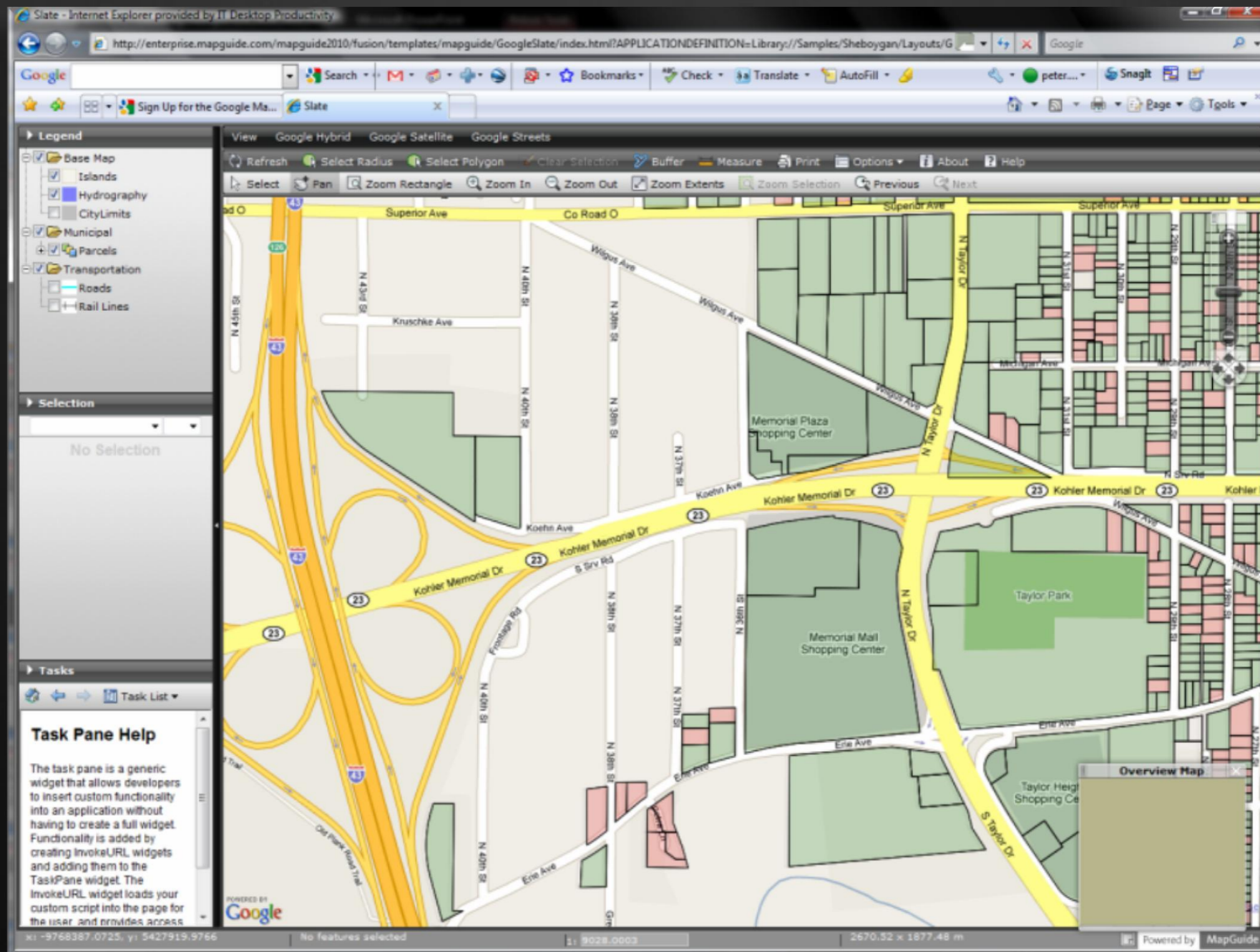


Chapter 7: Fusion API introduction

Flexible web layout

Fusion viewer / Flexible web layout



What is Fusion?

