jHiccup: Open Source Java Performance Measurement Tool

Measures jitter or 'hiccups' associated with the Java platform

WHAT IS JHICCUP?

jHiccup is an open source tool designed to measure the pauses and stalls (or "hiccups") associated with an application's underlying Java runtime platform. The new tool captures the aggregate effects of the Java Virtual Machine (JVM), operating system, hypervisor (if used), power management and hardware on application stalls and response time.

jHiccup allows developers, systems operators and performance engineers to easily create and analyze response time profiles, and to clearly identify whether causes of application delays reside in the application code or in the underlying runtime platform. jHiccup is completely transparent and non-intrusive to the application, has zero performance overhead in operation, and is compatible with all Java applications using any JVM.

HOW DOES JHICCUP WORK?

The jHiccup tool is focused on a very simple thing - showing whether or not your software stack (which includes your JVM) runs continuously. jHiccup shows graphically via 'Hiccup Charts' just how responsive the runtime platform really is.

jHiccup is actually very simple, and you can use it with any Java application on any JVM and any platform (Sun, IBM, Windows, MAC, etc.) The tool runs as a background thread and measures the time it takes to do nothing. It sleeps for 1 msec, then wakes up and checks whether it has actually been longer than 1 msec since it went to sleep. If it was, the tool records the amount of lag. So, for example, if jHiccup finds it was 500 msec since it went to sleep, that probably means that every thread experienced the same pause.

WHY USE JHICCUP?

By understanding the pauses associated with the underlying platform, IT organizations can better isolate latency and delays and the contributing components. jHiccup can also be used to compare JVMs, collectors and to identify stalls in the underlying platform due to scheduler delays, cron jobs or other system-level interruptions.

Try jHiccup

You can download jHiccup from the Azul Systems website at www.azulsystems.com/downloads/jHiccup and access the jHiccup forum here: www.jhiccup.com/forum. Please send feedback on jHiccup to tools@azulsystems.com.
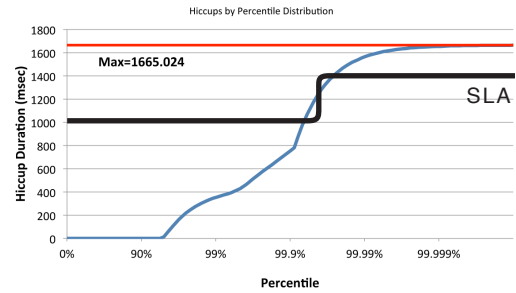
Hiccup Charts

Hiccup charts show you graphically how many times your system paused and for how long. In the chart to the right, the multi-hundred millisecond hiccups (black circle) on the left, are indicative of periodic young generation garbage collection. The larger spike on the right (grey circle) is less frequent but is multiple seconds in duration. This is old generation garbage collection.
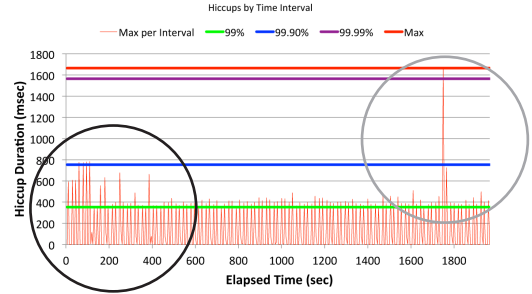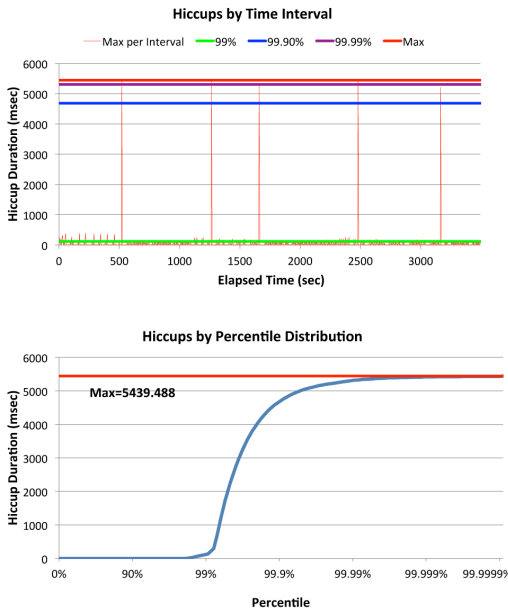
This second chart is the companion to the one on the previous page and shows the percentile distribution of the information in the top chart. For any percentile, you can figure out what the worst case response time was. This view is more useful for systems operating under SLAs. Here you see how the application performs against its required service level. This type of chart also makes it easier to plot your requirements against the actual behavior of the system.

Hiccups by Time Interval

Legend: Max per Interval — 99% — 99.90% — 99.99% — Max

Y-axis: Hiccup Duration (msec), X-axis: Elapsed Time (sec)

Hiccups by Percentile Distribution

Max=1665.024

SLA

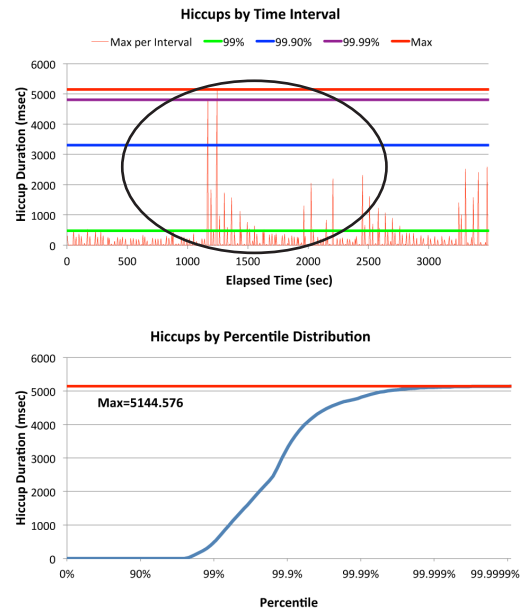*Y-axis: Hiccup Duration (msec), X-axis: Percentile*

Example: Using jHiccup for Comparing Collectors

In this example, jHiccup is used to compare two garbage collectors – HotSpot ParallelGC vs. G1. You can see that G1 has an interesting pattern of lots of smaller pauses, all in the range of 100s of milliseconds in addition to the long pauses both collectors share.

Oracle HotSpot ParallelGC, 1GB in 8GB heap

Hiccups by Time Interval

Legend: Max per Interval — 99% — 99.90% — 99.99% — Max

Y-axis: Hiccup Duration (msec), X-axis: Elapsed Time (sec)

Oracle HotSpot G1, 1GB in 8GB heap

Hiccups by Time Interval

Legend: Max per Interval — 99% — 99.90% — 99.99% — Max

Y-axis: Hiccup Duration (msec), X-axis: Elapsed Time (sec)

Hiccups by Percentile Distribution

Max=5439.488

Y-axis: Hiccup Duration (msec), X-axis: Percentile

Hiccups by Percentile Distribution

Max=5144.576

Y-axis: Hiccup Duration (msec), X-axis: Percentile

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