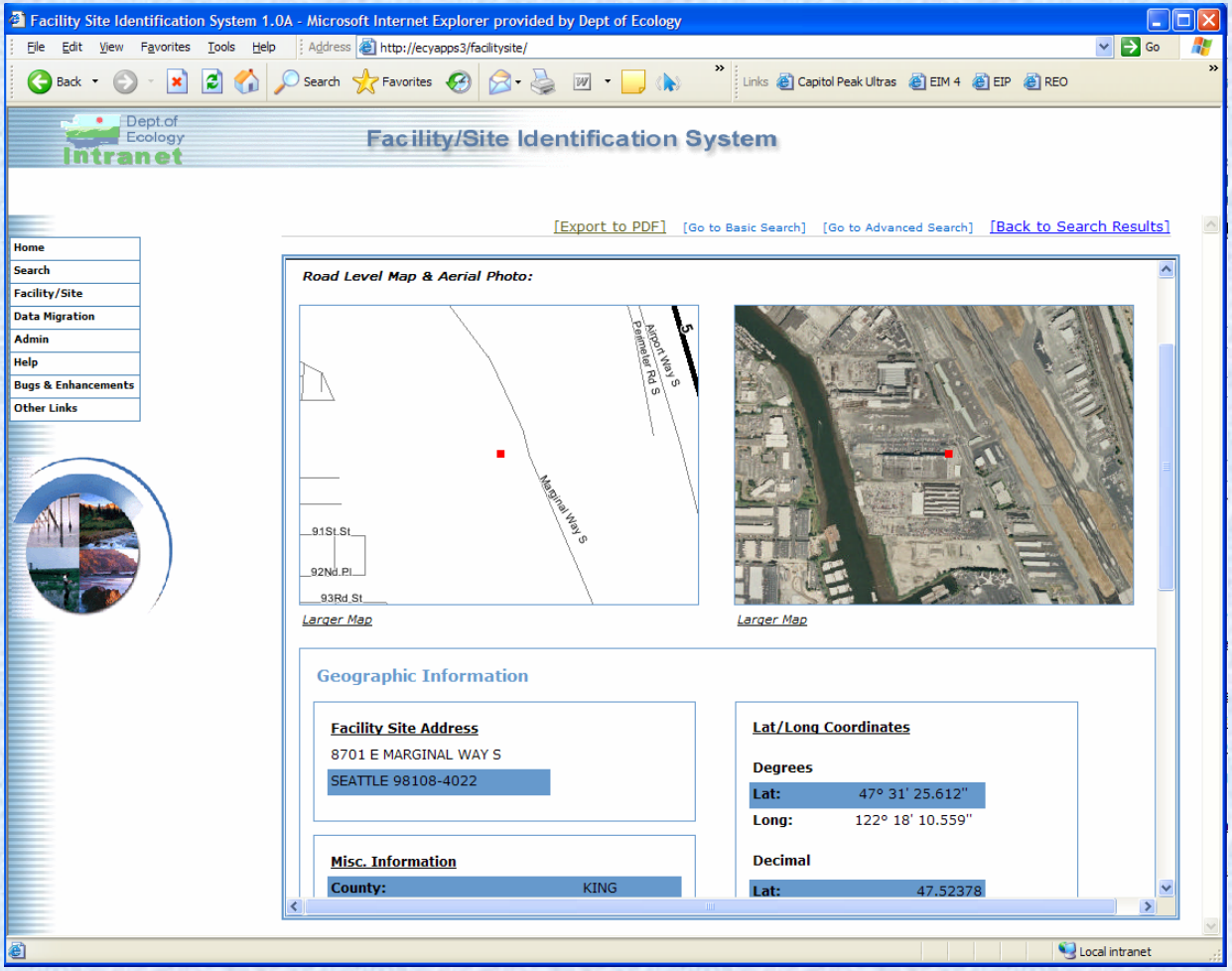
Providing GIS Functionality to Web Applications

Points of Discussion:

- Web Map Services
- Web Feature Services
- Ecology GIS Web Services
- OpenLayers Client

OGC Web Map and Feature Services: The Ecology Experience



Flavors of Web Map Services (WMS) currently in use at Ecology

- ArcIMS 9.1
  - *Used in production for Facility/Site reports*
- ArcGIS Server 9.2
  - *Used in development with WLF OpenLayers client*
  - *Better performance than ArcIMS-served WMS*
  - *Need to design/implement map caching*
- GeoServer 1.6 beta
  - *Experimenting with as an alternative to ESRI products*
  - *Cannot successfully connect to ArcSDE 9.x so far*
  - *Works well with shapefiles*

