

Drupal and ArcGIS

Yes, it can be done

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Developer



NatureServe

Who we are

- NatureServe is a conservation non-profit
- Network of member programs
- Track endangered species and habitats
- Across North America

Environmental Review

- Statutory requirement for most projects affecting the landscape
 - Roads, cell towers, housing, etc
- Differs by State
 - Custom rules per state
 - State governments organized differently
 - Very simple to very complex

Environmental Review Tool (ERT)

- Projects submitted online
 - Drawn
 - Uploaded
- Custom review geoprocess
- Custom reporting workflow

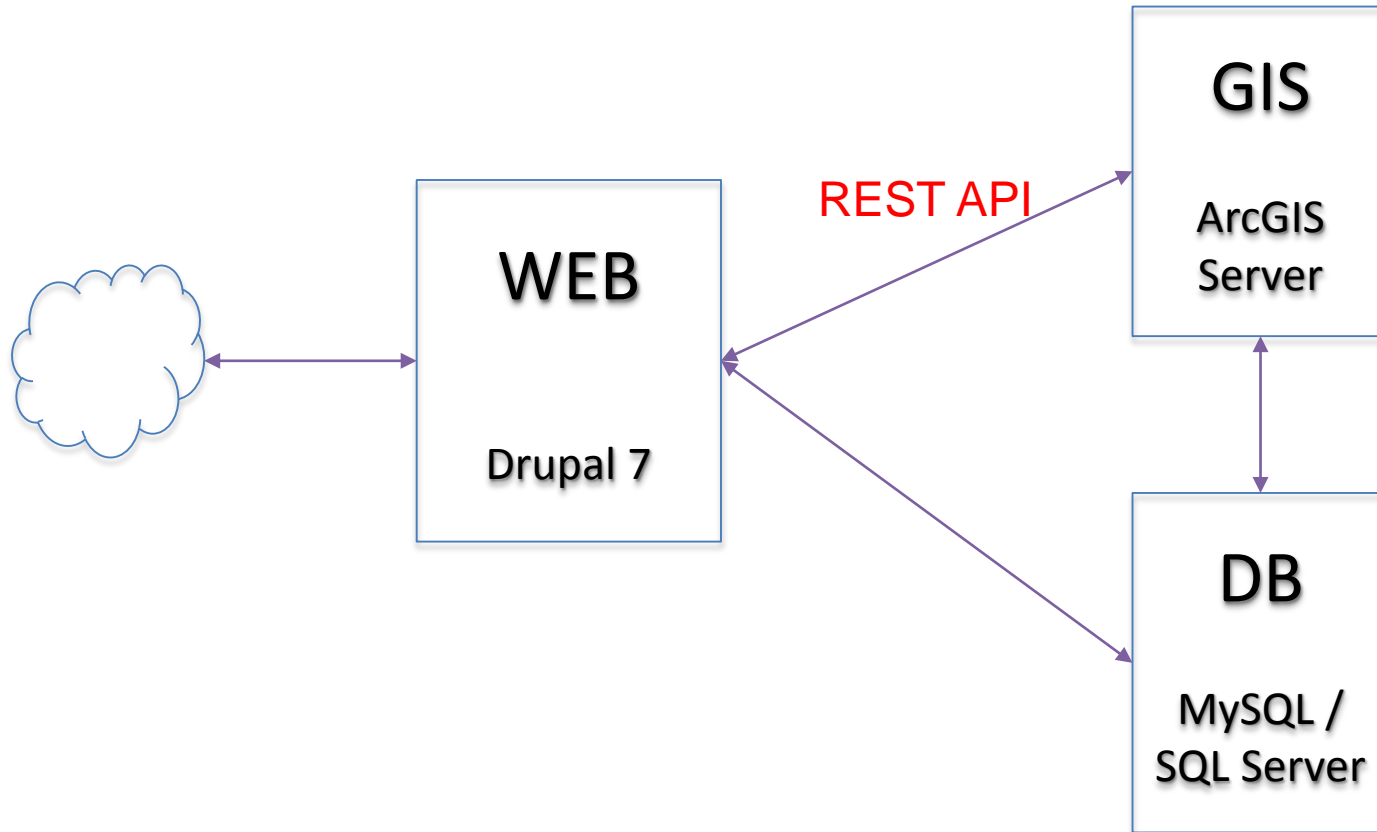
Why ERT?

