Programmieren II

Dr. Klaus Höppner

Hochschule Darmstadt – Sommersemester 2010

JAXB

Javadoc

JAXB

JAXB ist die *Java API for XML Binding*. Diese Programmschnittstelle erlaubt,

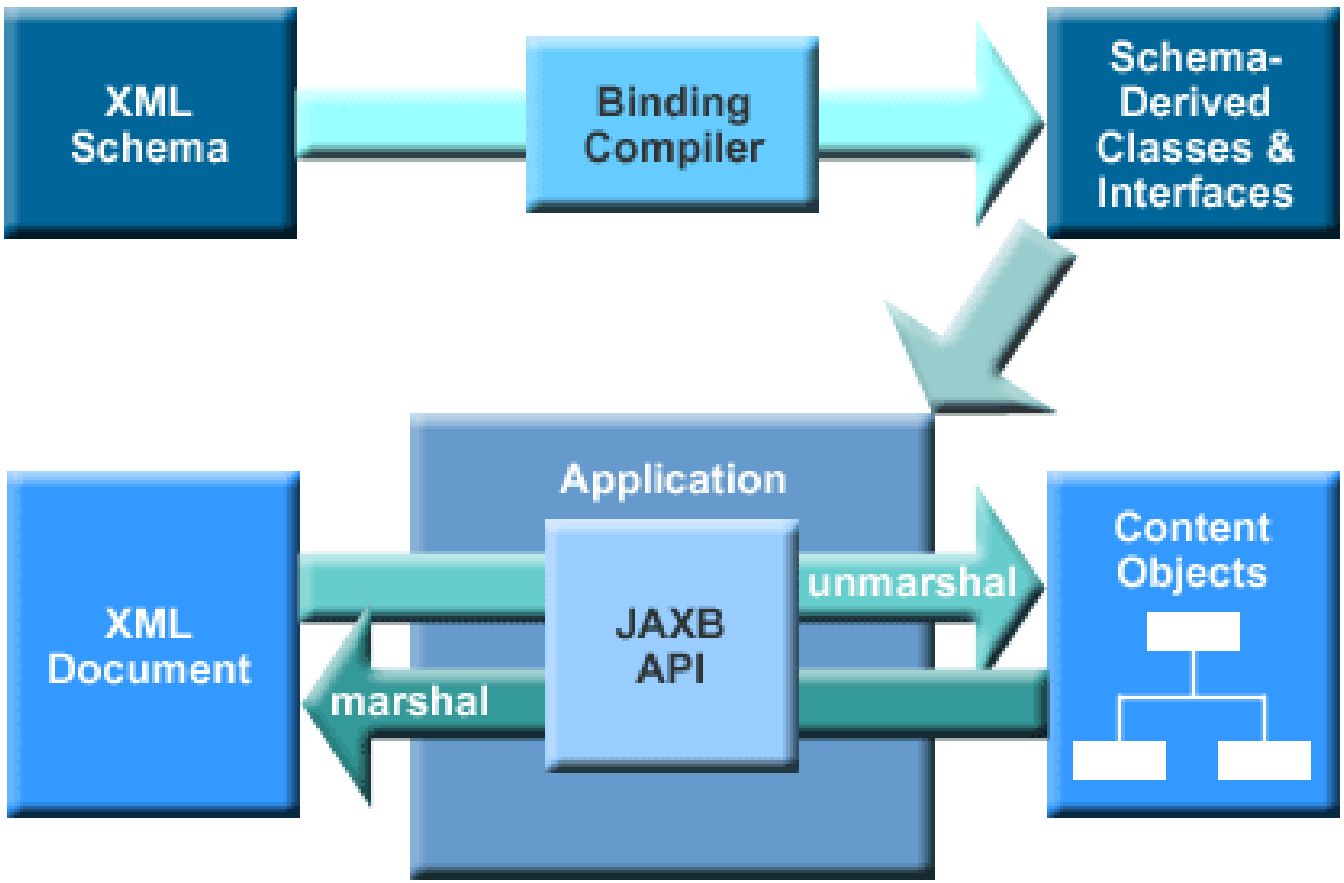
- Daten aus einer XML-Schema-Instanz heraus automatisch an Java-Klassen zu binden, und
- diese Java-Klassen aus einem XML-Schema heraus zu generieren.

JAXB ermöglicht auch den umgekehrten Weg, d. h. das Erstellen eines Schemas aus Java-Klassen (mit speziellen Annotationen).

Workflow

- Zunächst wird ein XML-Schema für die Daten erstellt (hier: `kontakt.xsd`)
- Dann wird mit dem Compiler `xjc` die entsprechende Klassenhierarchie erzeugt, z. B.
  `xtc -d src -p kontakt kontakt.xsd`
  erzeugt Java-Klassen zum Schema innerhalb des Paketes `kontakt`, das sich im Verzeichnis `src` befindet.
- Dort entstehen die Klassen `RootType` und `PersonType` mit entsprechenden Attributen, Gettern und Settern, die die komplexten Typen im Schema abbilden.
- Weiterhin wird eine Klasse `ObjectFactory` erzeugt, mit der neue Instanzen erzeugt werden können, die dann in XML abgebildet werden.