- A web-mapping application development framework
- Built primarily in JavaScript.
- Based on the Openlayers, easy to extend
- Using widgets, standard-compliant HTML and CSS.
- No plug-ins and works in all major browsers
- **Flexible Layouts** inside Autodesk Infrastructure Studio

<http://trac.osgeo.org/fusion/>

Fusion Capabilities

- Dynamic application generation from ApplicationDefinition resource and an HTML template
- Supports MapGuide Tiles and Untiled overlays
- Internationalization support
- Authentication integration
- Functional parity with the AJAX viewer

Components of Fusion

- Core
 - Platform-independent (entirely javascript)
 - Provides main API for building applications
 - OpenLayers (www.openlayers.org)
- Widgets
 - Discrete, independent functionality (zoom, pan, ...)
 - Plug-'n-play (zero programming)
- UI Library
 - Jx provides common application building blocks
 - Tabs, Menus, Buttons etc ...
 - Prototype, Scriptaculous
- Platform-specific plugins
 - MapGuide, MapServer, OGC, and potentially others

Fusion Developers are:

1. Web designers

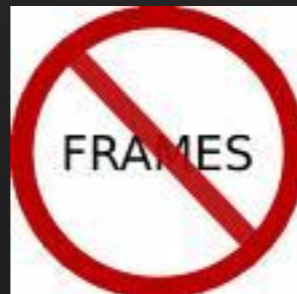
- Work in DreamWeaver, other HTML editor
- Use HTML, CSS, minimal javascript
- Concerned primarily with aesthetics, layout, look and feel, usability

2. Web developers

- Work in favorite IDE (Zend, text editor)
- Use JavaScript, PHP, ASP .NET, JSP
- Concerned with functionality

Why Fusion?

- The AJAX viewer is:
 - not flexible
 - frames based
 - difficult to customize functionality
 - difficult to modify layout



Creating a Fusion Application

- Fusion needs two things to make an application:
 1. An XML Application Definition
 - Typically ApplicationDefinition.xml
 2. An HTML web page
 - called a Template in the docs

Application Definition

- New resource type for MGOS/AIMS
- Structured XML similar to WebLayout
- Major blocks:
 - MapSet - lists maps available to the application
 - WidgetSet - relates widgets to a map
- Widgets
 - Are the control block for a widget
 - Name tag is where the widget goes
 - Type tag identifies the widget to use

Templates

- A template is just an HTML file
- ***Should*** have a valid doctype
- `<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">`
- Uses 'id' of tags to identify where widgets go
- *Any* tag will do
 - div, span, a, li are commonly used
- Includes fusion.js
- Calls Fusion.initialize()

Example of a Template

- `<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">`
- `<html>`
- `<head>`
- `<title>Simple Fusion Application</title>`
- `<script type="text/javascript" src="../../lib/fusion.js"></script>`
- `<script type="text/javascript">`
- `window.onload = function() { Fusion.initialize(); }`
- `</script>`
- `</head>`
- `<body>`
- `<div id="ZoomIn"></div>`
- `<div id="Map"></div>`
- `</body>`
- `</html>`

How does it Work?

- Load ApplicationDefinition.xml
- Loop through WidgetSet/Widget and
 - Find elements by ID using Widget Name
 - Request widget JavaScript file
- Load widget JavaScript files
- Load widget dependencies
- Create widgets
- Create a Session

Fusion Widgets

- Navigation & Map State
 - Zoom, Pan, Legend, Layer Manager, Extent History, Overview Map
- Selection
 - Rectangle, circle, polygon
- Info
 - Cursor Position, MapTips, Scale, etc
- Tasks
 - Buffer, Search, InvokeURL, About, Help, ...