- States with existing systems wanted an alternative
 - Systems are old
 - Very focused to their state
 - Locked out from modernization

ERT design goals

- Separate the custom review workflow from the core
- Configuration beats Coding
- User maintainable

ERT architecture



ERT Demo



ARIZONA GAME AND FISH DEPARTMENT

MANAGING TODAY FOR WILDLIFE TOMORROW

www.azgfd.gov

Home

Map

Terms & Conditions

Contact Us

Help

Switch Basemap Add Resources

Find address or place

Layers Make a Map Feature Search

Special Areas

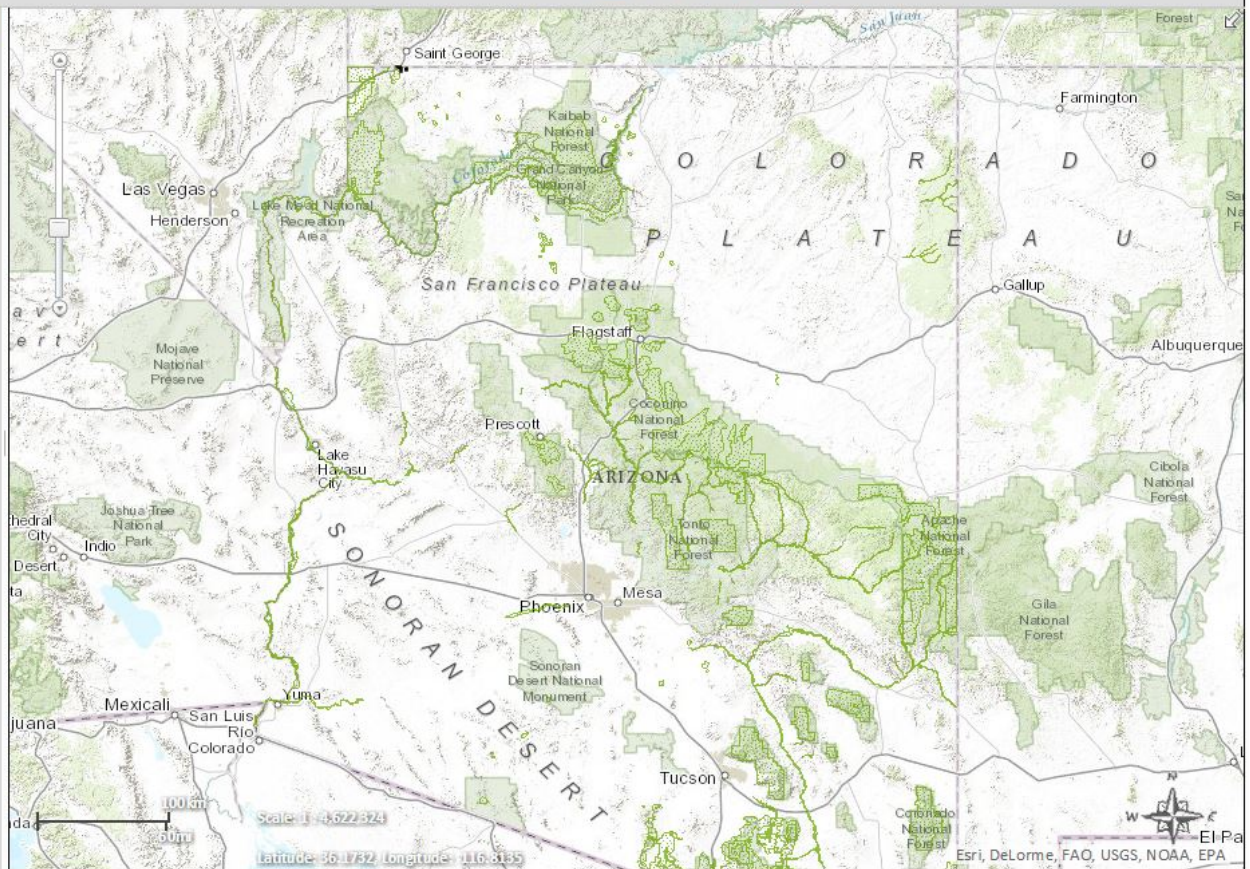
- Critical Habitat
- Important Bird Areas
- Special Areas
- Tribal Lands
- Wildlife Corridors

