IBM Software Group

IBM® WebSphere® Application Server V6

Database Connection Leak Diagnostics

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This presentation will focus on database connection leak diagnostics in WebSphere Application Server V6.

Goals

- Explain the database connection leak diagnostics in WebSphere Application Server V6
  - ▶ Functionality
  - ▶ Configuration

The goal of this presentation is to explain how database connection leak diagnostics work in WebSphere Application Server V6.

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Introduction

- Poorly-written applications often do not properly release database connections
  - ▸ Forget to call connection.close()
  - ▸ Most often in the exception case
  - ▸ Connections should be closed in a finally{} block

- Connections will only return to the pool after time-out
  - ▸ Can cause a back-up of new connections waiting for old connections to time out
  - ▸ New connections that have waited too long throw a connectionWaitTimeoutException

Applications can suffer from performance problems and even appear to "hang" if they do not close their connections properly. This is most often caused by developers not properly using the connection.close() method. To ensure that connections will be closed properly, they should be closed in a "finally{}" block.

WebSphere Application Server is instrumented to eventually time-out orphaned connections and return them to the pool, but for an application that makes frequent use of database connections, this might not be enough. New connections can get queued up waiting for the database while old connections are waiting to be timed out. This can bring the application grinding to a halt, and you can see connectionWaitTimeoutExceptions.

Connection leaks have traditionally been hard to diagnose because the error messages do not usually provide specific enough information about the source of the problem. Usually a source code review is needed to find points in the code where connections are not properly closed.

Diagnostic Functionality

- When activated, enables a connection manager tracer that holds the stack trace of all getConnection() calls in a Throwable object

- When a ConnectionWaitTimeoutException is thrown due to waiting on a full connection pool, print stack traces of <u>all</u> open connections

- Lower performance impact than connection manager tracing (1-5% impact)

- Different diagnostic functions for v4 Data Sources
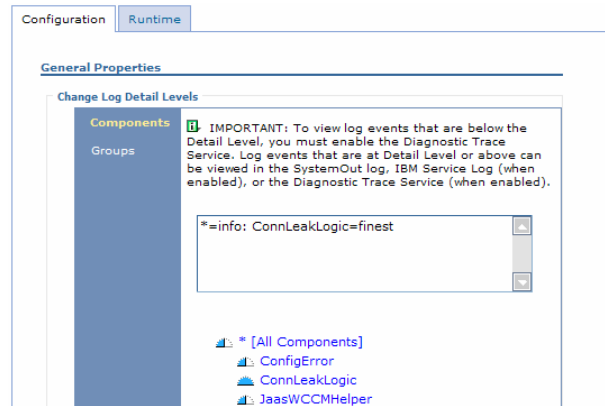 - http://www-1.ibm.com/support/docview.wss?rs=0&uid=swg21110015

Versions 5.1.1 and later of WebSphere Application Server have a feature that will hold the stack trace of all getConnection() calls. When a thread times out waiting on a connection from a full connection pool, it will throw a connectionWaitTimeoutException.

When this exception is thrown, the tracer will print out the stack traces for every open connection. You can then begin reviewing your application code for errors, using the stack traces as a starting point. In many cases the responsible method will be obvious, because it will appear in nearly all of the stack traces.

If you are using v4 Data Sources for your Java™ 2 Enterprise Edition (J2EE) 1.2 applications, these diagnostic functions are not applicable. For instructions on the different diagnostic function that is available on v4 Data Sources, follow the link on this slide.

To enable connection leak diagnostics, set the Log Detail Level to "ConnLeakLogic=finest" and enable diagnostic tracing.

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Summary

- WebSphere Application Server V6 has new connection leak diagnostic capability

  ▶ Logs stack traces of all open database connections when ConnectionWaitTimeoutException occurs

Connection Leak Diagnostics
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In summary, this presentation has focused on the new database connection leak diagnostic capability of WebSphere Application Server V6. This functionality makes it easy for you to find the method responsible for connection leaks by printing the stack traces for all open database connections whenever a thread throws an exception because it couldn't get a database connection from the pool in a reasonable amount of time.

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