Jx

- JavaScript-based UI library
- Open Source (MIT) www.jxlib.org
- Cross-browser compatible
- Provides basic building blocks for creating applications

Button

Toolbar

Tab

Panel

Grid

Menu

Color

Layout

Splitter

Tree

Using Jx in Fusion

- Fusion uses:
 - Toolbar
 - Button
 - Menu
 - Tree
 - Layout
- Application can use any Jx component to build the look and feel

Customizing Jx

- Jx components use
 - Simple, semantic HTML structures
 - UL, LI, A, DIV, SPAN, IMG
 - Tables are only for tabular data!
 - CSS 2 for presentation
 - CSS is 'hack' free
 - May use browser-specific stylesheets (IE)
- Change entire look and feel through a single CSS style sheet (500-600 lines)

Jx Builds On

- Prototype
 - www.prototypejs.org
 - Javascript framework for class-driven development in an AJAX environment
- Scriptaculous
 - script.aculo.us
 - Javascript visual effects library built on Prototype
 - Animation, drag-n-drop, ajax controls ...

OpenLayers

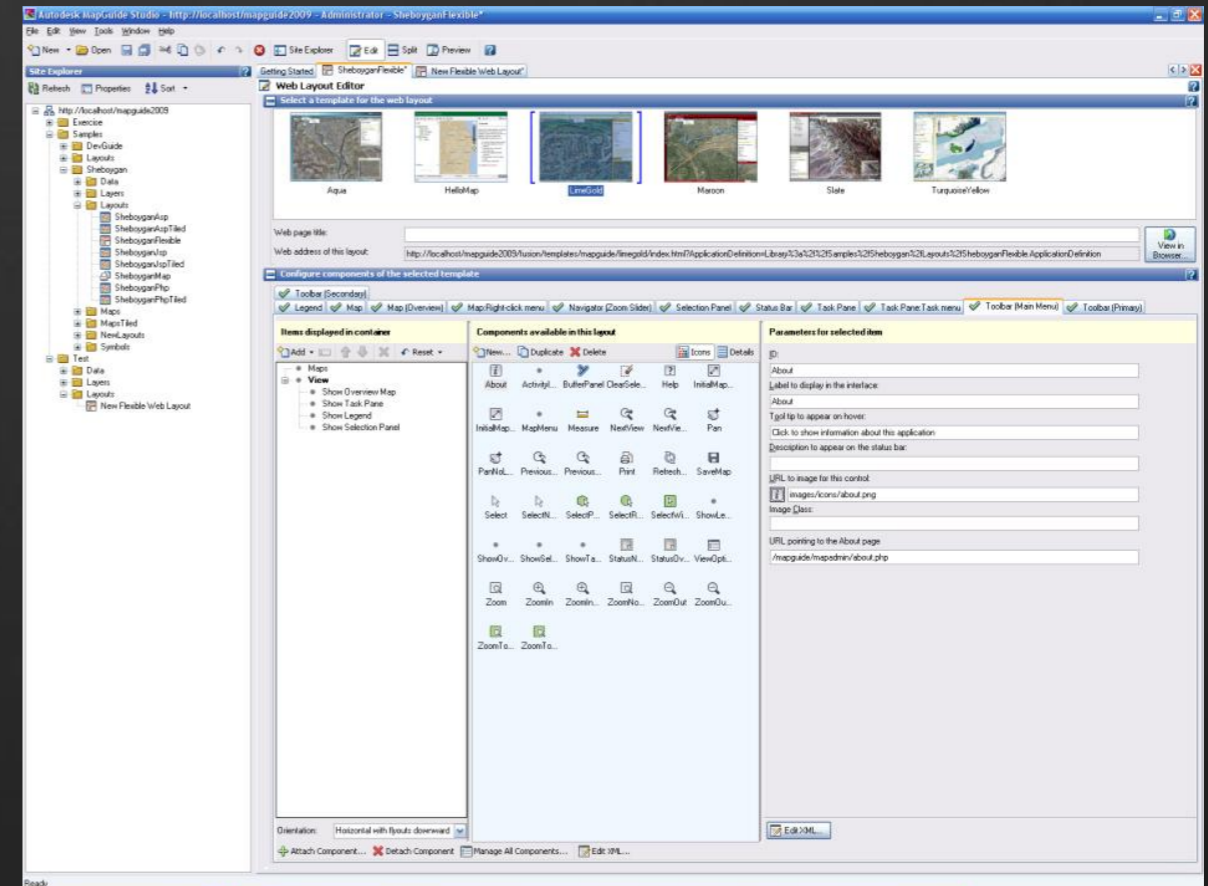
- www.openlayers.org
- OpenLayers is a javascript framework for creating tiled and untiled maps
- Unique layering system allows combining many different map sources in a single map view
- Advanced 'Mashup' capability
- Active development community