Reference Layers

- AZGFD Parcels
- AZGFD Regions
- BLM District
- BLM Field Offices
- Counties
- Milepost
- Land Ownership
- Quadrangles
- Sections
- Townships
- USFS Ranger Districts
- Wilderness Areas

HabiMap

- Amphibians
- Birds
- Fish
- Mammals
- Reptiles
- Riparian



Drupal?

- Content Management System
 - PHP
 - Content not just ‘pages’
- Built to be built upon
- Security is pervasive

Drupal modules

- Drupal extends via ‘modules’
- Many out there
- Essentials
 - Views
 - And Views Datasource (JSON)
 - Features
 - Configuration in code

Your Drupal module

- Where you put your code
- Choose a name, e.g. mymodule
- Create folder
 - /sites/all/modules/mymodule
- Two empty text files:
 - mymodule.module
 - mymodule.info

mymodule.info

```
name = My Module
description = A module that Frank told me to write
core = 7.x
dependencies[] = views
dependencies[] = features
```

- Always declare your dependencies
 - drush en mymodule
- You now have a module!

Drupal hooks

- Drupal...
 - Takes a request
 - Runs through a set of steps
 - Produces a response
- For each step
 - Checks for existence of hook functions
 - Runs any found

Drupal hooks again

- All hooks documented at drupal.org
- `hook_menu`
 - No such function in code, anywhere
 - `hook_ => mymodule_`
 - E.g. `mymodule_menu`
- Drupal gets to `hook_menu`
 - Runs all `..._menu`'s found

Theming

- Sets of page rendering templates
- Many themes available
- Themes can inherit from other themes
- Drupal creates arrays of JS, CSS, page content, hands these to the theme

Our 100% map page

- A specific template
 - Maximizing map working area
- Renders 'map page' content type
 - Fields for initial extent, etc
- User can create many focused map pages

Your 100% map page - 1

- Choose your theme
- Copy theme's –
 `page.tpl.php`
 to
 `page--node--mappage.tpl.php`
- Renders `<body>` to `</body>`, for the
 mappage content type

Your 100% map page - 2

- Map `<div>` must be properly 'Dojo contained'
 - Automatic resizing depends on this
- Drop all unused markup, exposing structure
- Add Dojo layout markup and divs to ensure correct nesting
- Use JS to insert CSS on `<html>`, if required
 - Via hook

mymodule.module

```
function mymodule_preprocess_page(&$variables) {

  // Pick up your content typed template
  $variables['theme_hook_suggestions'][] =
    'page__node__' . $variables['node']->type;

  // Add standard Esri CSS, after any other CSS
  drupal_add_css('http://js.arcgis.com/3.12/esri/css/esri.css',
    array('type' => 'external', 'group' => CSS_DEFAULT + 1));

  // Add Esri JSAPI, after any other JS
  drupal_add_js('http://js.arcgis.com/3.12/',
    array('type' => 'external', 'group' => JS_DEFAULT + 1));

  // Other possible type options:
  // (omitted) - path is site relative
  // inline - insert this CSS/JS string directly

  // So, further setup...
}

// Prefix all functions with either mymodule, for hooks,
// or _mymodule for all others.
// This should avoid name clashes with other modules
// (PHP's namespace is global)

// And look into hook_library!
```