Schaubild


XML Schema
Binding Compiler
Schema-Derived Classes & Interfaces
Application
XML Document
JAXB API
unmarshal
marshal
Content Objects

Beispiel

```
import java.io.*;
import javax.xml.bind.JAXBContext;
import javax.xml.bind.JAXBException;
import javax.xml.bind.JAXBElement;
import javax.xml.bind.Unmarshaller;
import kontakt.*;

public class JAXBParser {
    public static void main(String[] args) {
        try {
            JAXBContext jc = JAXBContext.newInstance("kontakt");
            Unmarshaller u = jc.createUnmarshaller();
            JAXBElement<?> kElement =
                (JAXBElement<?>) u.unmarshal(
                        new FileInputStream("personen.xml"));
            RootType kontakte = (RootType) kElement.getValue();
```

Beispiel (Forts.)

```
            for (PersonType person : kontakte.getPerson()) {
                System.out.println(person.getNachname());
                System.out.println(person.getFirma());
                System.out.println(person.isVip());
            }
        } catch (JAXBException e) {
            e.printStackTrace();
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        }
    }
}
```

Javadoc

Javadoc dient der Generierung von API-Dokumentationen:

- Pakete
- Klassen
- Methoden mit
  - Parametern
  - Rückgabewert

anhand von *strukturierten Kommentaren* im Quelltext.

Kommentarformat

Javadoc-Kommentare haben die Form

```
/**
Javadoc-Kommentar
*/
```

Hierbei werden simple HTML-Tags innerhalb der Kommentare und bestimmte mit `@` beginnende Tags erkannt.

Tags

Tag	Wo
`@author`	Klasse, Interface
`@version`	Klasse, Interface
`@param`	Konstruktor, Methode
`@return`	Methode
`@exception/@throws`	Methode
`@see`	
`@since`	
`@deprecated`	

Beispiel

```
/**
 * Graphics is the abstract base class for all graphics contexts
 * which allow an application to draw onto components realized on
 * various devices or onto off-screen images.
 * A Graphics object encapsulates the state information needed
 * for the various rendering operations that Java supports.  This
 * state information includes:
 * <ul>
 * <li>The Component to draw on
 * <li>A translation origin for rendering and clipping coordinates
 * <li>The current clip
 * <li>The current color
 * <li>The current font
 * <li>The current logical pixel operation function (XOR or Paint)
 * <li>The current XOR alternation color
 *     (see <a href="#setXORMode">setXORMode</a>)
 * </ul>
 * <p>
 * Coordinates are infinitely thin and lie between the pixels of the
 * output device.
 * Operations which draw the outline of a figure operate by traversing
 * along the infinitely thin path with a pixel-sized pen that hangs
```

Beispiel

```
* down and to the right of the anchor point on the path.
* Operations which fill a figure operate by filling the interior
* of the infinitely thin path.
* Operations which render horizontal text render the ascending
* portion of the characters entirely above the baseline coordinate.
* <p>
* Some important points to consider are that drawing a figure that
* covers a given rectangle will occupy one extra row of pixels on
* the right and bottom edges compared to filling a figure that is
* bounded by that same rectangle.
* Also, drawing a horizontal line along the same y coordinate as
* the baseline of a line of text will draw the line entirely below
* the text except for any descenders.
* Both of these properties are due to the pen hanging down and to
* the right from the path that it traverses.
* <p>
* All coordinates which appear as arguments to the methods of this
* Graphics object are considered relative to the translation origin
* of this Graphics object prior to the invocation of the method.
* All rendering operations modify only pixels which lie within the
* area bounded by both the current clip of the graphics context
* and the extents of the Component used to create the Graphics object.
```

Beispiel

```
 *
 * @author      Sami Shaio
 * @author      Arthur van Hoff
 * @version     %I%, %G%
 * @since       1.0
 */
public abstract class Graphics {

    /**
     * Draws as much of the specified image as is currently available
     * with its northwest corner at the specified coordinate (x, y).
     * This method will return immediately in all cases, even if the
     * entire image has not yet been scaled, dithered and converted
     * for the current output device.
     * <p>
     * If the current output representation is not yet complete then
     * the method will return false and the indicated
     * {@link ImageObserver} object will be notified as the
     * conversion process progresses.
     *
     * @param img       the image to be drawn
     * @param x         the x-coordinate of the northwest corner
```

Beispiel

```
 *                  of the destination rectangle in pixels
 * @param y         the y-coordinate of the northwest corner
 *                  of the destination rectangle in pixels
 * @param observer  the image observer to be notified as more
 *                  of the image is converted.  May be
 *                  <code>null</code>
 * @return          <code>true</code> if the image is completely
 *                  loaded and was painted successfully;
 *                  <code>false</code> otherwise.
 * @see             Image
 * @see             ImageObserver
 * @since           1.0
 */
public abstract boolean drawImage(Image img, int x, int y,
                                  ImageObserver observer);


/**
 * Dispose of the system resources used by this graphics context.
 * The Graphics context cannot be used after being disposed of.
 * While the finalization process of the garbage collector will
 * also dispose of the same system resources, due to the number
```

Beispiel

```
 * of Graphics objects that can be created in short time frames
 * it is preferable to manually free the associated resources
 * using this method rather than to rely on a finalization
 * process which may not happen for a long period of time.
 * <p>
 * Graphics objects which are provided as arguments to the paint
 * and update methods of Components are automatically disposed
 * by the system when those methods return.  Programmers should,
 * for efficiency, call the dispose method when finished using
 * a Graphics object only if it was created directly from a
 * Component or another Graphics object.
 *
 * @see       #create(int, int, int, int)
 * @see       #finalize()
 * @see       Component#getGraphics()
 * @see       Component#paint(Graphics)
 * @see       Component#update(Graphics)
 * @since     1.0
 */
public abstract void dispose();

/**
```

Beispiel

```
     * Disposes of this graphics context once it is no longer
     * referenced.
     *
     * @see       #dispose()
     * @since     1.0
     */
    public void finalize() {
    dispose();
    }
}
```