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Event Driven Programming in Java – Part 2

Posted on December 3, 2014 by Arulkumaran Kumaraswamipillai — No Comments ↓

This extends the basic tutorial on **event driven programming in Java**. This tutorial covers **JMX enabling** the ***EventHub*** class vian *MBeans* and monitoring through JMX compliant tool like **jconsole**.

Step 1: Define the interface with the methods that are intractable via the JMX compliant client like jconsole.

```
package com.writtentest14;

public interface EventHubMBean {

 /**
  * Attributes
  */
```

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```
    long getEventCount();


    /**
     *   Operations
     */
    void fireEventById(String eventId);
}

```

Step 2: Define the implementation of the above interface. Note it extends ***StandardMBean*** from the Java management API.

```
package com.writtentest14;

import javax.management.StandardMBean;

public class StandardEventHubMBean extends Stand

    private EventHub eventHub;

    public StandardEventHubMBean(EventHub eventH
        super(EventHubMBean.class, false);
        this.eventHub = eventHub;
    }

    @Override
    public long getEventCount() {
        return this.eventHub.getEventCount();
    }

    @Override
    public void fireEventById(String eventId) {
        Event event = new Event(eventId);
        this.eventHub.fire(event);
    }

}

```

Step 3: Now, the revised EventHib with JMX enabled.

```
package com.writtentest14;

import java.lang.management.ManagementFactory;
import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.concurrent.ConcurrentHashMap;
import java.util.concurrent.ConcurrentMap;
import java.util.concurrent.CopyOnWriteArrayLis
import java.util.concurrent.atomic.AtomicLong;

import javax.management.MBeanServer;
import javax.management.MBeanServerFactory;
import javax.management.MalformedObjectNameExce
import javax.management.ObjectName;
```

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```

/**
 * register and unregister event listeners
 */

public class EventHub {

 private static final EventHub INSTANCE = creat

 private ConcurrentMap<String, List<EventListen

 private EventDispatcher synchronousDispatcher;

 private AtomicLong eventCount = new AtomicLong

 public EventHub() {
  registerMBean();
 }

 public static EventHub instance() {
  return INSTANCE;
 }

 public EventHub(EventDispatcher synchronousDis
  this.synchronousDispatcher = synchronousDispa
  registerMBean();
 }

 public long getEventCount() {
  return this.eventCount.get();
 }



 private long getNextEventNumber() {
  return this.eventCount.incrementAndGet();
 }

 protected EventDispatcher getSynchronousDispat
  return this.synchronousDispatcher;
 }

 public void setSynchronousDispatcher(EventDisp
  this.synchronousDispatcher = dispatcher;
 }

 public void fire(Event event) {
  dispatch(event, getSynchronousDispatcher());
 }


 public synchronized void addListener(String ev
  List<EventListener<Event>> listeners = this.r
  if (listeners != null) {
   listeners.add(listener);
  } else {
   listeners = new CopyOnWriteArrayList<EventLi
   listeners.add(listener);
   this.registeredListeners.put(eventId, listen
  }

 }


 public void removeListener(String eventId, Eve
  List<EventListener<Event>> listeners = this.r
```

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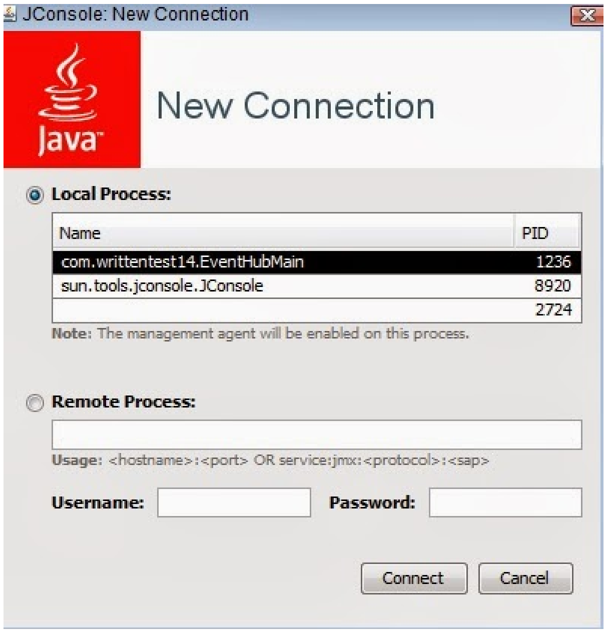
```
  if (listeners != null) {
   listeners.remove(listener);

  }
 }

 private void registerMBean() {
  MBeanServer server = getMBeanServer();
  StandardEventHubMBean mbean = new StandardEve
  try {
   server.registerMBean(mbean, getMBeanObjectNa
  } catch (Exception e) {
   e.printStackTrace();
  }

 }

 protected void dispatch(Event event, EventDisp
  getNextEventNumber();
  List<EventListener<Event>> listeners = getLis
  if (!listeners.isEmpty()) {

   dispatcher.dispatch(event, listeners);

  }
 }

  private static EventHub createInstance() {
         EventHub instance = new EventHub(new S
         return instance;
     }

 private List<EventListener<Event>> getListener
  List<EventListener<Event>> listeners = this.r
  return (listeners != null) ? listeners : Coll
 }

 private MBeanServer getMBeanServer() {
  ArrayList<MBeanServer> servers = MBeanServerF
  if (servers != null &amp;&amp; !servers.isEmp
   return (MBeanServer) servers.get(0);
  } else {
   // If it all fails, get the platform default
   return ManagementFactory.getPlatformMBeanSer
  }
 }

 private ObjectName getMBeanObjectName() {
  try {
   String name = "com.com.writtentest14:type=Ev
   return new ObjectName(name);
  } catch (MalformedObjectNameException e) {
   throw new RuntimeException(e);
  }
 }

}

