Lotusphere2011
IBM Software

BP212 Deep Dive into IBM XPage Expression Language Syntax

Colin MacDonald | Senior Engineer | GBS
Karsten Lehmann | CEO | Mindoo GmbH

Smarter software for a Smarter Planet.

Agenda

- Setting the context, revise familiar old LotusScript
- Moving to the less familiar, are there similarities with XPages?
- Brief History – DNA of EL and XPages
- A closer look at Value Properties and EL
- EL Syntax
- Managed Beans

Agenda

- How do we use managed beans in XPages?
- Which interface do you serve?
- Demo
- Wrap-up
- Q & A
- Complimentary Sessions

Setting the context - Familiar

- Flashback to a pre-XPage world
- Configurable, highly dynamic pages were difficult
  - Feed the data as JSON/XML to the browser and use JavaScript to write the page.
  - Run a LotusScript agent to print HTML
- LotusScript Evaluate
  - Gave you the ability to take a STRING and evaluate code
  - Could be user driven data
- Use Cases
  - Content Management
  - Web based workflow

Show some LotusScript code

Setting the context - Unfamiliar

- We're assuming you know
  - XPages is a UI with underlying XML
  - XML → Java → Java Byte Code
  - You place UI Components and bind them to a data source
- XPages are really just a Java agent.
  - Emits HTML markup by printing to a stream
  - Executes code in events

Show XPage Java code

Setting the context – Unfamiliar continued

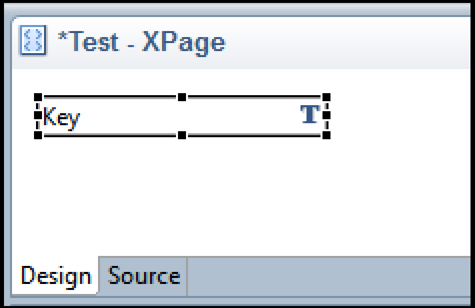
- We're assuming you know
  - XPages is a UI with underlying XML
  - XML ⟶ Java ⟶ Java Byte Code
  - You place UI Components and bind them to a data source
- XPages are really just a Java agent.
  - Emits HTML markup by printing to a stream
  - Executes code in events
- Evaluate == EL
  - @Formula
  - Addition of Server Side JavaScript
  - Includes base EL Syntax*

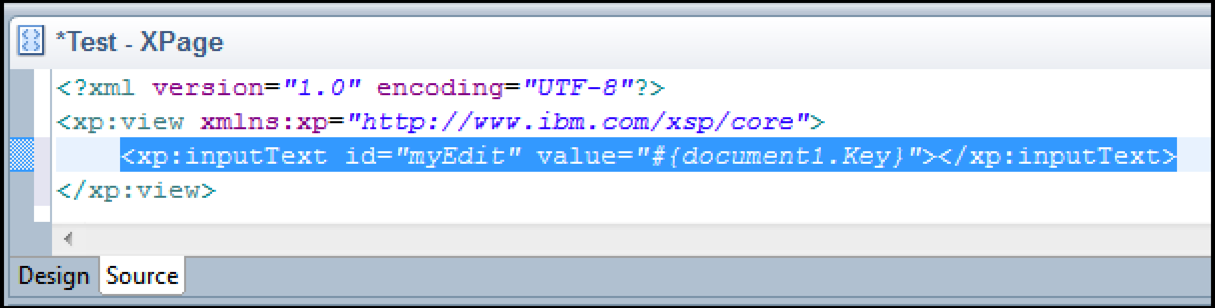
Introduction to Value Property and EL

- You should be familiar with the source tab of an XPage
  - Key to understanding XPage's JSF & JSP roots
  - It's all just XML → Strings
- You should be familiar with these already
  - Simple Data Bindings
  - Javascript
- You'd think we'd only be interested in EL in the Advanced Tab
  - Expression Language (EL) ← Is this the Jackpot?
  - Scoped Variable
  - Component Parameter
  - Custom

Introduction to Value Binding and EL

- Lets look at the XML Source for:
  - A Simple data binding
  - A Scoped Variable
  - Expression Language (EL)
- Why is it all the same?
  - Could it be because it's all EL under the hood?





```
<?xml version="1.0" encoding="UTF-8"?>
<xp:view xmlns:xp="http://www.ibm.com/xsp/core">
    <xp:inputText id="myEdit" value="#{document1.Key}"></xp:inputText>
</xp:view>
```

Lets take a look

So it is really just a STRING!

Brief History – DNA of EL and XPages
(explaining what and why)

- As the 20th Century drew to a close we had
  - Java Server Pages (JSP)
  - Standard Tag Library (STL or JSTL)
  - STL had Simplest Possible Expression Language (SPEL)
- By 2004 – 2005
  - JSP 2.0 with enhanced SPEL in JSR Review
  - Java Server Faces (JSF) was introduced and needed to extend SPEL
  - JSP and JSF aligned on a Unified Expression Language
- XPages is JSF under the hood
  - JSF 1.2 with some JSF 2.0 features
  - Plus all that Domino stuff

Lets look at the JSF EL Syntax

- #{expr} or ${expr}
  - # indicates dynamic
  - $ static after construction (on page load). i.e. more efficient
  - expr is a combination of literals, identifiers and operators
- Literals (derived from Java)
  - Boolean: true, false
  - Integer: As in Java
  - Floating point: As in Java
  - String: 'xyz' or “xyz”,
    - includes escaped characters \' \” \\
  - null
- Operators
  - Arithmetic: +, -, *, /, div, mod
  - Logical: and, &&, or, ||, not, !
  - Relational: ==, eq, !=, ne, <, lt, >, gt, <=, le, >=, ge
  - Conditional: A ? B : C

Lets look at some more of the JSF EL Syntax

- Not to be forgotten
  - Null check: empty (use as a unary operator to get a boolean return)
  - Type check: instanceof
- Identifiers
  - Implicit Objects available in JSF Framework
    - FacesContext
    - Param
    - Cookie
    - etc.

