XML is essential for huge corporate systems …. and for us

Using the Power of XML Personally

Lawrence Snyder
University of Washington, Seattle

Review ...

- Recall that XML is the land of tags so we can structure input separate from any processing application
- Three types of tags
  - Identity
  - Affinity
  - Collection

Our Plan For Today

- We'll explain how you can create personal XML software for a simple task of interest to you … we'll use a diary as an example
- Begin by thinking through the design
- Second Work A Simple Example
- Then Consider the Diary Problem

A Diary Of Travels

- One kind of diary is a travel record
- Kinds of info:
  - State name
  - What we did
  - A flag adds some interest
- Also need a title

Places I've Traveled

Washington State

The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!

Oregon

South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place. First, the University of Oregon's team is called the Ducks. Also, Mt. Bachelor is near the Sisters; with so many women around, why is it still a bachelor?
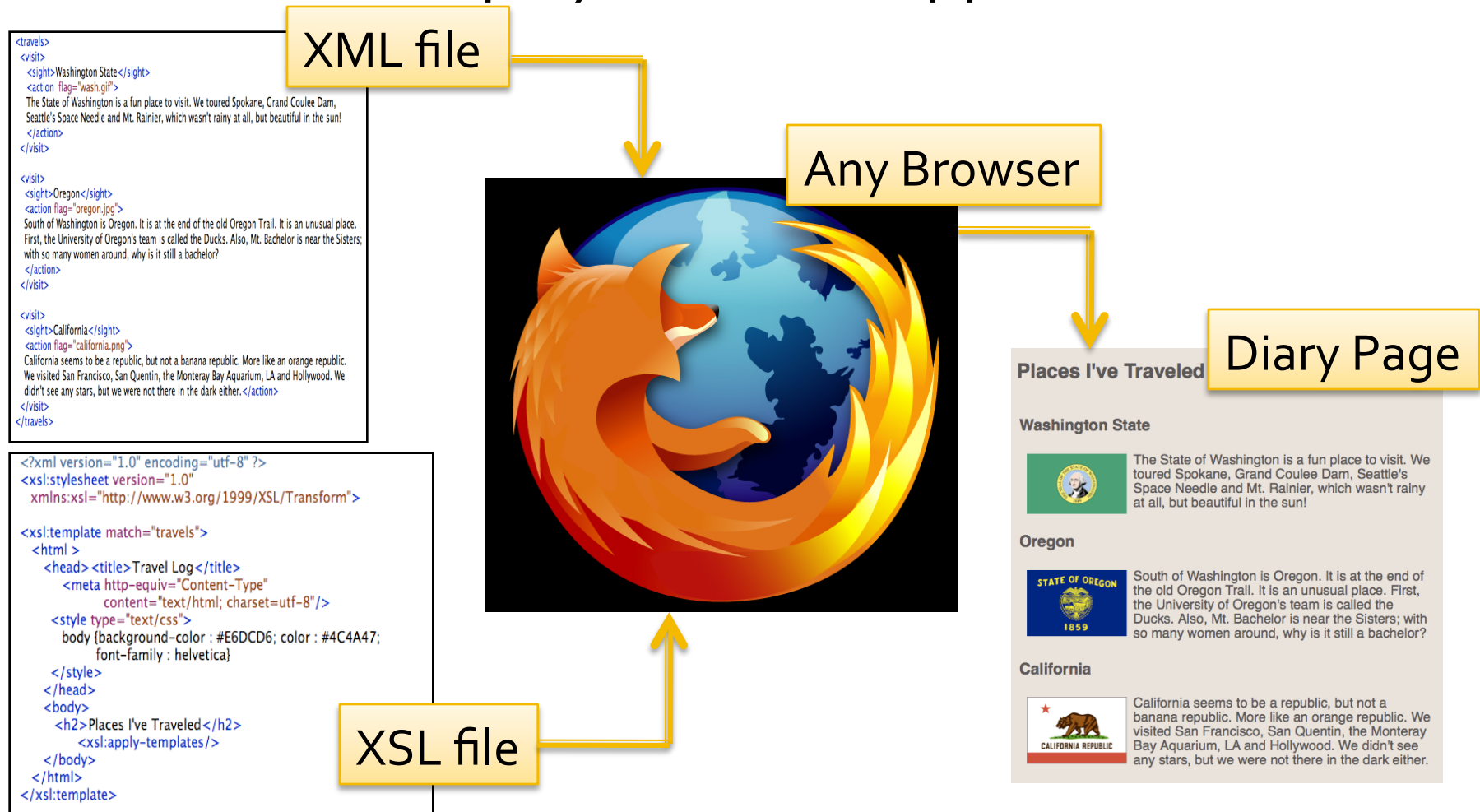
California

California seems to be a republic, but not a banana republic. More like an orange republic. We visited San Francisco, San Quentin, the Monteray Bay Aquarium, LA and Hollywood. We didn't see any stars, but we were not there in the dark either.