Capturing user data

- We use the JSON webmap format
 - As used by the Print widget
- 100% as the user saw things
- Easily analyzed
- Geoprocess ready featuresets

It's there, honest

```
{ "mapOptions": { "showAttribution": true, "extent": { "xmin": -12511748.72658136,
"ymin": 4076445.371464352, "xmax": -12452280.718575573, "ymax": 4087910.925707113,
"spatialReference": { "wkid": 102100 } }, "spatialReference": { "wkid": 102100 } },
"operationalLayers": [ { "id": "baseMap", "title": "baseMap", "opacity": 1,
"minScale": 591657527.591555, "maxScale": 1128.497176,
"url": "https://services.arcgisonline.com/arcgis/rest/services/World_Topo_Map/MapServer"
}, { "id": "graphicsLayer1", "opacity": 1, "minScale": 0, "maxScale": 0,
"featureCollection": { "layers": [ ] } }, { "id": "graphicsLayer2", "opacity": 1, "minScale": 0,
"maxScale": 0, "featureCollection": { "layers": [ ] } }, { "id": "annotationLayer", "opacity": 1,
"minScale": 0, "maxScale": 0, "featureCollection":
{ "layers": [ { "layerDefinition": { "name": "polygonLayer",
"geometryType": "esriGeometryPolygon", "featureSet": { "geometryType": "esriGeometryPolyg
on", "features": [ { "geometry": { "rings": [ [ [ -12490461.014203966, 4075986.749294642 ], [ -
12488129.684841271, 4075107.7234693635 ], [ -12488129.684841271, 4073808.293988517 ], [ -
12490499.232718108, 4073387.8903329493 ], [ -12490461.014203966, 4075986.749294642 ] ] ] ],
"spatialReference": { "wkid": 102100 } }, "symbol": { "color": [ 0, 0, 0, 128 ],
"outline": { "color": [ 0, 0, 0, 255 ], "width": 0.75, "type": "esriSLS",
"style": "esriSLSolid" }, "type": "esriSFS", "style": "esriSFSolid" } } ] } ] } },
{ "id": "textAnnotationLayer", "opacity": 1, "minScale": 0, "maxScale": 0,
"featureCollection": { "layers": [ ] } }, { "id": "graphicsLayer34", "opacity": 1, "minScale": 0,
"maxScale": 0, "featureCollection": { "layers": [ ] } }, { "id": "graphicCurrDrawLyr",
"opacity": 1, "minScale": 0, "maxScale": 0, "featureCollection": { "layers": [ ] } },
{ "id": "mapmain_graphics", "opacity": 1, "minScale": 0, "maxScale": 0,
"featureCollection": { "layers": [ ] } } ],

"layoutOptions": { "titleText": "", "authorText": "", "copyrightText": "",
"scaleBarOptions": { "metricUnit": "esriKilometers", "metricLabel": "km",
"nonMetricUnit": "esriMiles", "nonMetricLabel": "mi" },

"legendOptions": { "operationalLayers": [ { "id": "graphicsLayer1" }, { "id": "graphicsLayer2" },
{ "id": "annotationLayer" }, { "id": "textAnnotationLayer" },
{ "id": "graphicsLayer34" }, { "id": "graphicCurrDrawLyr" } ] } }
```

Environmental Review Mechanics

- PHP extracts webmap featureset
- Sends to REST geoprocess endpoint
 - Once you can speak ArcGIS Server...
- Geoprocess crunches data
- PHP examines results
 - Emails users
 - Produces reports
 - Whatever else client specifies

Report example

Map Printing

- Map *images* via ArcGIS Server printing service(s)
- Manipulated webmap JSON + GP results
 - Extent changes
 - Legend alteration
 - Layers added or dropped
 - Etc

Report generation

- TCPDF
 - Great PDF generation library in PHP
 - Vast majority of PDF features available
- Accepts HTML
 - Easy to generate and style
 - Maps embedded via `` tags
 - User entered content can be added *verbatim*

Questions?

Thanks!

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