Flavors of Web Feature Services (WFS) currently in use at Ecology

- ArcIMS 9.1
  - *Experimenting with*
  - *Can successfully return requests restrained by bounding box, feature ID, attribute value*
  - *Cannot display in OpenLayers client*
- ArcGIS Server 9.2
  - *No WFS server available at 9.2*
  - *Future ESRI direction supporting WFS with AGS is unclear*
- GeoServer 1.6 beta
  - *Experimenting with as an alternative to ESRI products*
  - *Cannot successfully connect to ArcSDE 9.x*
  - *Works well with shapefiles*
  - *OpenLayers can display demo shapefiles but so far we cannot display our own shapefiles*
  - *Can display WFS-served shapefiles with ECY data in uDig (open source ArcMap alternative)*

Next Steps

- WMS
  - *Implement map caching where appropriate (ArcGIS Server, TileCache?)*
  - *Design strategic plan for WMS services*
  - *Continue to experiment with FOSS alternatives (GeoServer, MapServer)?*
- WFS
  - *Solve the OpenLayers client WFS feature display problem*
  - *Pin ESRI down on future plans for WFS and WFS-T support*
  - *Design strategic plan for WFS and WFS-T services*
  - *Continue to experiment with FOSS alternatives (GeoServer, MapServer)?*

