Schedule Expression

Example schedule-expression can be browsed at https://github.com/apache/tomee/tree/master/examples/schedule-expression

In this example we exercise the `TimerService`.

> **NOTE** "The TimerService interface provides enterprise bean components with access to the container-provided Timer Service.

The EJB Timer Service allows entity beans, stateless session beans, and message-driven beans to be registered for timer callback events at a specified time, after a specified elapsed time, or after a specified interval."

For a complete description of the TimerService, please refer to the Java EE tutorial dedicated to the [Timer Service](http://docs.oracle.com/javaee/6/tutorial/doc/bnboy.html).

FarmerBrown

At `PostConstruct` we create 5 programmatic timers. First four will most likely not be triggered during the test execution, however the last one will timeout a couple of times.

Each timer contains an info attribute, which can be inspected at timeout.

```java
package org.superbiz.corn;

import javax.annotation.PostConstruct;
import javax.annotation.Resource;
import javax.ejb.Lock;
import javax.ejb.LockType;
import javax.ejb.ScheduleExpression;
import javax.ejb.Singleton;
import javax.ejb.Startup;
import javax.ejb.Timeout;
import javax.ejb.Timer;
import javax.ejb.TimerConfig;
import javax.ejb.TimerService;
import java.util.concurrent.atomic.AtomicInteger;

/**
 * This is where we schedule all of Farmer Brown's corn jobs
 *
 * @version $Revision$ $Date$
 */
@Singleton
@Lock(LockType.READ) // allows timers to execute in parallel
@Startup
```

```java
public class FarmerBrown {

    private final AtomicInteger checks = new AtomicInteger();

    @Resource
    private TimerService timerService;

    @PostConstruct
    private void construct() {
        final TimerConfig plantTheCorn = new TimerConfig("plantTheCorn", false);
        timerService.createCalendarTimer(new ScheduleExpression().month(5).dayOfMonth
("20-Last").minute(0).hour(8), plantTheCorn);
        timerService.createCalendarTimer(new ScheduleExpression().month(6).dayOfMonth
("1-10").minute(0).hour(8), plantTheCorn);

        final TimerConfig harvestTheCorn = new TimerConfig("harvestTheCorn", false);
        timerService.createCalendarTimer(new ScheduleExpression().month(9).dayOfMonth
("20-Last").minute(0).hour(8), harvestTheCorn);
        timerService.createCalendarTimer(new ScheduleExpression().month(10).
dayOfMonth("1-10").minute(0).hour(8), harvestTheCorn);

        final TimerConfig checkOnTheDaughters = new TimerConfig("checkOnTheDaughters",
false);
        timerService.createCalendarTimer(new ScheduleExpression().second("*").minute(
"*").hour("*"), checkOnTheDaughters);
    }

    @Timeout
    public void timeout(Timer timer) {
        if ("plantTheCorn".equals(timer.getInfo())) {
            plantTheCorn();
        } else if ("harvestTheCorn".equals(timer.getInfo())) {
            harvestTheCorn();
        } else if ("checkOnTheDaughters".equals(timer.getInfo())) {
            checkOnTheDaughters();
        }
    }

    private void plantTheCorn() {
        // Dig out the planter!!!
    }

    private void harvestTheCorn() {
        // Dig out the combine!!!
    }

    private void checkOnTheDaughters() {
        checks.incrementAndGet();
    }

    public int getChecks() {
```

```
        return checks.get();
    }
}
```

FarmerBrownTest

The test class acquires an instance from the context and waits for 5 seconds to give the timers a chance to timeout.

```
package org.superbiz.corn;

import junit.framework.TestCase;

import javax.ejb.embeddable.EJBContainer;
import javax.naming.Context;

import static java.util.concurrent.TimeUnit.SECONDS;

/**
 * @version $Revision$ $Date$
 */
public class FarmerBrownTest extends TestCase {

    public void test() throws Exception {

        final Context context = EJBContainer.createEJBContainer().getContext();

        final FarmerBrown farmerBrown = (FarmerBrown) context.lookup(
"java:global/schedule-expression/FarmerBrown");

        // Give Farmer brown a chance to do some work
        Thread.sleep(SECONDS.toMillis(5));

        final int checks = farmerBrown.getChecks();
        assertTrue(checks + "", checks > 4);
    }
}
```

Running

```
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running org.superbiz.corn.FarmerBrownTest
Apache OpenEJB 4.0.0-beta-1    build: 20111002-04:06
http://tomee.apache.org/
```

```
INFO - openejb.home = /Users/dblevins/examples/schedule-expression
INFO - openejb.base = /Users/dblevins/examples/schedule-expression
INFO - Using 'javax.ejb.embeddable.EJBContainer=true'
INFO - Configuring Service(id=Default Security Service, type=SecurityService,
provider-id=Default Security Service)
INFO - Configuring Service(id=Default Transaction Manager, type=TransactionManager,
provider-id=Default Transaction Manager)
INFO - Found EjbModule in classpath: /Users/dblevins/examples/schedule-
expression/target/classes
INFO - Beginning load: /Users/dblevins/examples/schedule-expression/target/classes
INFO - Configuring enterprise application: /Users/dblevins/examples/schedule-
expression
WARN - Method 'lookup' is not available for 'javax.annotation.Resource'. Probably
using an older Runtime.
INFO - Configuring Service(id=Default Singleton Container, type=Container, provider-
id=Default Singleton Container)
INFO - Auto-creating a container for bean FarmerBrown: Container(type=SINGLETON,
id=Default Singleton Container)
INFO - Configuring Service(id=Default Managed Container, type=Container, provider-
id=Default Managed Container)
INFO - Auto-creating a container for bean org.superbiz.corn.FarmerBrownTest:
Container(type=MANAGED, id=Default Managed Container)
INFO - Enterprise application "/Users/dblevins/examples/schedule-expression" loaded.
INFO - Assembling app: /Users/dblevins/examples/schedule-expression
INFO - Jndi(name="java:global/schedule-
expression/FarmerBrown!org.superbiz.corn.FarmerBrown")
INFO - Jndi(name="java:global/schedule-expression/FarmerBrown")
INFO -
Jndi(name="java:global/EjbModule481105279/org.superbiz.corn.FarmerBrownTest!org.superb
iz.corn.FarmerBrownTest")
INFO - Jndi(name="java:global/EjbModule481105279/org.superbiz.corn.FarmerBrownTest")
INFO - Created Ejb(deployment-id=org.superbiz.corn.FarmerBrownTest, ejb-
name=org.superbiz.corn.FarmerBrownTest, container=Default Managed Container)
INFO - Created Ejb(deployment-id=FarmerBrown, ejb-name=FarmerBrown, container=Default
Singleton Container)
INFO - Started Ejb(deployment-id=org.superbiz.corn.FarmerBrownTest, ejb-
name=org.superbiz.corn.FarmerBrownTest, container=Default Managed Container)
INFO - Started Ejb(deployment-id=FarmerBrown, ejb-name=FarmerBrown, container=Default
Singleton Container)
INFO - Deployed Application(path=/Users/dblevins/examples/schedule-expression)
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 6.141 sec

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
```