

Java Media Framework

some example code

Dave Price
Computer Science
University of Wales, Aberystwyth

SimpleControls.java

```
import java.awt.*;  
import java.awt.event.*;  
import java.net.URL;  
import java.net.MalformedURLException;  
import java.io.IOException;  
import javax.media.*;  
import javax.media.control.*;  
import javax.media.rtp.*;
```

```
public class SimpleControls extends Frame  
implements ControllerListener, ActionListener {  
  
    Player player = null;  
  
    Component visualComponent;  
    Component controlPanelComponent;  
  
    GainControl gainControl;  
    Component gainVisualComponent;  
  
    // a SUN Proprietary Control  
    Control jmdControl;  
    Component jmdVisualComponent;  
  
    String urlName; // name of file or url  
  
    Control [] playerControls;
```

```
    public static void main(String args []) {  
        SimpleControls first =  
            new SimpleControls("file:bluescreen2.mov");  
        first.commence();  
    }  
  
    public SimpleControls(String f) {  
        super("Simple Controls Example");  
        urlName = f;  
    }
```

```

public void commence() {

    /* give us a quit Button */

    Button quitButton = new Button("Quit");
    quitButton.addActionListener(this);
    add(quitButton, BorderLayout.WEST);

    /* make URL out of name supplied */

    URL url = null;
    try {
        url = new URL(urlName);
    } catch (MalformedURLException mue) {
        /* should deal with problem here */
    }
}

```

```

// Create an instance of a player for this media

try {
    player = Manager.createPlayer(url);
} catch (NoPlayerException e) {
    Fatal("Could not create player for "
        + url);
} catch (MalformedURLException e) {
    Fatal("Invalid media file URL!");
} catch (IOException e) {
    Fatal("IO exception creating player for "
        + url);
}

```

```

/* Now let's see what Control items this
   player supports */

playerControls = player.getControls();

if (playerControls.length == 0) {
    System.out.println("This player claims to"
        + " have no associated controls");
} else {
    System.out.println("This player has " +
        playerControls.length + " controls");
    for(int i=0; i < playerControls.length;i++) {
        System.out.println("This control's " +
            "toString gives: " +
            playerControls[i].getClass());
        whichControl( playerControls[i]);
    }
}

```

```

/* Add ourselves as a listener for a
   player's events */

player.addControllerListener(this);
pack();
setVisible(true);

// Ask the player to Realize

player.realize();
}

```

```

public synchronized void
    controllerUpdate(ControllerEvent event) {

    System.err.println("Listener called");

    if (event instanceof RealizeCompleteEvent) {
        System.err.println("RealizeCompleteEvent");

        // so we now know we can ask for
        // the visual component

        visualComponent =
            player.getVisualComponent();
        if (visualComponent != null ) {

            add(visualComponent, BorderLayout.CENTER);
        }
    }
}

```

```

// and get the control panel visual
// component too

controlPanelComponent =
    player.getControlPanelComponent();
if (controlPanelComponent != null ) {
    add(controlPanelComponent
        ,BorderLayout.SOUTH);
}

```

```

/* Here's an example of getting a control
   which has its own specific "get" method */

gainControl = player.getGainControl();
if (gainControl != null) {
    gainControl.setLevel(1.0F);
    System.out.println("Gain level set to " +
        gainControl.getLevel() );
    gainVisualComponent =
        gainControl.getControlComponent();
    if (gainVisualComponent != null) {
        add(gainVisualComponent, BorderLayout.EAST);
    } else {System.err.println(
        "Gain Control but no Visual Component");
    }
} else {
    System.err.println("No Gain Control");
}

```

```

/* Now I'll try to get Sun's proprietary
   component that shows me how the JMF
   has plugged the application together */

if ((jmdControl =
    player.getControl("com.sun.media.JMD"))
    != null) {
    System.err.println(
        "Found Sun's JMD Control");
    if ((jmdVisualComponent =
        jmdControl.getControlComponent()
        != null ) {
        add(jmdVisualComponent,
            BorderLayout.EAST);
    }
}

