "@thresholdsConfig": {
                "@thresholds": [
                        {
                        "name": "Configured-5m-ThreadCount",
                        "producerName": "ThreadCount",
                        "statName": "ThreadCount",
                        "valueName": "Current",
                        "intervalName": "5m",
                        //timeUnit can be ignored here
            "@guards": [
                                {"value": "30", "direction": "DOWN", "status": "GREEN"},
                                {"value": "30", "direction": "UP", "status": "YELLOW"},
                                {"value": "45", "direction": "UP", "status": "ORANGE"},
                                {"value": "60", "direction": "UP", "status": "RED"},
                                {"value": "100", "direction": "UP", "status": "PURPLE"},
                        ]
                        }
                ]
        },
```

Configuration file and location

MoSKito is configured based on @ConfigureMe Annotations:

```
@ConfigureMe(name="moskito")
public class MoskitoConfiguration {
        @Configure
        private ThresholdsAlertsConfig thresholdsAlertsConfig = new ThresholdsAlertsConfig();
        @Configure
        private ThresholdsConfig thresholdsConfig = new ThresholdsConfig();
        @Configure
        private AccumulatorsConfig accumulatorsConfig = new AccumulatorsConfig();
...
```

ConfigureMe expects the Configuration file to be named **moskito.json** and looks for it in the classpath. However, it is possible to give this file a different name (or use xml or properties instead of json).

```
MoskitoConfiguration configuration = new MoskitoConfiguration();
ConfigurationManager.INSTANCE.configureAs(configuration, "anothername");
MoskitoConfigurationHolder.INSTANCE.setConfiguration(configuration);
```

Of course, you can setup the configuration object entirely by yourself (write the needed code) or get current configuration object from *MoskitoConfigurationHolder* and alter it.
However, do it at the start of the system, since many of the configuration options can't be changed on the fly (yet). Still, you can change others.

Sections

ThresholdsAlerts

The **ThresholdsAlerts** config contains two sections: **AlertHistory** and **NotificationProviders**.

```
        "@thresholdsAlertsConfig": {
                "@notificationProviders": [ NOTIFICATIONPROVIDER ],
                "@alertHistoryConfig": { }
    }
```

AlertHistory

The **AlertHistory** config defines how many items are stored in the in-memory alert history, and can be displayed in MoSKito-WebUI:

```
                "@alertHistoryConfig": {
                        "maxNumberOfItems": 500,
                        "toleratedNumberOfItems": 550
                }
```

Attribute	Value	Default
`maxNumberOfItems`	Number of items that can be stored in the alert history.	200
`toleratedNumberOfItems`	Tolerated overload. The AlertHistory will be shortened only after the size growth above *toleratedNumberOfItems.* This helps to reduce the amount of list operations.	220

NotificationProviders

The built-in notification system allows to configure multiple notification providers. Notification providers will be triggered as soon as a *threshold* changes its status and the change breaks the limits of this notification provider.

Each notification provider is configured with the following attributes:

Attribute	Value
className	Name of the class that implements *net.anotheria.moskito.core.threshold.alerts.NotificationProvider*
parameter	Customization of the provider. This attribute is provider-specific.
guardedStatus	The triggering status.

Parameter interpretation:

ClassName	Interpretation
net.anotheria.moskito.core.threshold.alerts.notificationprovider.LogFileNotificationProvider	Name of the Logger.
net.anotheria.moskito.core.threshold.alerts.notificationprovider.MailNotificationProvider	Comma-separated list of recipient's email addresses.
net.anotheria.moskito.core.threshold.alerts.notificationprovider.SysoutNotificationProvider	Ignored.

Thresholds

What is a Threshold?

Thresholds continuously watch a single producer and give a signal when its performance changes.

For more info, read the Thresholds section of MoSKito Concepts.

The thresholds config contains a list of threshold objects. This is another way to define thresholds.

Thresholds may also be added via MoSKito-Inspect.