Major Fusion API Components

- **ApplicationDefinition**
- CSS (Cascading Style Sheet)
- <DIV> Skeleton
- Jx JavaScript Functions

Flexible Layout Editor

- Layout editor for Fusion viewer
- Determine viewer's features and contents
- Does NOT determine the look and feel
- Generate ApplicationDefinition XML



Map Tab

✓ Toolbar (Secondary) ✓ Legend ✓ Map ✓ Map (Overview) ✓ Map:Right-click menu ✓ Navigator (Zoom Slider) ✓ Selected

Map resource used in this layout:

Library://Samples/Sheboygan/Maps/Sheboygan.MapDefinition

Right-click menu

MapRightClickMenu

Initial view of the map:

☒ Use map's initial view

☐ Use custom view

Center: X: 0.000000

Y: 0.000000

Zoom to: 1: 0.000000

Set to current map zoom

Edit Map Groups...

Edit Map Groups...

Set to current map zoom

MapSet XML

```
<?xml version="1.0" encoding="utf-8"?>
<MapSet xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <MapGroupType id="MgMainMapId">
    <Map>
      <Type>MapGuide</Type>
      <SingleTile>true</SingleTile>
      <Extension>
        <ResourceId />
      </Extension>
    </Map>
    <Extension />
  </MapGroupType>

  <MapGroupType id="Sheboygan">
    <Map>
      <Type>MapGuide</Type>
      <SingleTile>true</SingleTile>
      <Extension>
        <ResourceId>Library://Samples/Sheboygan/Maps/Sheboygan.MapDefinition
      </ResourceId>
      </Extension>
    </Map>
    <Extension />
  </MapGroupType>
</MapSet>
```

Task Menu Tab

☒ Toolbar (Secondary)
 ☒ Legend
 ☒ Map
 ☒ Map (Overview)
 ☒ Map:Right-click menu
 ☒ Navigator (Zoom Slider)
 ☒ Selection Panel
 ☒ Status Bar
 ☒ Task Pane
 ☒ Task Pane:Task menu

Items displayed in container

Add
Reset

- Buffer
- Measure
- List Selected Features

Components available in this layout

New...
Duplicate
Delete
Icons
Details

ID	Type	Referenced By
About	About	Map:Right-click menu
BufferPanel	Buffer Panel	Toolbar (Primary), Map
ClearSelection	Clear Selection	Toolbar (Primary), Map
Help	Help	Map:Right-click menu
InitialMapView	Initial Map View	Toolbar (Secondary), M
InitialMapViewNoL...	Initial Map View	Toolbar/Vertical
ListSelection	Invoke URL	Task Pane:Task menu
MapMenu	Map Menu	
Measure	Measure	Toolbar (Primary), Map
NextView	Extent History	Toolbar (Secondary), M
NextViewNoLabel	Extent History	Toolbar/Vertical
Pan	Pan	Toolbar (Secondary), M
PanNoLabel	Pan	Toolbar/Vertical
PreviousView	Extent History	Toolbar (Secondary), M
PreviousViewNoL...	Extent History	Toolbar/Vertical
Print	Print	Toolbar (Primary)
RefreshMap	Refresh Map	Toolbar (Primary), Map
SaveMap	Save Map	
Select	Select	Toolbar (Primary), Tool
SelectNoLabel	Select	Toolbar/Vertical
SelectPolygon	Select Polygon	Map:Right-click menu

Parameters for selected item

ID:

About

Label to display in the interface:

About

Tool tip to appear on hover:

Click to show information about this application

Description to appear on the status bar:

URL to image for this control:


 images/icons/about.png

Image Class:

