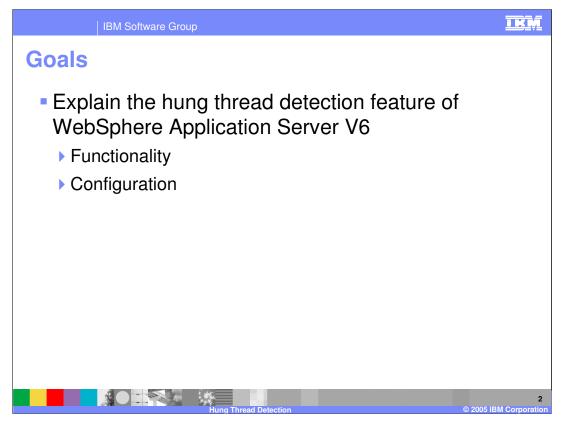
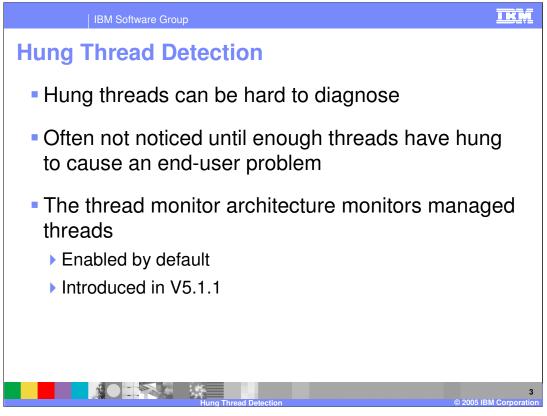


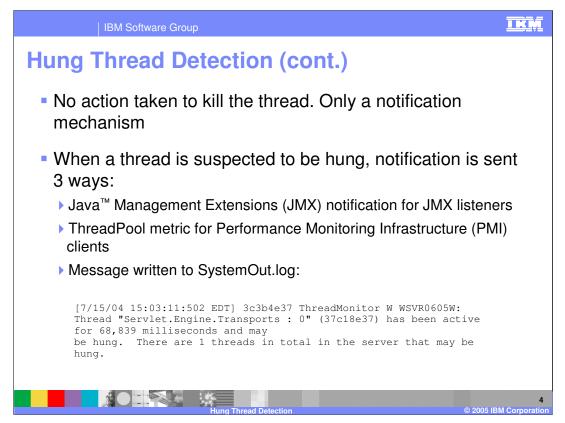
This presentation will focus on the hung thread detection feature of WebSphere Application Server V6.



The goal of this presentation is to explain how hung thread detection works in WebSphere Application Server V6, and how you can customize the hang detection policy.

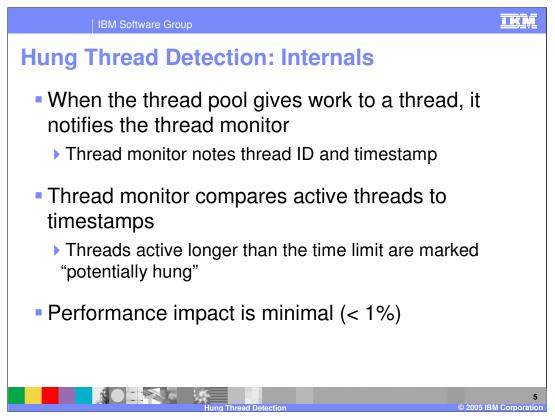


Hung threads have traditionally been hard to diagnose. This is usually because hung threads will go unnoticed until enough threads have hung to cause a problem for your users, such as an application not responding even though it appears to be running. The thread monitor architecture, which was introduced in version 5.1.1, monitors managed threads, meaning threads that belong to a thread pool, and issues a notification if it detects any hung threads. Threads created by application code cannot be monitored by the thread monitor.



The thread monitor doesn't try to deal with the hung threads, it just issues notifications, so that you can then take action to resolve the issue.

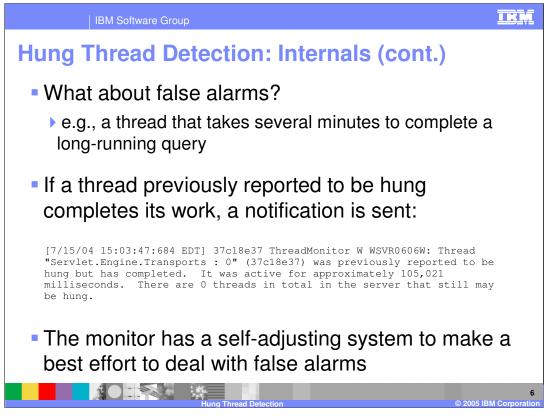
When a hung thread is detected, three notifications are sent: a JMX notification for JMX listeners, PMI Thread Pool data is updated for tools like the Tivoli[®] Performance Viewer, and a message is written to the SystemOut log to indicate the name and ID of the hung thread, as well as the time for which it has been hung.