```
        "@thresholdsConfig": {
                "@thresholds": [ THRESHOLD ]
        },
```

or, in Java words:

```
public class ThresholdsConfig {

        /**
         * Configured thresholds.
         */
        @Configure
        private ThresholdConfig[] thresholds;
```

Threshold

Each Threshold contains the following info:

```
{
  "name": "Configured-5m-ThreadCount",
  "producerName": "ThreadCount",
  "statName": "ThreadCount",
  "valueName": "Current",
  "intervalName": "5m",
  //timeUnit can be ignored here
  "@guards": [ GUARD ]
}
```

Attribute	Value	

name	The name of the value for AlertHistory, Logs and WebUI	
producerName	Name (id) of producer. Exact match required!	
statName	Name of the StatValue. Exact match required!	
valueName	Name of the Value. Exact match required!	
intervalName	Name of the interval the Threshold is tied to.	
timeUnit	TimeUnit if applicable (for example, MILLISECONDS or SECONDS)	See *net.anotheria.moskito.core.stats.TimeUnit*
guards	List of GUARD objects.	

Threshold Guards

A guard is a trigger (set of conditions) that changes the status of a Threshold.

For example:

```
        {"value": "30", "direction": "DOWN", "status": "GREEN"},
        {"value": "30", "direction": "UP", "status": "YELLOW"},
        {"value": "45", "direction": "UP", "status": "ORANGE"},
```

Attribute	Value
value	The value of the associated (producer | stat | statvalue) tuple, which changes the Threshold's status.
direction	Direction in which the value is passed: UP means the current value is higher than the guard value, DOWN - lower than the guard value.
status	The status that the Threshold is set to after the guard is triggered.

Accumulators

Accumulators store the performance history of a producer and display accumulated data in charts.

For more info, read about Accumulators in MoSKito Concepts.

The **accumulators** section configures accumulators, setting the default **accumulationAmount**.

Accumulation amount

```
        "@accumulatorsConfig" : {
                "accumulationAmount": 500
        },
```

The **accumulationAmount** controls the amount of values an accumulator can store. The real amount can be 10% higher, because 10% overload is allowed to reduce number of list operations.

Accumulators

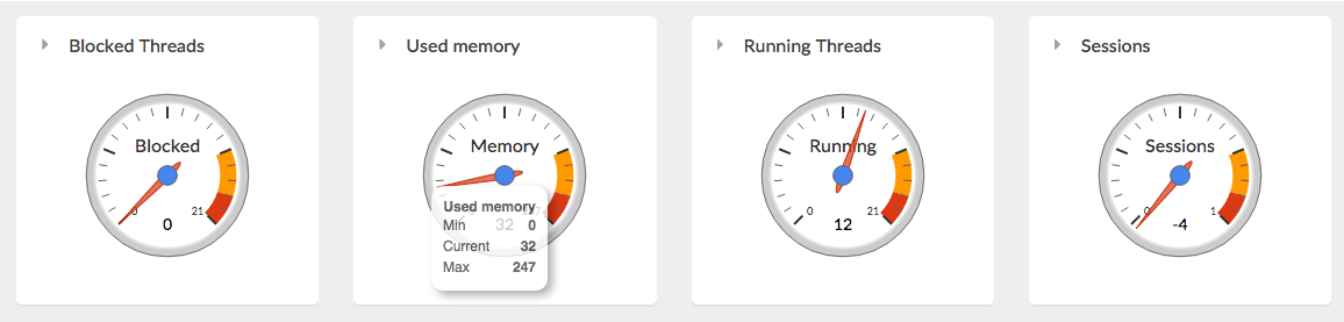
```
        "@accumulatorsConfig" : {
...
                "@accumulators": [
                        {
                                "name": "Configured SessionCount Cur 5m",
                                "producerName": "SessionCount",
                                "statName": "Sessions",
                                "valueName": "cur",
                                "intervalName": "5m"
                        }
            ...
                ]
        },
```

Basically, accumulators' section contains the same values for each accumulator as for each threshold:

Attribute	Value	
name	The name of the value for WebUI	
producerName	Name (id) of the producer. Exact match required!	
statName	Name of the StatValue. Exact match required!	
valueName	Name of the Value. Exact match required!	
intervalName	Name of the interval the accumulator is tied to.	
timeUnit	TimeUnit if applicable (for example, MILLISECONDS or SECONDS)	See *net.anotheria.moskito.core.stats.TimeUnit*

Gauges

Gauges are a visualization tool for representation of current state of a producer in relation to it's expected min and max states.



Gauges can be used in Dashboards.

Gauges

Gauges are configured in their own section in the configuration file.