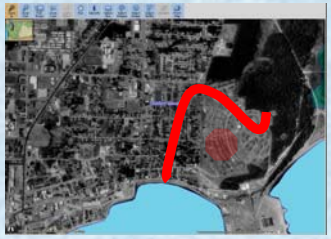
Location Finder Services

On-Line Applications

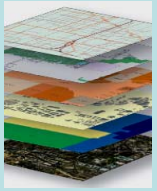
•JARPA
•WDOH Applications

Address Geo-Coding Services

Location Verification & Editing Services



Geo-Processing Web Service



Geo-Processing Service

SOAP Request with GML feature + Layer List + Buffer Distance

Ecology GeoProcessing Service

Return Intersected Layer Info

SOAP Response XML with Intersected Layer attributes reported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<?xml version="1.0" encoding="UTF-8" ?>
- <GeoprocessingResults>
  - <Layer LayerName="City">
    - <IntersectedFeature>
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    </Layer>
  + <Layer LayerName="Tribal_Lands">
  + <Layer LayerName="Parcels2006">
  + <Layer LayerName="dnr_arc">
  - <Layer LayerName="HUC_6th_field">
    - <IntersectedFeature>
        <SUBWAT_NM>LOWER GREEN RIVER</SUBWAT_NM>
        <CATCHMENT>171100130399XX</CATCHMENT>
      </IntersectedFeature>
    - <IntersectedFeature>
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        <CATCHMENT>171100140204XX</CATCHMENT>
      </IntersectedFeature>
    </Layer>
  + <Layer LayerName="sections">
  - <Layer LayerName="wq_303d_2004">
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        <ECOLOGY_ID>LY34GL12.450</ECOLOGY_ID>
      </IntersectedFeature>
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        <WRIA_NR>9</WRIA_NR>
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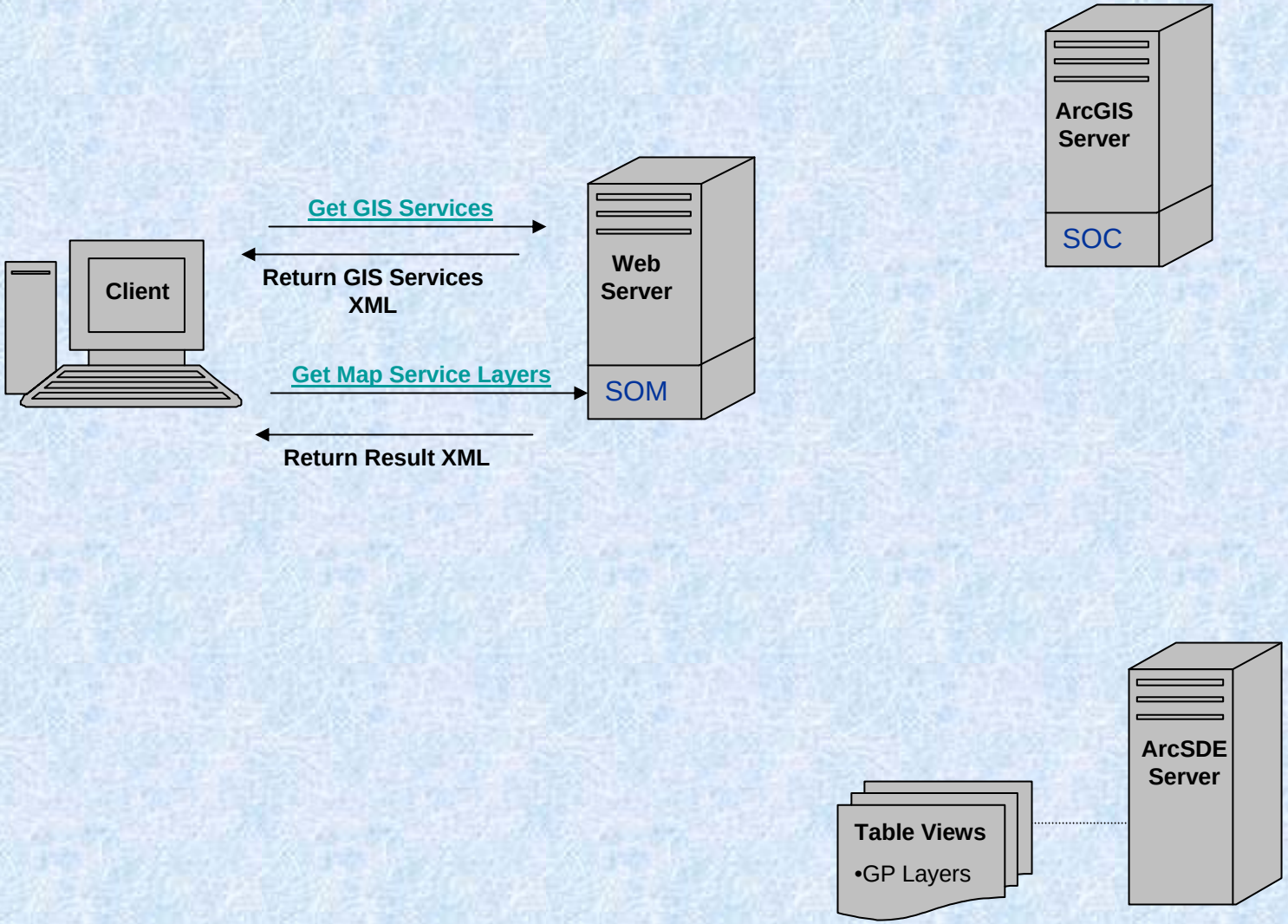
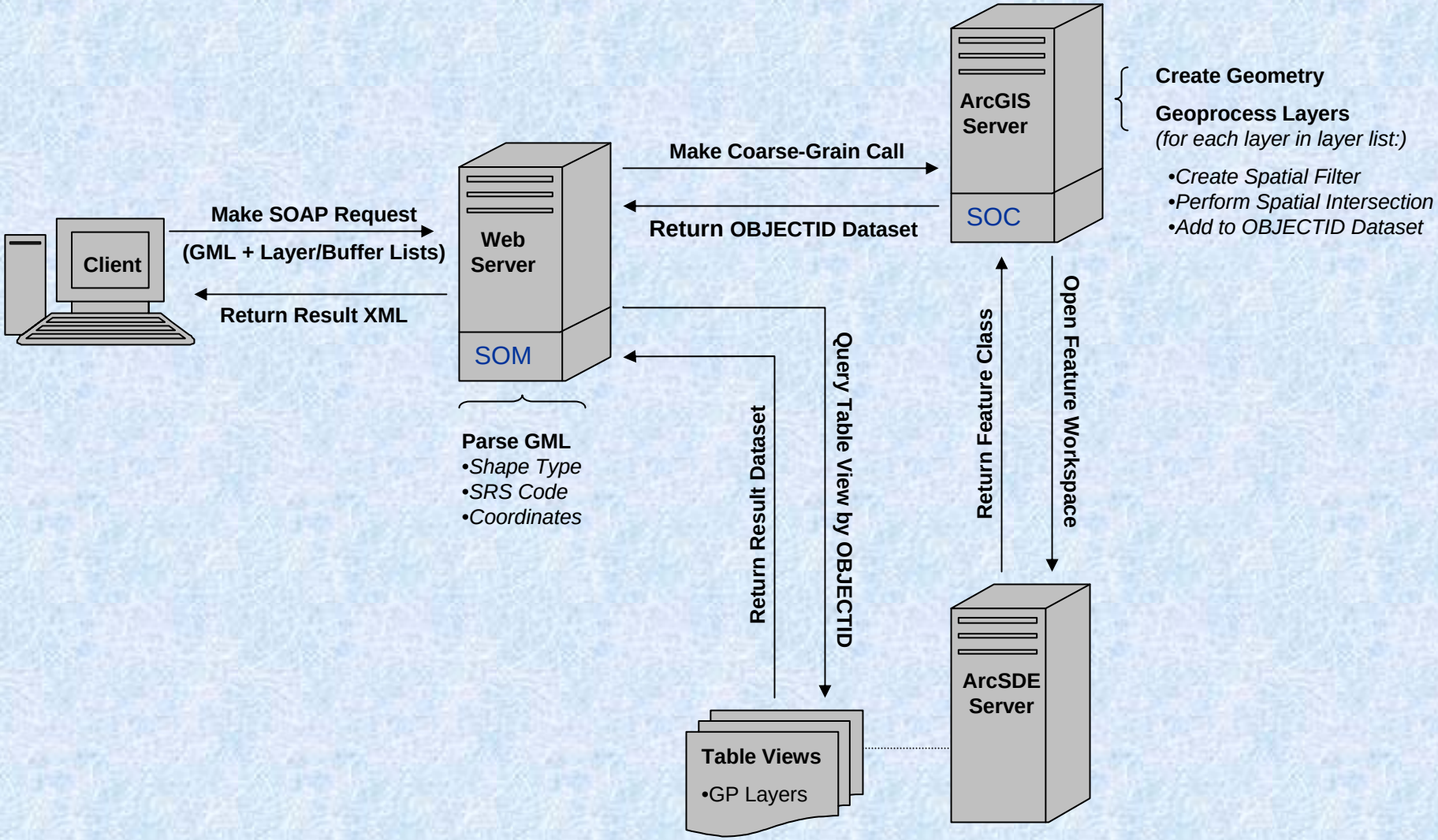
Geo-Processing Service : Under the Hood