When the thread pool issues work to a thread, it sends a notification to the thread monitor, which notes the thread ID and the time in a list.

At user-configurable intervals, the thread monitor looks at the active threads, and compares them to the list, to determine how long each thread has been active. If a thread has been active longer than the user-specified threshold, the thread is marked as "potentially hung", and the notifications are sent as discussed on the previous slide.

The performance impact of this monitoring is less than 1%.



It's possible that a thread could actually be running for longer than the specified threshold for legitimate reasons. For example, a thread could be executing a large database query that takes several minutes to return.

The thread monitor is built to recognize false alarms and adjust itself automatically. When a thread that was previously marked as "potentially hung" completes its work and exits, a notification is sent. After a certain number of false alarms, the threshold is automatically increased by 50% to account for these long-running threads. The idea is that if there are several threads that are routinely active for 20 minutes, the threshold will eventually adjust itself to be higher than 20 minutes, so as to not mark those threads as hung.

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Create custom properties on the application server:									
Property	Units	Default	Description						
com.ibm.websphere.threadmonitor.interval	secs.	180	interval at which the thread pools will be polled for hung threads						
com.ibm.websphere.threadmonitor.threshold	secs.	600	the length of time that a thread can be active before being marked as "potentially hung"						
com.ibm.websphere.threadmonitor.false.alar m.threshold	N/A	100	the number of false alarms that can occur before automatically increasing the threshold by 50%.						
 Can also be configure Information Center sho 			, 0						
	OWS a	n exam	ple of this						

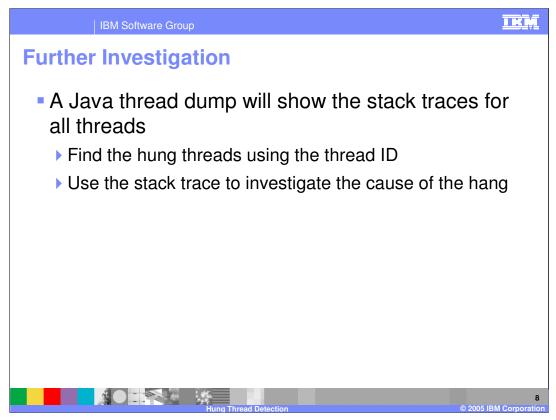
The hang detection policy can be configured by creating custom properties for the application server.

com.ibm.websphere.threadmonitor.interval is the interval at which the thread pools will be polled for hung threads (in seconds). It defaults to 180 seconds, which is 3 minutes.

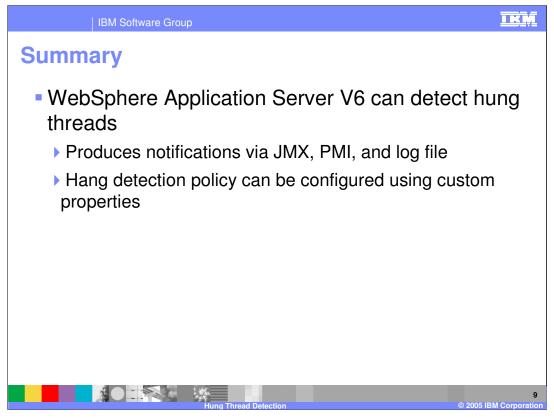
com.ibm.websphere.threadmonitor.threshold is the length of time that a thread can be active before being marked as "potentially hung". The default value is ten minutes.

com.ibm.websphere.threadmonitor.false.alarm.threshold is the number of false alarms that can occur before automatically increasing the threshold by 50%. The default value is 100. Automatic adjustment can be disabled altogether by setting this property to zero.

The application server must be restarted for these changes to take effect. To adjust the hang detection policy on the fly, use wsadmin. The WebSphere Application Server Information Center has detailed instructions on adjusting the policy with wsadmin.



After being notified of a hung thread problem, the most logical next step is to trigger a Java thread dump. Use the thread ID from the notification to find the hung thread in the dump, and use the stack trace information to begin investigating the cause of the problem.



In summary, this presentation has focused on the new hung thread detection feature of WebSphere Application Server V6. The thread monitor monitors thread pools in an Application Server and notifies you of hung threads via JMX, PMI, and the SystemOut.log file. The policy that governs the behavior of the thread monitor can be configured using custom properties.

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