URL pointing to the About page

/mapguide/mapadmin/about.php

Task Menu XML

```
<?xml version="1.0" encoding="utf-8"?>
<UiltemContainerType xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <Name>TaskMenu</Name>
  <Type>ContextMenu</Type>
  <Position>top</Position>
  <Extension />
  <Item xsi:type="WidgetItemType">
    <Function>Widget</Function>
    <Widget>BufferPanel</Widget>
  </Item>
  <Item xsi:type="WidgetItemType">
    <Function>Widget</Function>
    <Widget>Measure</Widget>
  </Item>
  <Item xsi:type="WidgetItemType">
    <Function>Widget</Function>
    <Widget>ListSelection</Widget>
  </Item>
</UiltemContainerType>
```

Widget Editor - ShowOverviewMap

✓ Selection Panel

✓ Status Bar

✓ Task Pane

✓ Task Pane: Task menu

Toolbar (Main Menu)

✓ Toolbar (Primary)

Icons

Details

Extent History

Extent History

Invoke Script

Invoke Script

Invoke URL

Map Menu

Refresh Map

Save Map

Select Within

View Options

Zoom on Click

Zoom on Click

Parameters for selected item

ID:

ShowOverviewMap

Label to display in the interface:

Show Overview Map

Tool tip to appear on hover:

Display the overview map window

Description to appear on the status bar:

URL to image for this control:

Image Class:

Script to invoke:

showOverviewMap()

ShowOverviewMap XML


```
<?xml version="1.0" encoding="utf-8"?>
<UiWidgetType xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">


  <Name>ShowOverviewMap</Name>
  <Type>InvokeScript</Type>
  <Location />
  <Extension>
    <Script>showOverviewMap()</Script>
    <Target />
  </Extension>
  <ImageUrl />
  <ImageClass />
  <Label>Show Overview Map</Label>
  <Tooltip>Display the overview map window</Tooltip>
  <StatusText />
  <Disabled>false</Disabled>
</UiWidgetType>
```


Widget Editor - ListSelection


Icons


Details


Extent History


Extent History


Invoke Script


Invoke Script


Invoke URL


Map Menu


Refresh Map

Save Map

Select Within

View Options

Zoom on Click

Zoom on Click

ID:
ListSelection

Label to display in the interface:
List Selected Features

Tool tip to appear on hover:
List Selected Features

Description to appear on the status bar:
List Selected Features





URL to image for this control:
 images/icons/invoke-url.png

Image Class:

URL to invoke:
ListSelectionTask.aspx


Pass in these additional parameters with the URL:
 Add  Remove

Key	Value
-----	-------

Use only these layers:
All Layers 

☒ Disable command if nothing is selected

Target:
Task Pane

 Edit XML...