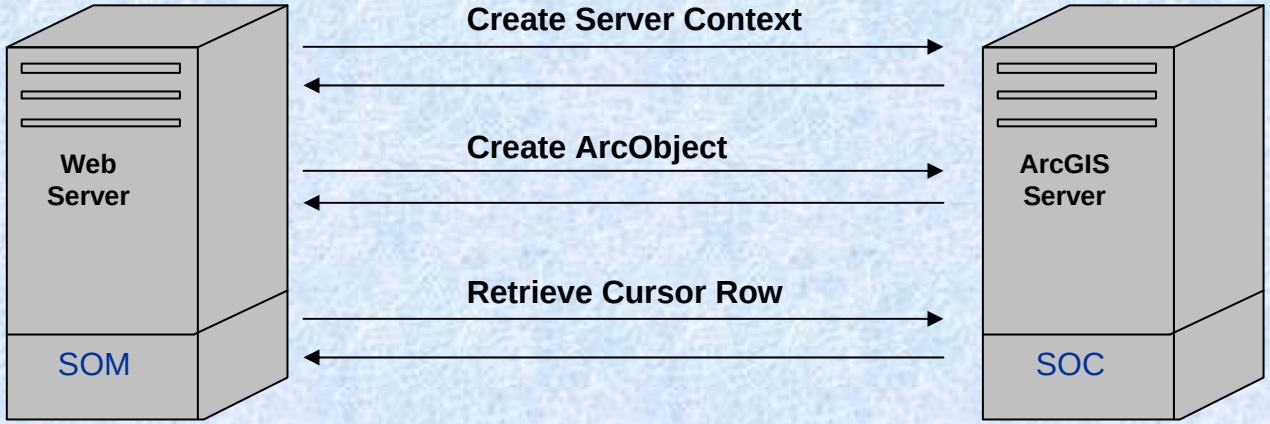


Geo-Processing Service : Under the Hood continued

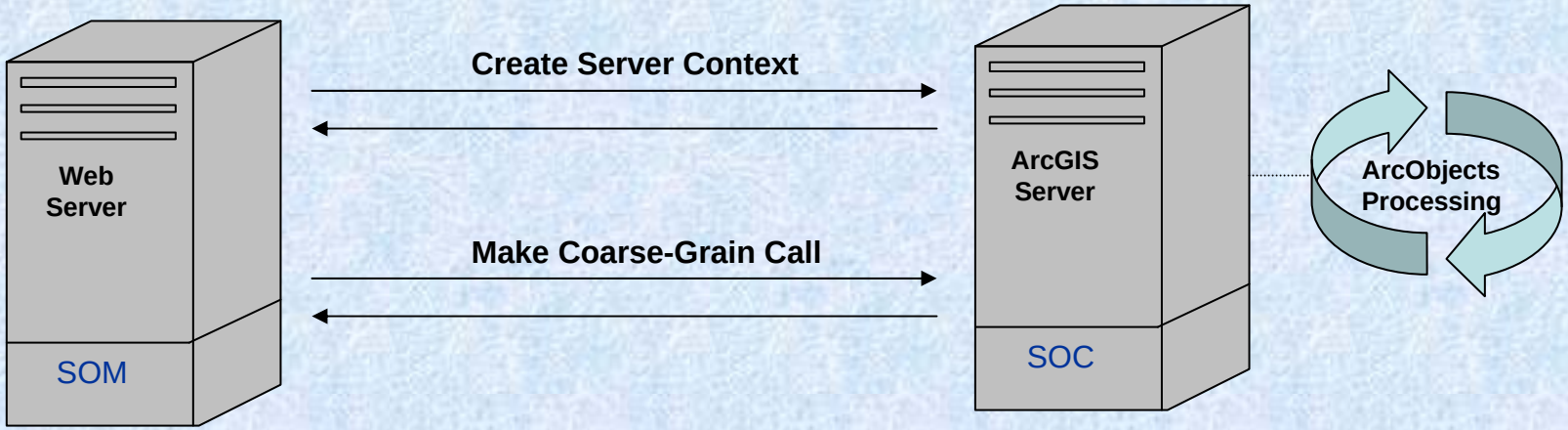


Server Extension Approach: Commute Trip Reduction Plan

Without Server Extension (many trips to ArcGIS Server)



With Server Extension (few trips to ArcGIS Server)



Interlude…

- Questions or comments on WMS, WFS, or Ecology’s GIS web services?