Big Picture of How This Works

- Here are the players in this application

XML file

Any Browser

Diary Page

XSL file

Building The XML File

- Use Tags As Usual … Notice Tag Uses

```xml
<travels>
  <visit>
    <sight>Washington State</sight>
    <action  flag="wash.gif">
    The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam,
    Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
    </action>
  </visit>

  <visit>
    <sight>Oregon</sight>
    <action flag="oregon.jpg">
    South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place.
    First, the University of Oregon's team is called the Ducks. Also, Mt. Bachelor is near the Sisters;
    with so many women around, why is it still a bachelor?
    </action>
  </visit>

  <visit>
    <sight>California</sight>
    <action flag="california.png">
    California seems to be a republic, but not a banana republic. More like an orange republic.
    We visited San Francisco, San Quentin, the Monteray Bay Aquarium, LA and Hollywood. We
    didn't see any stars, but we were not there in the dark either.</action>
  </visit>
</travels>
```

Processing The File

- For this application, "processing" the file means displaying it on the screen
  - We use a browser to display XML tagged content
  - Here's how ---
    - For each tag, we say what HTML we want, using "XSL"
    - Put those definitions into a file (they're called **templates**)
    - Put directions at the top of the XML definition telling it where to find the definitions file
    - "Run" the XML in Firefox or other browser ... it does all the rest!

Just Do It!

XSL: Extensible Markup Language

- XSL is "processing" markup language for XML … and (of course) it's written in XML
- Let's take a look

```xml
<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="travels">
  <html >
    <head><title>Travel Log</title>
      <meta http-equiv="Content-Type"
            content="text/html; charset=utf-8"/>
    <style type="text/css">
      body {background-color : #E6DCD6; color : #4C4A47;
            font-family : helvetica}
    </style>
    </head>
    <body>
      <h2>Places I've Traveled</h2>
        <xsl:apply-templates/>
    </body>
  </html>
</xsl:template>
```

The Rest of XSL Definition

- This is the remainder of the Travel Log XSL

```
<xsl:template match="visit">
  <table width="500">
    <xsl:apply-templates/>
  </table>
</xsl:template>

<xsl:template match="sight">
  <tr><td><h3>
    <xsl:apply-templates/></h3>
  </td></tr>
</xsl:template>

<xsl:template match="action">
 <tr><td style="text-size:xsmall; padding-left:10px">
    <img src="{@flag}"  alt="Flag of Location" width="120"
         style="float:left; padding-right:8px"/>
  <xsl:apply-templates/>
 </td></tr>
</xsl:template>

</xsl:stylesheet>
```

XSL is just a lot of tags

Take A Look At XSL Structure

- A browser can show the hierarchy tree of a file written in XML ... the XSL file is one
- The travelLogSS.xsl file
- The XML file xmlXSL/travelLog.xml

XSL: Extensible Markup Langauge

- Just looking at XSL, it seems very complicated because it mixes its own tags with HTML tags

```
<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
    xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
```

Standard header text ... must be first in XSL file

```
<xsl:template match="travels">
<html >
    <head><title>Travel Log</title>
        <meta http-equiv="Content-Type"
                content="text/html; charset=utf-8"/>
    <style type="text/css">
        body {background-color : #E6DCD6; color : #4C4A47;
            font-family : helvetica}
    </style>
    </head>
    <body>
        <h2>Places I've Traveled</h2>
            <xsl:apply-templates/>
    </body>
</html>
</xsl:template>
```

Here's how to say what XML tag this definition is for

HTML in here

Important tag, to be explained next

Now, Let's Just Do It

- So, we build the skeleton of the XSL with our text editor

```
travelLogSS.xsl          (no symbol selected)

<?xml version="1.0" encoding="utf-8" ?>
<xsl:stylesheet version="1.0"
    xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="travels">
    <xsl:apply-templates/>
</xsl:template>

<xsl:template match="visit">
    <xsl:apply-templates/>
</xsl:template>

<xsl:template match="sight">
    <xsl:apply-templates/>
</xsl:template>

<xsl:template match="action">
    <xsl:apply-templates/>
</xsl:template>

</xsl:stylesheet>
```

standard header - copy

"apply-templates" tag says "style inner stuff"