```
"@gaugesConfig": {
    "@gauges": [GAUGE],
        "@defaultZones":[ZONE]
}
```

Each gauge is configured in following way

```
{
  "name": "Name of the gauge is displayed in the gauge itself and should be short",
  "caption": "Caption of the gauge block, has more chars to fit",
  "@minValue" : GAUGEVALUE,
  "@currentValue" : GAUGEVALUE,
  "@maxValue" : GAUGEVALUE,
  "@zones": [ZONE]
}
```

A *GAUGEVALUE* can be a constant or a reference to a producer. In the following example a static gauge is configured.

```
"@minValue": {
    "constant": 0
},
"@currentValue": {
  "constant": 70
},
"@maxValue": {
  "constant":100
},
```

One might argue, that a static gauge doesn't make much sense, but it demonstrates the principle and you can use it to present a value which is produced outside of the system.

A GAUGEVALUE can be tight to a producer/stat/value tuple as in following example:

```
{
  "name": "Running",
  "caption": "Running Threads",
  "@minValue": {
    "constant": 0
  },
  "@currentValue": {
    "producerName": "ThreadStates",
    "statName": "RUNNABLE",
    "valueName": "Current",
    "intervalName": "1m"
  },
  "@maxValue": {
    "producerName": "ThreadCount",
    "statName": "ThreadCount",
    "valueName": "current",
    "intervalName": "default"
  }
}
```

Remember you can use either *constant* keyword or *producerName, statName* and *valueName.* If a gauge value config contains *constant* everything else will be ignored for this value.

Besides the values the zones of each gauge can be configured. If you don't provide gauge specific configuration, *defaultZones* are applied. If you provide no *defaultZones* either, the pre-configured default zones are used, which are hardwired in GaugeAPIImpl.

DefaultZones

You can configure default zones which would be applied to all your gauges, if the gauges don't have explicit zone configuration.

```
"@gaugesConfig": {
    "@gauges": [GAUGE],
        "@defaultZones":[ZONE]
}
```

For example:

```
"@defaultZones":[
  {
    "color": "orange",
    "left": 0.85,
    "right": 0.9
  },
  {
    "color": "red",
    "left": 0.9,
    "right": 1
  }
]
```

Full example

Below example configuration of gauges part.

```
"@gaugesConfig": {
    "@gauges": [
      {
        "name": "Constant",
        "@minValue": {
            "constant": 0
        },
        "@currentValue": {
          "constant": 70
        },
        "@maxValue": {
          "constant":100
        },
        "@zones":[
          {
            "color": "green",
            "left": 0,
            "right": 0.25
          },
          {
            "color": "yellow",
            "left": 0.25,
            "right": 0.5
          },
          {
            "color": "orange",
            "left": 0.5,
            "right": 0.75
          },
          {
            "color": "red",
            "left": 0.75,
            "right": 1
          }
        ]

      },
      {
        "name": "Sessions",
        "@minValue": {
          "constant": 0
        },
        "@currentValue": {
          "producerName": "SessionCount",
          "statName": "Sessions",
          "valueName": "cur",
          "intervalName": "default"
```

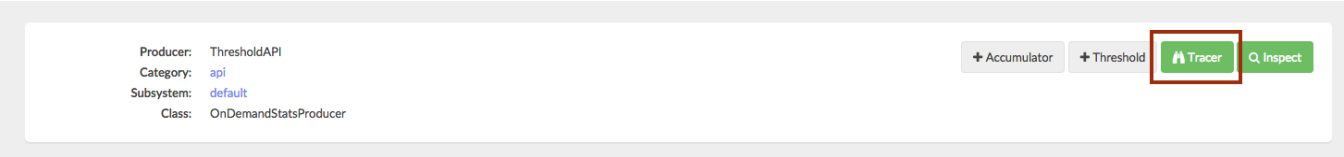
```
      },
      "@maxValue": {
        "producerName": "SessionCount",
        "statName": "Sessions",
        "valueName": "max",
        "intervalName": "default"
      }
    },
    {
      "name": "Memory",
      "caption": "Used memory",
      "@minValue": {
        "constant": 0
      },
      "@currentValue": {
        "producerName": "Heap memory",
        "statName": "Heap memory",
        "valueName": "Used Mb",
        "intervalName": "default"
      },
      "@maxValue": {
        "producerName": "JavaRuntimeMax",
        "statName": "JavaRuntimeMax",
        "valueName": "Current Mb",
        "intervalName": "default"
      }
    },
    {
      "name": "Blocked",
      "caption": "Blocked Threads",
      "@minValue": {
        "constant": 0
      },
      "@currentValue": {
        "producerName": "ThreadStates",
        "statName": "BLOCKED",
        "valueName": "Current",
        "intervalName": "1m"
      },
      "@maxValue": {
        "producerName": "ThreadCount",
        "statName": "ThreadCount",
        "valueName": "current",
        "intervalName": "default"
      }
    },
    {
      "name": "Running",
      "caption": "Running Threads",
      "@minValue": {
        "constant": 0
      },
      "@currentValue": {
        "producerName": "ThreadStates",
        "statName": "RUNNABLE",
        "valueName": "Current",
        "intervalName": "1m"
      },
      "@maxValue": {
        "producerName": "ThreadCount",
        "statName": "ThreadCount",
        "valueName": "current",
        "intervalName": "default"
      }
    }
  ],
"@defaultZones":[
  {
    "color": "orange",
    "left": 0.85,
    "right": 0.9
```