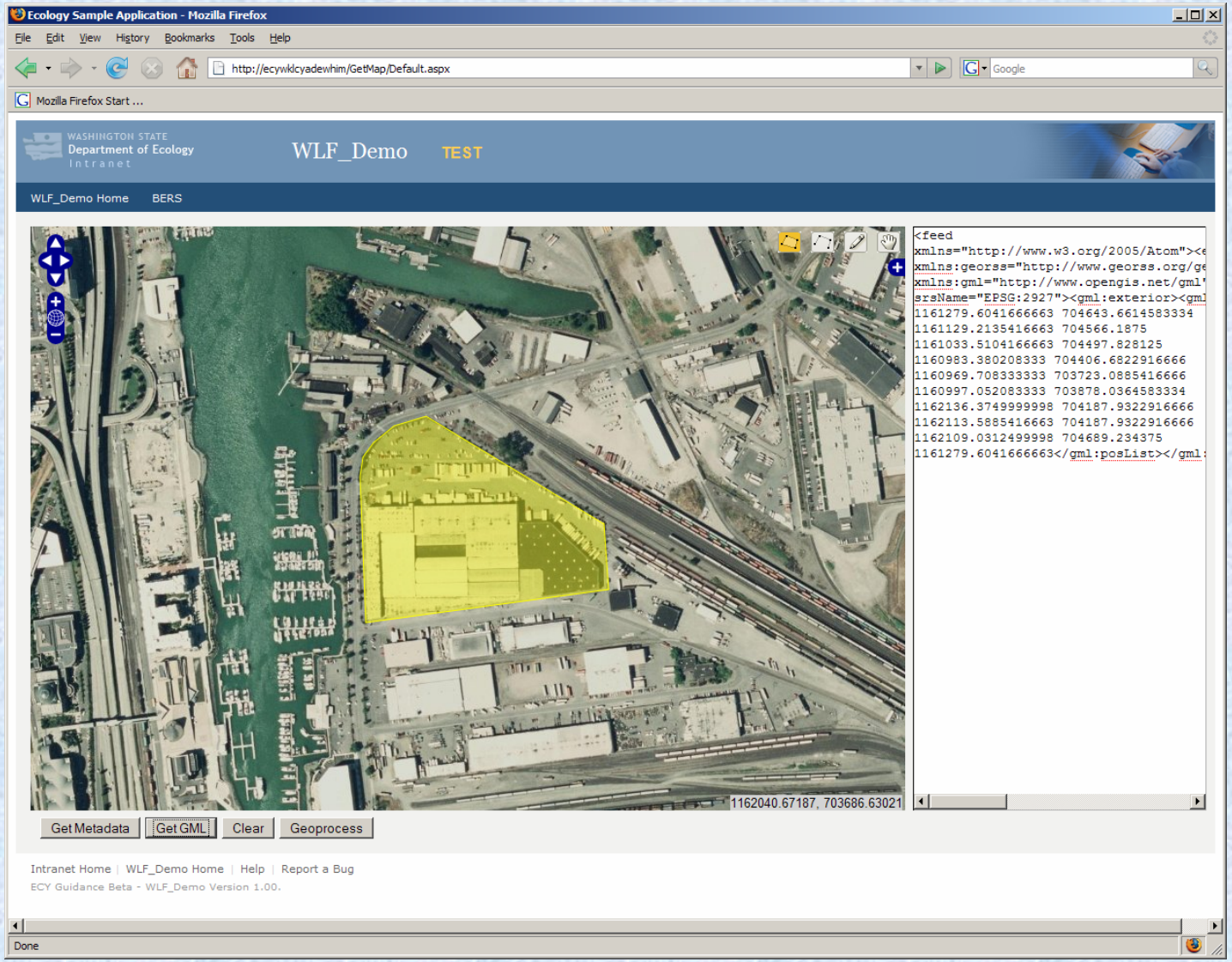
Next…

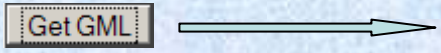
- Putting it together in an open source client

Example OpenLayers Client

- Example to demonstrate consumption of GIS web services
- Provides non-ESRI product$ web developers an open source map client to create GML for these web services

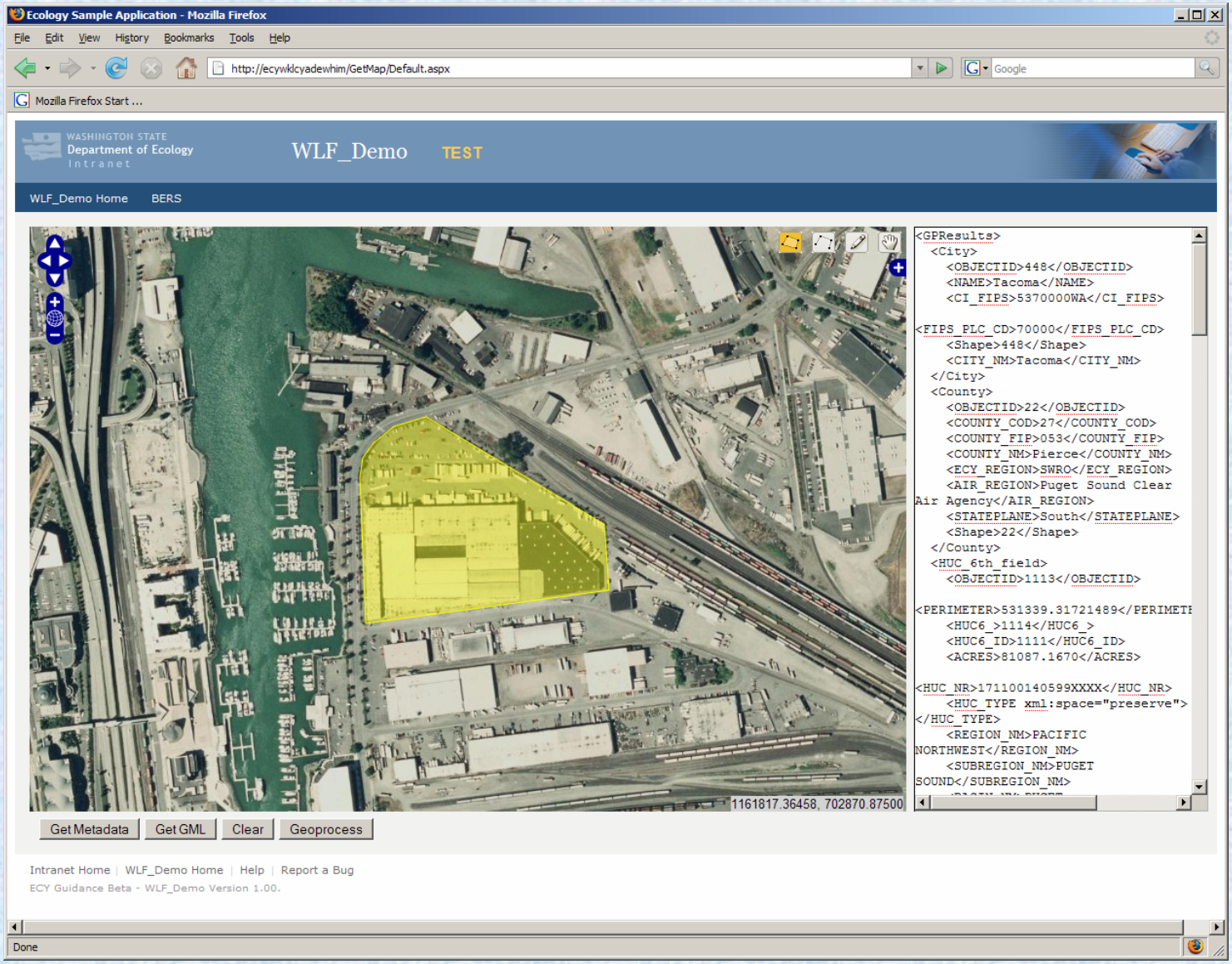
Example OpenLayers Client: GetGML()