Lets take a look

(and see if that works in XPages)

Lets look at some more of the JSF EL Syntax

- Identifiers
  - Implicit Objects in JSF Framework (IBM)
  - Managed Beans <u>we</u> inject via faces-config.xml
- Properties of Identifiers
  - You can access properties of the bean using "." and "[ ]" notation
  - myBean.name → myBean.getName();
  - myBean["Phil"] → myBean.get("Phil");
  - myBean.addresses["home"].street → myBean.getAddresses().get("home").getStreet();
- So what are these beans?

Managed Beans

- What is a Bean
  - It's a Plain Old Java Object (POJO)
  - It's created and managed by the JSF Servlet
  - Can contain whatever you want
  - ANYTHING YOU CAN CODE!
- JSF uses Faces-Config.xml to control Managed Beans
  - It's an XML document that defines what Managed Beans are available
  - Controls the lifespan of the bean (application, session, request, view)

```
<?xml version="1.0" encoding="UTF-8"?>
<faces-config>
  <managed-bean>
    <managed-bean-name>JumpingBean</managed-bean-name>
    <managed-bean-class>com.sample.bean.JumpingBean</managed-bean-class>
    <managed-bean-scope>application</managed-bean-scope>
  </managed-bean>
</faces-config>
```

How do we do this in XPages?

- If you juggle you Eclipse Views, you get access to faces-config.xml
  - Add the Java Package Explorer view to your DDE Perspective
  - Look for WebContent/WEB-INF folder
- You have to add your Java files to a source folder inside the NSF
  - Add that source folder to the build path
  - Make sure you compile/build
- You should now have managed beans available in your XPages EL

Lets take a look

(at that working in XPages)

What interface do you serve?

- Java interfaces are an extremely powerful feature
  - No implementation, but defines a contract.
  - If your bean implements an interface:
    - It can be used by any code that understands that interface
    - The calling code only cares about the contract
    - Can implement multiple interfaces
- Why is this important?
  - The EL resolver is just a bit of Java code
  - It looks for beans that either conform to Java Get/Set Value Semantics
    - That's standard Java syntax and is found using reflection
  - OR, conforms to a supported interface
- So what interfaces are supported?
  - Java Map
  - XPages DataObject Interface
    - That's com.ibm.xsp.model.DataObject

What interface do you serve?

- So really, why is this important?
  - Dynamic Data API
  - Extensible & flexible
  - You really don't want to pre-populated a Map of all customers to do this
    - CustomerDB[“Phil”]

What interface do you serve?

```
package com.acme.demo.persondata;
import com.ibm.xsp.model.DataObject;

public class PersonData implements DataObject {

        public Class<?> getType(Object id) {
                // Return the type of class that id resolves to. Complex case could return Employee or Customer
                return Person.class;
        }

        public Object getValue(Object id) {
                // Retrieve a record from some store, based on id
                return null;
        }

        public boolean isReadOnly(Object id) {
                // You are free to implement your own, or rely on your underlying data store
                return false;
        }

        public void setValue(Object id, Object value) {
                // Store value in your data store using id
        }
}
```

Use Cases in the Demo

- Purchase Request
  - We will take a really classic Notes Application pattern
    - Table entry of line items
    - No embedded view element
    - Fields like Descrip_1 ... Descrip_n & Qty_1 … Qty_n
  - And show you how to implement an XPage version
    - No conversion of data necessary
    - Just add an XPage
- Resolution of client-side ID inside Repeat controls
  - Complex XPages produce identifiers like this:
    - view_1:somePanel_3:ID_4
    - Very Bad for client-side JavaScript
  - Fortunately EL is just string replacement, so we'll show you how.

Use Cases in the Demo

- Moving your application logic into back-end Java classes
  - Share code between multiple applications (NSF's)
    - Version control, Unit Tests
    - All the Java goodness
  - Separate UI development from back-end code development
    - Best Practice for large projects, skill-sets differ
    - Model View Controller pattern.
    - Logging can be integrated transparently
  - Opens door to other data stores and data providers
- Using Xpath in EL
  - Xpath is part of Domino today
  - We'll go over what you have to do to use it
- Can we extend EL beyond JavaScript?

Demo

Wrap-up

- EL is just String transformation.
  - Multi-layered like an onion
    - ${expr} at page load (construction)
    - #{expr} on page refresh (dynamic)
- Managed Beans open the door
  - Limited by your imagination
- Gone are the days of “Notes can't do that”!

Question and Answer Time

Complementary Sessions

- AD102 Hacking IBM Lotus Designer (Gently)
  - By Tim Tripcony and Maureen Leland
  - Take-away:
    - Minimum: A FacesConfig editor plugin.
    - Maximum: Techniques you can use to empower your XPage development.
- AD114 There and Back Again:
  Strategies for Re-factoring Notes Applications to XPages
  - By Nathan T. Freeman and Philippe Riande
  - Take-away: Turning classic into modern.
    - Armed with your improved EL knowledge and these strategies, you will be better able to answer the migration question.

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