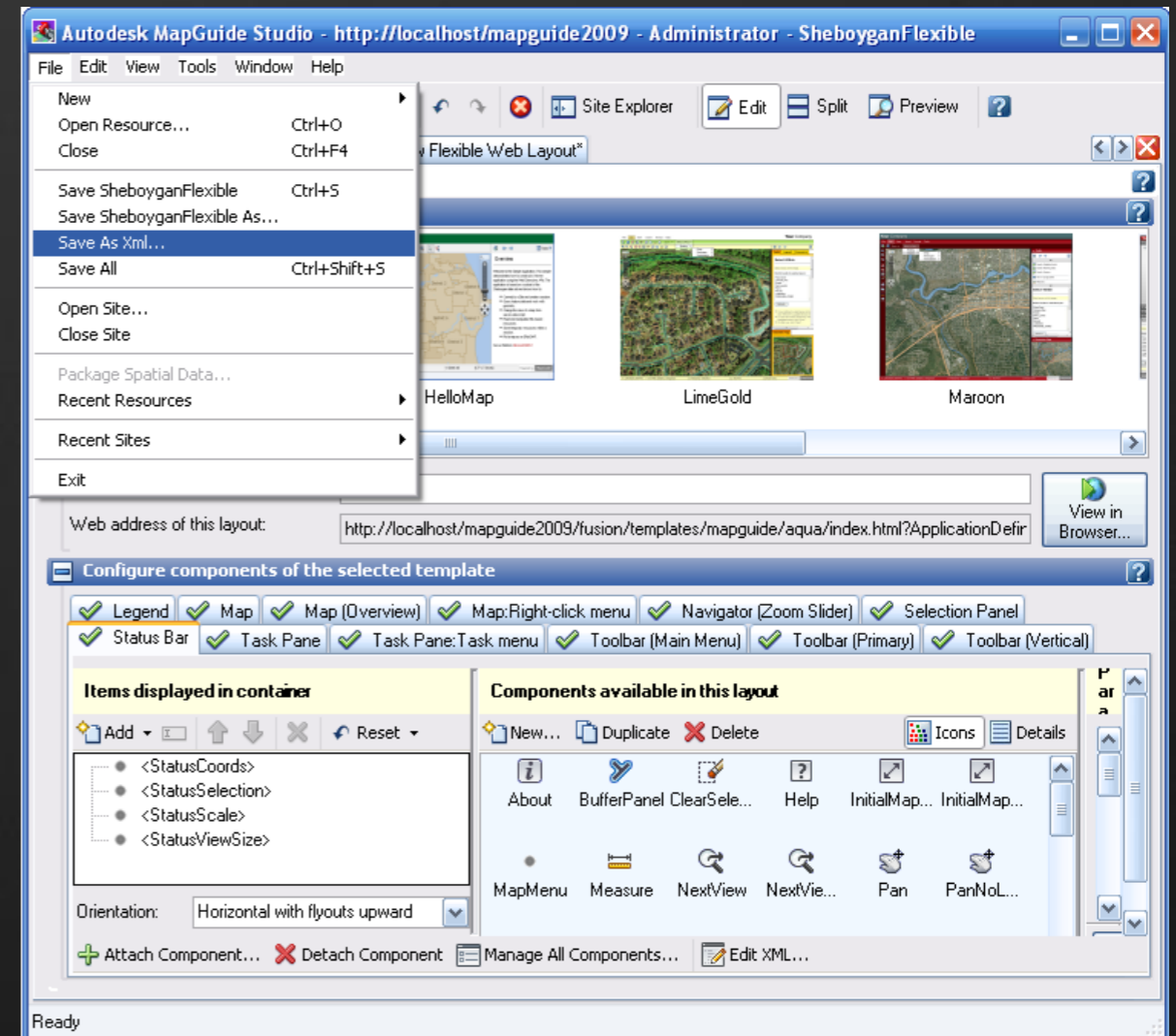
List Selection XML

```
<?xml version="1.0" encoding="utf-8"?>
<UiWidgetType xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <Name>ListSelection</Name>
  <Type>InvokeURL</Type>
  <Location />
  <Extension>
    <Url>ListSelectionTask.aspx</Url>
    <DisableIfSelectionEmpty>true</DisableIfSelectionEmpty>
    <Target>TaskPane</Target>
  </Extension>
  <ImageUrl>images/icons/invoke-url.png</ImageUrl>
  <ImageClass />
  <Label>List Selected Features</Label>
  <Tooltip>List Selected Features</Tooltip>
  <StatusText>List Selected Features</StatusText>
  <Disabled>false</Disabled>
</UiWidgetType>
```

ApplicationDefinition XML

- Aggregation of the earlier XMLs
- Determine viewer's features
- Determine viewer's contents



Major Fusion API Components

- ApplicationDefinition
- CSS (Cascading Style Sheet)
- <DIV> Skeleton
- Jx JavaScript Functions

CSS – Visual Style

- Color, font, style, etc.
- Cascading Style Sheet
- Change of CSS file changes the visual style



CSS Example

```
<style type="text/css">  
  @import url(css/limegold_fusion.css);  
</style>
```