Uses OpenLayers GeoRSS.js class to write GeoRSS GML

Example OpenLayers Client: Geoprocess()

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<FIPS_PLC_CD>70000</FIPS_PLC_CD>
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  </City>
  <County>
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    <COUNTY_FIP>053</COUNTY_FIP>
    <COUNTY_NM>Pierce</COUNTY_NM>
    <ECY_REGION>SWRO</ECY_REGION>
    <AIR_REGION>Puget Sound Clear
Air Agency</AIR_REGION>
    <STATEPLANE>South</STATEPLANE>
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  </County>
  <HUC_6th_field>
    <OBJECTID>1113</OBJECTID>

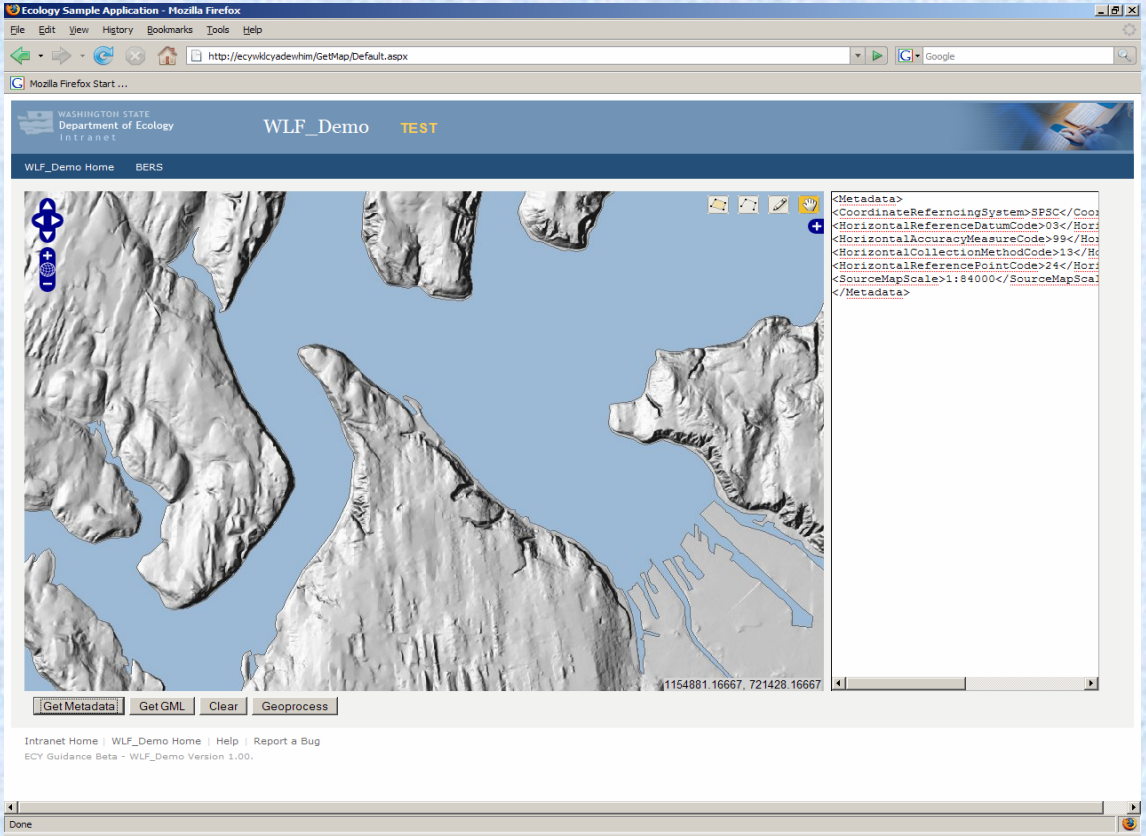
<PERIMETER>531339.31721489</PERIMETE
    <HUC6_>1114</HUC6_>
    <HUC6_ID>1111</HUC6_ID>
    <ACRES>81087.1670</ACRES>