```

```

        pack();

    } else {
        System.err.println("Another Event " +
                           event.toString());
    }
}

```

```

/* from one of Sun's examples */

void Fatal (String s) {
    // Applications will make various choices about
    // what to do here. We print a message
    System.err.println("FATAL ERROR: " + s);
    throw new Error(s); // Invoke the uncaught
                        // exception handler
                        // System.exit() is another
                        // choice.
}

```

```

public void actionPerformed(ActionEvent e) {
    System.out.println(
        "He pressed the button");
    if (player != null) player.close();
    System.exit(0);
}

```

```

public void whichControl(Object c) {
    if ( c instanceof BitRateControl) {
        System.out.println("BitRateControl");
    } else if ( c instanceof BufferControl) {
        System.out.println("BufferControl");
    } else if (c instanceof CachingControl) {
        System.out.println("CachingControl");
    } else if (c instanceof ExtendedCachingControl){
        System.out.println("ExtendedCachingControl");
    } else if (c instanceof FormatControl) {
        System.out.println("FormatControl");
    } else if (c instanceof FrameGrabbingControl) {
        System.out.println("FrameGrabbingControl");
    } else if (c instanceof
                    FramePositioningControl){
        System.out.println("FramePositionControl");
    } else if (c instanceof FrameProcessingControl)
    { System.out.print("FrameProcessingControl");
}

```

```

} else if (c instanceof FrameRateControl) {
    System.out.print("FrameRateControl");
} else if (c instanceof GainControl) {
    System.out.println("GainControl");
} else if (c instanceof H261Control) {
    System.out.println("H261Control");
} else if (c instanceof H263Control) {
    System.out.println("H263Control");
} else if (c instanceof KeyFrameControl) {
    System.out.println("KeyFrameControl");
} else if ( c instanceof MonitorControl) {
    System.out.println("MonitorControl");
} else if (c instanceof MpegAudioControl) {
    System.out.println("MpegAudioControl");
} else if ( c instanceof PacketSizeControl) {
    System.out.println("PacketSizeControl");
}

```

```

} else if (c instanceof PortControl) {
    System.out.println("PortControl");
} else if (c instanceof QualityControl) {
    System.out.println("QualityControl");
} else if (c instanceof RTPControl) {
    System.out.println("RTPControl");
} else if ( c instanceof
    SilenceSuppressionControl){
    System.out.println(
        "SilenceSuppressionControl");
} else if ( c instanceof StreamWriterControl) {
    System.out.println("StreamWriterControl");
} else if (c instanceof TrackControl) {
    System.out.println("TrackControl");
} else
    System.out.println("***UnknownControl***");
}
}

```

jmf.log file from SimpleControls

```

# JMF Version 2.0
#

## Platform: SunOS, sparc, 5.7
## Java VM: Sun Microsystems Inc., 1.2

$$ Profile: instantiation: 39 ms

## Player created:
com.sun.media.content.unknown.Handler@8725d2
## using DataSource:
com.sun.media.protocol.file.DataSource@20e537

$$ Profile: parsing: 647 ms

```

```

## Building flow graph for:
file:bluescreen2.mov

## Building Track: 0
## Input: ima4, 44100.0 Hz, 16-bit, Stereo,
BigEndian, Signed, FrameSize=544 bits

## Building Track: 1
## Input: JPEG, 160x120, FrameRate=12.0,
Length=3574

```

Here's the completed flow graph:

```
com.sun.media.parser.video.QuicktimeParser@16986ed
  connects to:
com.ibm.media.codec.audio.ima4.JavaDecoder@1196dd3
  format: ima4, 44100.0 Hz, 16-bit, Stereo,
BigEndian, Signed, FrameSize=544 bits
  protocol: 1
```

```
com.ibm.media.codec.audio.ima4.JavaDecoder@1196dd3
  connects to:
com.sun.media.render.audio.JavaSoundRenderer@118
49cd
  format: LINEAR, 44100.0 Hz, 16-bit, Stereo,
BigEndian, Signed
  protocol: 3
```

```
com.sun.media.parser.video.QuicktimeParser@16986ed
  connects to:
com.sun.media.codec.video.jpeg.NativeDecoder@796a79
  format: JPEG, 160x120, FrameRate=12.0,
Length=3574
  protocol: 1
```

```
com.sun.media.codec.video.jpeg.NativeDecoder@796a79
  connects to:
com.sun.media.render.video.XLibRenderer@195376b
  format: RGB, 160x120, FrameRate=12.0,
Length=19200, 32-bit, Masks=255:65280:16711680,
LineStride=160, class [I
  protocol: 3
```