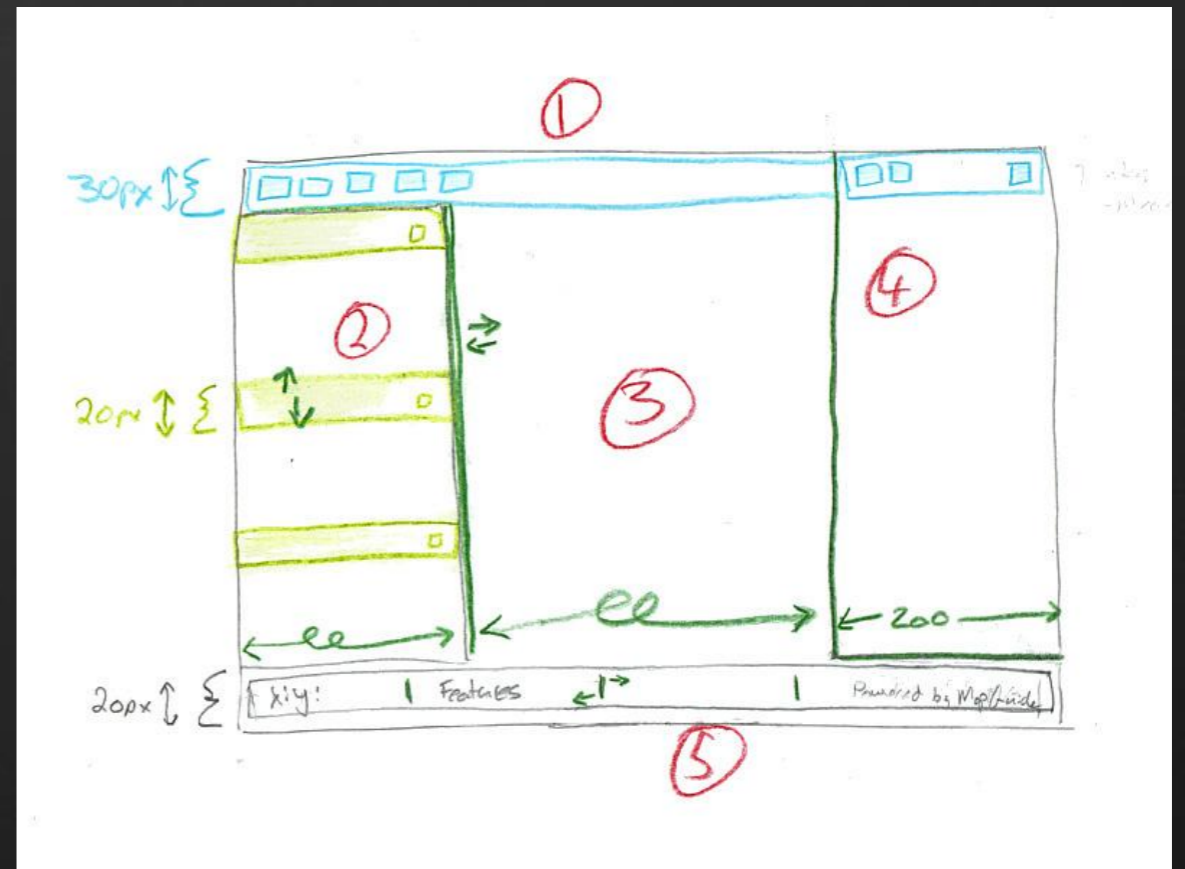
```
/******/  
#StatusBarContainer {  
  border-top: 1px solid #000000;  
  background: #fffebe;  
  color: #ffffff;  
  line-height: 22px;  
  font-size: 10px;  
  vertical-align: middle;  
}
```

Major Fusion API Components

- ApplicationDefinition
- CSS (Cascading Style Sheet)
- **<DIV> Skeleton**
- Jx JavaScript Functions

<DIV> Skeleton – Viewer's Anatomy

- Define containers
- Use HTML <DIV> to define the skeleton
- <DIV> order doesn't matter
- <DIV> replaced with actual HTML code during run time



<DIV> Skeleton

```
<body>
<div id="AppContainer">

  <div id="SplitterArea">
    <div id="Sidebar">
      <div id="SidebarCollapse"></div>
      <div id="Top"></div>
      <div id="Bottom"></div>
      <div id="Middle"></div>
    </div>
    <div id="Map">
      <div id="Navigator"></div>
    </div>
  </div>

  <div id="Toolbar"></div>
  <div id="TaskPane"></div>

  <div id="StatusbarContainer">
    <div id="Statusbar"></div>
  </div>
</div>

<div id="Maptip"></div>
</body>
```