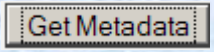
<HUC_NR>171100140599XXXX</HUC_NR>
    <HUC_TYPE xml:space="preserve">
</HUC_TYPE>
    <REGION_NM>PACIFIC
NORTHWEST</REGION_NM>
    <SUBREGION_NM>PUGET
SOUND</SUBREGION_NM>
```


Geoprocess

Invokes Geo-Processing Service:
(passes GeoRSS GML generated by OpenLayer, layer list, buffer list)

Example OpenLayers Client: GetMetadata()





Known → **Static**

- Coordinate Referencing System
- Horizontal Reference Datum Code
- Horizontal Collection Method Code

Known → **Dynamic**

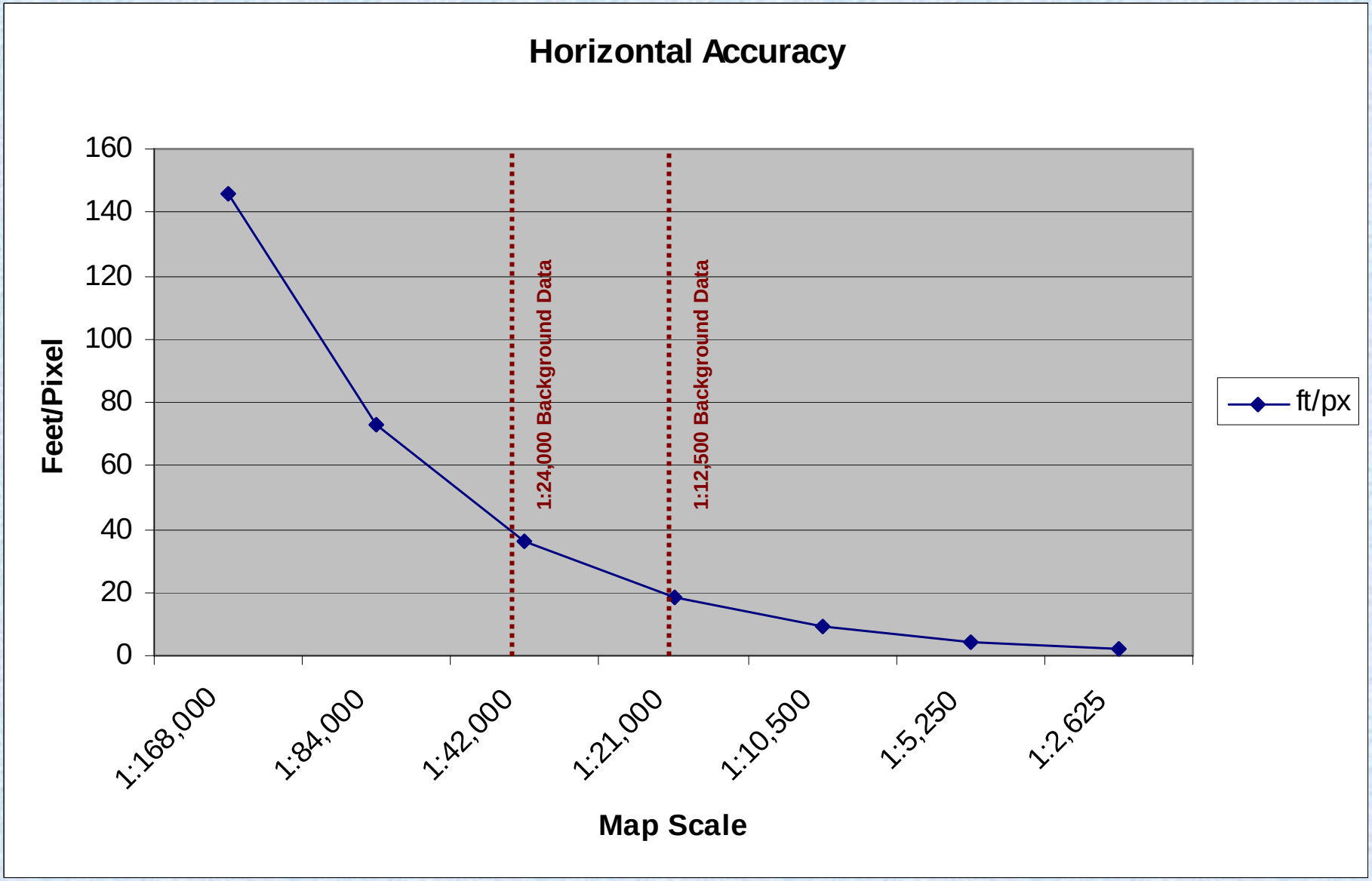
- Source Map Scale (returned from map)
- Horizontal Accuracy Measure Code (derived from base data horizontal accuracy, zoom level, pixel size in real world measurement…needs to be determined)

Unknown → **User Provided**

- Other location specific information such as Location Name, Location Type, etc.

Horizontal Accuracy of a Map Click?

Base Data Resolution vs. Map Pixel Size



Questions/Comments?