```

Step 4: Run the *EveneHubMain* defined in part 1. Type ***jconsole*** from a DOS command prompt.



● Local Process:

Name	PID
com.writtentest14.EventHubMain	1236
sun.tools.jconsole.JConsole	8920
	2724

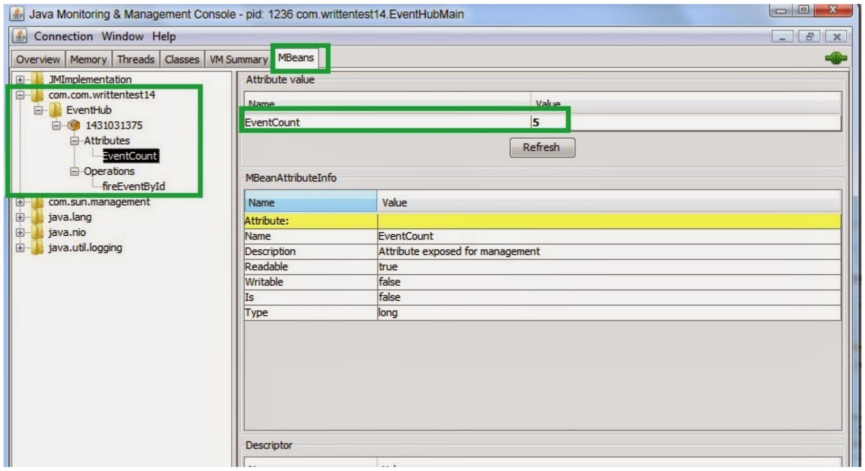
Note: The management agent will be enabled on this process.

○ Remote Process:

Usage: <hostname>:<port> OR service:jmx:<protocol>:<sap>

Username: Password:

Step 5: You can now view the attributes and operations defined in *EventHubMBean* interface. It displays the number of events processed.



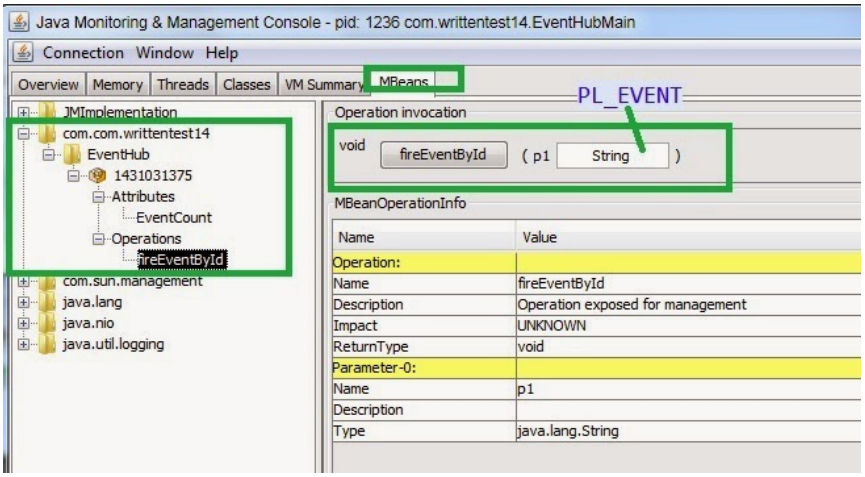
Attribute value

Name	Value
EventCount	5

MBeanAttributeInfo

Name	Value
Attribute:	
Name	EventCount
Description	Attribute exposed for management
Readable	true
Writable	false
Is	false
Type	long

Step 6: You can also fire an event by entering an event name and clicking on *fireEventById( )*.



Name	Value
Operation:	
Name	fireEventById
Description	Operation exposed for management
Impact	UNKNOWN
ReturnType	void
Parameter-0:	
Name	p1
Description	
Type	java.lang.String

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