BigMemory Go Operations Guide

Version 4.3.9

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TERRACOTTA

This document applies to BigMemory 4.3.9 and to all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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1 Logging

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SLFJ Logging

BigMemory Go uses the SLF4J logging facade, so you can plug in your own logging framework. The following information pertains to Ehcache logging. For information about SLF4J in general, refer to the SLF4J website.

With SLF4J, users must choose a concrete logging implementation at deploy time. The options include Maven and the download kit.

Note:
In respect of considerations concerning EU General Data Protection Regulation (GDPR), be aware that in cases of incorrect login procedure or other error scenarios, LDAP username and IP address may be logged in the tmc-security log file. Amongst other events, such data may be collected for reasons of configuring messages based on such logs. LOG4J offers possibilities for log-purging and log-retention, which may offer useful strategies to avoid unwanted loss or exposure of sensitive data possibly conflicting with regulations.

Concrete Logging Implementation use in Maven

The maven dependency declarations are reproduced here for convenience. Add *one* of these to your Maven POM.

```
<dependency>
    <groupId>org.slf4j</groupId>
    <artifactId>slf4j-jdk14</artifactId>
    <version>1.5.8</version>
</dependency>
 <dependency>
    <groupId>org.slf4j</groupId>
    <artifactId>slf4j-log4j12</artifactId>
    <version>1.5.8</version>
</dependency>
 <dependency>
    <groupId>org.slf4j</groupId>
    <artifactId>slf4j-simple</artifactId>
    <version>1.5.8</version>
</dependency>
```

Concrete Logging Implementation use in the Download Kit

The slf4j-api jar is in the kit along with the BigMemory Go jars so that, if the app does not already use SLF4J, you have everything you need. Additional concrete logging implementations can be downloaded from SLF4J website.

Recommended Logging Levels

BigMemory Go seeks to trade off informing production-support developers of important messages and cluttering the log. ERROR messages should not occur in normal production and indicate that action should be taken.

WARN messages generally indicate a configuration change should be made or an unusual event has occurred. DEBUG and TRACE messages are for development use. All DEBUG level statements are surrounded with a guard so that no performance cost is incurred unless the logging level is set. Setting the logging level to DEBUG should provide more information on the source of any problems. Many logging systems enable a logging level change to be made without restarting the application.

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About Shutdown

BigMemory Go is shut down through the Ehcache API. Note that Hibernate automatically shuts down its Ehcache CacheManager.

The recommended way to shutdown BigMemory Go is:

- To call CacheManager.shutdown()
- In a web app, register the Ehcache ShutdownListener

Though not recommended, you can also register a JVM shutdown hook.

ServletContextListener

Ehcache provides a ServletContextListener that shuts down the CacheManager. Use this to shut down Ehcache automatically, when the web application is shut down. To receive notification events, this class must be configured in the deployment descriptor for the web application. To do so, add the following to web.xml in your web application:

```
<listener>
  <listener-class>
       net.sf.ehcache.constructs.web.ShutdownListener</listener-class>
</listener>
```

The Shutdown Hook

The CacheManager can optionally register a shutdown hook. To do so, set the system property `net.sf.ehcache.enableShutdownHook=true`. This will shut down the CacheManager when it detects the Virtual Machine shutting down and it is not already shut down.

Use the shutdown hook when the CacheManager is not already being shutdown by a framework you are using, or by your application.

Note:
Shutdown hooks are inherently problematic. The JVM is shutting down, so sometimes things that can never be null are. Ehcache guards against as many of these as it can, but the shutdown hook should be the last option to use.

The shutdown hook is on CacheManager. It simply calls the shutdown method. The sequence of events is:

- Call dispose for each registered CacheManager event listener.
- Call dispose for each Cache.

Each Cache will:

- Shutdown the MemoryStore. The MemoryStore will flush to the DiskStore.
- Shutdown the DiskStore. If the DiskStore is persistent ("localRestartable"), it will write the entries and index to disk.

- Shutdown each registered CacheEventListener.
- Set the Cache status to shutdown, preventing any further operations on it.
- Set the CacheManager status to shutdown, preventing any further operations on it.

The shutdown hook runs when:

- A program exists normally. For example, when System.exit() is called, or when the last non-daemon thread exits.
- The Virtual Machine is terminated, e.g., CTRL-C. This corresponds to `kill -SIGTERM pid` or `kill -15 pid` on Unix systems.

The shutdown hook will not run when:

- The Virtual Machine aborts.
- A SIGKILL signal is sent to the Virtual Machine process on Unix systems, e.g., `kill -SIGKILL pid` or `kill -9 pid`.
- A `TerminateProcess` call is sent to the process on Windows systems.

Dirty Shutdown

If Ehcache is shutdown dirty, all in-memory data will be retained if BigMemory Go is configured for restartability. For more information, see "Configuring Fast Restart" in the *Configuration Guide* for BigMemory Go.