\$\$ Profile: graph building: 5793 ms

\$\$ Profile: realize, post graph building: 1093 ms

Computed latency for video: 779 ms

Script of running SimpleControls

Script started on Mon 20 Mar 2000 20:01:45 GMT
moin% java SimpleControls

```
Open log file: /dcs/dap/JAVA/JMF/jmf.log
This player has 2 controls
This control's toString gives: class
com.sun.media.MediaEngine$2
BitRateControl
This control's toString gives: class
com.sun.media.BasicJMD
***UnknownControl***
```

Listener called
Another Event
javax.media.TransitionEvent[source=com.sun.media.
.content.unknown.Handler@8725d2,previous=Unreali
zed,current=Realizing,target=Realized]
Listener called
Another Event
javax.media.DurationUpdateEvent[source=com.sun.m
edia.content.unknown.Handler@8725d2,duration=jav
ax.media.Time@1db741c
Listener called
RealizeCompleteEvent
Gain level set to 1.0
Gain Control but no Visual Component

Found Sun's JMD Control
Listener called
Another Event
javax.media.TransitionEvent[source=com.sun.media.c
ontent.unknown.Handler@8725d2,previous=Realized,cu
rrent=Prefetching,target=Started]
Listener called
Another Event
javax.media.PrefetchCompleteEvent[source=com.sun.m
edia.content.unknown.Handler@8725d2,previous=Prefe
tching,current=Prefetched,target=Started]
Listener called
Another Event
javax.media.StartEvent[source=com.sun.media.conten
t.unknown.Handler@8725d2,previous=Prefetched,curre
nt=Started,target=Started,mediaTime=javax.media.Ti
me@645831,timeBaseTime=javax.media.Time@1da18f7]
Listener called

Another Event
javax.media.EndOfMediaEvent[source=com.sun.media
.content.unknown.Handler@8725d2,previous=Started
,current=Prefetched,target=Prefetched,mediaTime=
javax.media.Time@19d17a5]
He pressed the button
Listener called
Another Event
javax.media.ControllerClosedEvent[source=com.sun
.media.content.unknown.Handler@8725d2]

WaitPlayer

```
import java.awt.*;  
import java.awt.event.*;  
import java.net.URL;  
import java.net.MalformedURLException;  
import java.io.IOException;  
import javax.media.*;  
import javax.media.control.*;
```

```

public class WaitPlayer extends Frame
implements ControllerListener, ActionListener {

    Player player = null;

    /* These next two variables are used to help
       the code that waits for specified states
       to be reached */

    Object waitSync = new Object();
    boolean stateTransitionOK = true;

    // visual component of player
    Component visualComponent;
    // visual control panel component
    Component controlPanelComponent;

```

```

// a SUN Proprietary Control
    Control jmdControl;
// a SUN Proprietary Control
    Component jmdVisualComponent;

    String urlName;
    // the name supplied for the file or url

    Control [] playerControls;

    /* Now a quit button and a rewind and
       play button */

    Button quitButton = new Button("Quit");
    Button rewindAndPlayButton =
        new Button("Rewind and Play");

```

```

    public static void main(String args []) {
        WaitPlayer first =
            new WaitPlayer("file:bluescreen2.mov");
        first.commence();
    }

    public WaitPlayer(String f) {
        super("Wait Player Example");
        urlName = f;
    }