Major Fusion API Components

- ApplicationDefinition
- CSS (Cascading Style Sheet)
- <DIV> Skeleton
- Jx JavaScript Functions

Jx JavaScript –Layout Creation

- Jx JavaScript functions used to lay out the viewer
- Create containers, ie. panels, splitters, dialogs
- Initialize containers, ie. title, position, size
- Hook up containers with widgets in ApplicationDefinition
- Set up event handlers

Jx JavaScript Programming

1. Reference Fusion.js JavaScript library
2. Invoke layout creation in window.onload event
3. Create and initialize containers
4. Set up Fusion event handlers

Step 1: Reference Fusion.js

```
<script type="text/javascript" src="../../lib/fusion.js"></script>
```

Step 2: window.onload event

```
<script type="text/javascript">  
  window.onload = function() {  
    Fusion.initializeLocale();  
  
    //...  
  
    Fusion.initialize();  
  }  
</scrip>
```

Step 3: Create Layout

```
<script type="text/javascript">  
window.onload = function() {  
    Fusion.initializeLocale();
```

```
var main = new Jx.Layout('AppContainer', {left: 20, right: 20, top: 20, bottom: 20});  
new Jx.Layout('Toolbar', {height: 25, left: 0, right: 0, top: 0, bottom: null});  
new Jx.Layout('Map', {width: null, height: null, left: 0, right: 0, top: 40, bottom: 0});
```

```
dOverviewMap = new Jx.Dialog({id: 'dialogOverviewMap', imageBaseUrl: 'images/',  
    title: OpenLayers.String.translate('ovmapTitle'),  
    modal: false, resizable: false,  
    right: 50, bottom: 50, width: 200, height: 200,  
    contentID: 'OverviewMap', helpID: " } );
```

```
dOverviewMap.show();
```

```
    Fusion.initialize();  
}  
</scrip>
```

Step 4: Set Up Events

```
Fusion.registerForEvent(Fusion.Event.FUSION_INITIALIZED, fusionInitialized);
```

```
Fusion.registerForEvent(Fusion.Event.FUSION_ERROR, fusionError);
```

```
var fusionInitialized = function() {  
    dTasks.hide();  
    dTasks.domObj.style.right = '100px';  
    dTasks.domObj.style.left = '';  
    dLegend.hide();  
    dLegend.domObj.style.left = '20px';  
    dSelection.hide();  
    dSelection.domObj.style.left = '100px';  
    $('AppContainer').resize({forceResize: true});  
}
```

```
var fusionError = function(eventId, error) {  
    //console.log('Fusion Error: \n' + error.toString());  
}
```

Demo

Hello Map - Mozilla Firefox

File Edit View History Bookmarks Tools Help Google Bookmark MGE Encarta Dictionary Dictionary and Thesa...

http://localhost/mapguide2009/fusion/HelloMap/index.html

Refresh Select Zoom Rectangle Clear Selection Buffer Measure View Print Options

Tasks

The following parcels are selected on the map.

REGUTIS, FRANK J.	1728 N. 27TH ST.	0.18
KRYSAK, JERRY J.	1723 N. 27TH PL.	0.17
COLBATH, RICHARD L.	1726 N. 27TH PL.	0.15
PITTNER, MARK A &	1711 N. 27TH PL.	0.14
KORTMAN, TERRY A.	1710 N. 27TH PL.	0.15
JOHNSON, LEE A	1712 N. 27TH ST.	0.12
GILL, WILLIAM J.	1706 N. 27TH ST.	0.12
GOETSCH, TIM A.	1705 N. 27TH PL.	0.18
BROTZ, MARY F.	1704 N. 27TH PL.	0.15
LOHOFF, HELMUTH W.	1622 N. 27TH ST.	0.12

Overview Map

District 8
District 7
District 9
District 5
District 10
District 11

Done

Questions

Questions ?