Say how to style each XML tag

All that's left is HTML

Top-level Tag: <travels>

- The "root tag" needs to style the main page

```
<xsl:template match="travels">
    <xsl:apply-templates/>
</xsl:template>
```

```
<xsl:template match="travels">
  <html >
    <head><title>Travel Log</title>
        <meta http-equiv="Content-Type"
              content="text/html; charset=utf-8"/>
      <style type="text/css">
        body {background-color : #E6DCD6; color : #4C4A47;
              font-family : helvetica}
      </style>
    </head>
    <body>
      <h2>Places I've Traveled</h2>
        <xsl:apply-templates/>
    </body>
  </html>
</xsl:template>
```

```
<travels>
 <visit>
  <sight>Washing
  <action  flag="wa
  The State of Washi
  Seattle's Space Need
  </action>
```

"style inner stuff"

Continue For Other Tags

```
<xsl:template match="visit">
    <xsl:apply-templates/>
</xsl:template>
```

```
<xsl:template match="visit">
  <table width="500">
      <xsl:apply-templates/>
  </table>
</xsl:template>
```

```
<xsl:template match="sight">
    <xsl:apply-templates/></h3>
</xsl:template>
```

```
<xsl:template match="sight">
  <tr><td><h3>
      <xsl:apply-templates/></h3>
  </td></tr>
</xsl:template>
```

Grab the Attribute Value

- When we have an attribute like

  <action flag="wash.gif">

  we grab the value using a very odd syntax

  <img src="{@flag}" …

```
<xsl:template match="action">
 <tr><td style="text-size:xsmall; padding-left:10px">
    <img src="{@flag}"  alt="Flag of Location" width="120"
         style="float:left; padding-right:8px"/>
 <xsl:apply-templates/>
 </td></tr>
</xsl:template>
```

Linking to XSL

- To make this all happen, we go to the XML and link it to the XSL file

  - Add two "boiler plate" encoding lines (just copy)

  - Make href point to the XSL file

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="travelLogSS.xsl"?>
```

```
<travels>
 <visit>
   <sight>Washington State</sight>
   <action  flag="wash.gif">
   The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam,
   Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!
   </action>
 </visit>

 <visit>
  <sight>Oregon</sight>
```

Ta Dah!

We have an app! … open XML file with Firefox

Places I've Traveled

Washington State

The State of Washington is a fun place to visit. We toured Spokane, Grand Coulee Dam, Seattle's Space Needle and Mt. Rainier, which wasn't rainy at all, but beautiful in the sun!

Oregon

South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place. First, the University of Oregon's team is called the Ducks. Also, Mt. Bachelor is near the Sisters; with so many women around, why is it still a bachelor?

California

California seems to be a republic, but not a banana republic. More like an orange republic. We visited San Francisco, San Quentin, the Monteray Bay Aquarium, LA and Hollywood. We didn't see any stars, but we were not there in the dark either.

Now, Add to Data As Needed

- The Travel Log app is done; we don't expect to write more XSL, except to restyle something
- Just add to XML file

Oregon

South of Washington is Oregon. It is at the end of the old Oregon Trail. It is an unusual place. First

```
<visit>
<sight>Alaska</sight>
<action flag="ak.png">
Alaska is kind of hard to describe -- it is enormous. We visited Anchorage,
of course, but we also saw Denali (Mt. McKinley), where we saw grizzly bears. In Fairbanks
on the summer solstice, we saw the Midnight Sun Baseball game -- no lights, just sunshine!
</action>
</visit>
```

Alaska

Alaska is kind of hard to describe -- it is enormous. We visited Anchorage, of course, but we also saw Denali (Mt. McKinley), where we saw grizzly bears. In Fairbanks on the summer solstice, we saw the Midnight Sun Baseball game -- no lights, just sunshine!

Done

Adding More KINDS of Data

- What about the pictures???
- Add an XML picture tag … like HTML, it will be self-terminating; needs styling XSL, too

- `<pic name="im/mtrainier.jpg" />` goes in XML
- `<xsl:template match="pic">` goes in XSL
  ```
  <img src="{@name}"
          alt="Travel pic" width="500"/>
  </xsl:template>
  ```

- Place `<pic>` tags inside of `<action>` tags

Adding More XML

- Suppose our travels take us to Chicago ... we have two options:
  - Treat Chicago like any a state sight – it has a flag, for example

  - Add a new kind of visit, maybe a <tour> that is similar to <action> but is used for cities; it can have different attributes, like sports_team="Cubs"
- Additional XML means more XSL is needed at the start

Assignment 17

- Same thing