```

```

    public void commence() {
        /* give us a quit Button */

        quitButton.addActionListener(this);
        add(quitButton, BorderLayout.WEST);

        /* give us a rewind and play
           again Button */
        rewindAndPlayButton.addActionListener(this);
        add(rewindAndPlayButton, BorderLayout.NORTH);

        /* make URL out of name supplied */
        URL url = null;
        try {
            url = new URL(urlName);
        } catch (MalformedURLException mue) {
        }
    }

```



```
// Create an instance of a player for this media
try {
    player = Manager.createPlayer(url);
} catch (NoPlayerException e) {
    Fatal("Could not create player for " +url);
} catch (MalformedURLException e) {
    Fatal("Invalid media file URL!");
} catch (IOException e) {
    Fatal("IO exception creating player for "
        + url);
}

// Add ourselves as a listener for a player's events

    player.addControllerListener(this);
```

```
// Ask the player to Realize
    player.realize();

/* Now just block until state reached */
    if ( waitForState(player.Realized) ) {
        // so we now know we can ask for
        // the visual component
        visualComponent=player.getVisualComponent();
        if (visualComponent != null ) {
            add(visualComponent, BorderLayout.CENTER);
        }
    }
// and get the control panel visual component
    controlPanelComponent =
        player.getControlPanelComponent();
    if (controlPanelComponent != null ) {
        add(controlPanelComponent
            ,BorderLayout.SOUTH);
    }
}
```

```
/* Now I'll try to get Sun's proprietary
component that shows me how the JMF has plugged
the application together */
if ((jmdControl =
    player.getControl("com.sun.media.JMD"))
    != null) {
    System.err.println(
        "Found Sun's JMD Control");
    if ((jmdVisualComponent =
        jmdControl.getControlComponent()) != null ) {
        add(jmdVisualComponent, BorderLayout.EAST);
    }
}
pack();
}

pack();
setVisible(true);
```

```
// Ask the player to prefetch and fill it's
// buffers etc

    player.prefetch();

// Now block and wait for that to prefetch
// to complete

    if ( waitForState(player.Prefetched) )
        System.err.println("Player now Prefetched");
    else
        System.err.println(
            "Player failed to Prefetch");

    }
```

```

/**
 * Block until the processor has transitioned
to the given state.
 * Return false if the transition failed.
 * This is taken from Sun's examples.
 */
boolean waitForState(int state) {
    synchronized (waitSync) {
        try {
            while (player.getState() != state
                    && stateTransitionOK)
                waitSync.wait();
        } catch (Exception e) {}
    }
    return stateTransitionOK;
}

```

```

/**
 * Controller Listener.
 * This is taken from Sun's examples.
 */
public void controllerUpdate(
        ControllerEvent evt) {

    if (evt instanceof ConfigureCompleteEvent ||
        evt instanceof RealizeCompleteEvent ||
        evt instanceof PrefetchCompleteEvent) {
        synchronized (waitSync) {
            stateTransitionOK = true;
            waitSync.notifyAll();
        }
    } else if (evt instanceof
        ResourceUnavailableEvent) {

```

```

        synchronized (waitSync) {
            stateTransitionOK = false;
            waitSync.notifyAll();
        }
    } else if (evt instanceof EndOfMediaEvent) {
        System.err.println("End of Media Reached");
    } else System.err.println(" Event raised was "
        + evt.getClass());
}

```

```

void Fatal (String s) {
    // Applications will make various choices about
    // what to do here. We print a message
    System.err.println("FATAL ERROR: " + s);
    throw new Error(s);
    // Invoke the uncaught exception
    // handler System.exit() is another
    // choice.

}

```

```
public void actionPerformed(ActionEvent e) {
/* So a button was pressed, check which one */
if ( e.getSource() == quitButton ) {
    System.out.println("He pressed the button");
    if (player != null) player.close();
        System.exit(0);
} else if(e.getSource()== rewindAndPlayButton ) {
/* make sure we are not started */
if (player.getState() != player.Started) {
    player.setMediaTime(new Time(0L)); //zero media t
    player.prefetch(); // prefetch the media
    if ( waitForState(player.Prefetched) ) {
        System.err.println("Player now Prefetched");
        player.start(); // and start
    } else System.err.println(
        "Player failed to Prefetch");
    }
}
}
```