```
    },
    {
      "color": "red",
      "left": 0.9,
      "right": 1
    }
  ]

},
```

Tracers

Tracers allow you to monitor who is executing a place of code, in code. Tracers are typically switched on/off from inspect on Runtime with the *Tracer* b utton in SingleProducerView in MoSKito Inspect:



However, there are some configuration options for Tracers too.

Tracers are configured via the element *tracingConfig* in MoSKito Configuration.

Here an example:

```
"@tracingConfig": {
  "tracingEnabled": true,
  "loggingEnabled": true,
  "inspectEnabled": true,
  "maxTraces": 50,
  "tracers": [],
  "shrinkingStrategy": "KEEPLONGEST"
}
```

All tracing configuration options are changeable at Runtime. The options mean in particular:

Attribute	Value	
tracingEnabled	true/false. If false tracing won't be active. Tracing can generate some additional load, mainly due to StackTrace creation. So it's wise to switch it off if not needed.	
loggingEnabled	true/false. If true every trace will be logged out into a Logger called *MoSKitoTracer*.	
inspectEnabled	true/false. If true support for inspection in MoSKito Inspect is enabled	
maxTraces	max number of traces (calls with parameters and stacktraces) per Tracer.	To reduce array operations MoSKito will allow Tracers to get 10% more traces than allowed, before cutting them.
tracers	Predefined Tracers. This is basically a list of ProducerIds.	Actually, the idea of tracers is that you want them dynamically, but you can add them in configuration too.
shrinkingStrategy	"FIFO" or "KEEPLONGEST" - defined by *net.anotheria.moskito.core.config.tracing.ShrinkingStrategy*	When amount of tracers exceeds the tolerated amount of traces, MoSKito will start to remove some traces to save memory space. There are two possible strategies here, FIFO -> First in First Out or KEEPLONGEST. Keeplongest sorts the traces by execution duration and keeps those which lasts longer. This is useful in tracking anomalies.

Plugins

Plugins section allows to load custom software aka plugins.

```
        "@pluginsConfig": {
                "@plugins": [
                        {
                                "name": "EmbeddedCentralConnector",
                                "configurationName": "none",
                                "className": "net.anotheria.moskito.central.connectors.embedded.
EmbeddedConnector"
                        }
                ]
        }
```

For each plugin, the following values are configured:

Attribute	Value	
name	The name of the plugin for plugin view.	
configurationName	The name of the plugin configuration.	The configuration is of plugin-special type.
className	The name of the plugin class.	The class should implement *net.anotheria.moskito.core.plugins.Moskitoplugin*

Builtin Producers

Builtin Producers section allows to configure which builtin producers should be enabled by default. If you don't set anything, all producers are enabled (default value = true).

Example:

```
        "@builtinProducersConfig": {
                "javaMemoryProducers": false,
                "javaMemoryPoolProducers": false,
                "osProducer": false
        }
```

Supported attributes are:

Attribute	Producers
javaMemoryProducers	Memory based on Runtime.getRuntime().freeMemory
javaMemoryPoolProducers	Memory based on GC Memory Pools / Spaces
javaThreadingProducers	ThreadCountProducer ThreadStatesProducer
osProducer	OS Stats (on *nix only) incldung min/max files etc
runtimeProducer	Runtime - process name and uptime
mbeanProducers	Automatical monitoring of all mbeans. Requires additional configuration (MBeanProducerConfig)