Developing a Web Mapping Application for Collaborative Dataset Management

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Innovate! & Penn State

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- Contractor for Local, Territorial and Federal Governments and private organizations
- Build End-user solutions to collect/manage geospatial data and help answer questions.

Intro

GIS should be an integral part to an organization's day to day activities

Better data organization

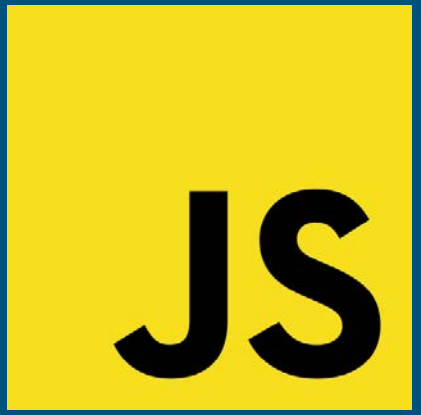
Increase collaboration

This approach can apply to many different databases

For this application I focused on Geographic Response Planning for the EPA

Building Blocks

- HTML5
- CSS3
- JavaScript
  - ArcGIS JS API 3.x
  - AngularJS 1.x
    - Angular Material 1.x
- ArcGIS Server/Online



What is a Geographic Response Plan?

Plan covering loosely defined geographic area

Used for early stage response to oil, chemical or any spill that could cause serious harm to sensitive sites.

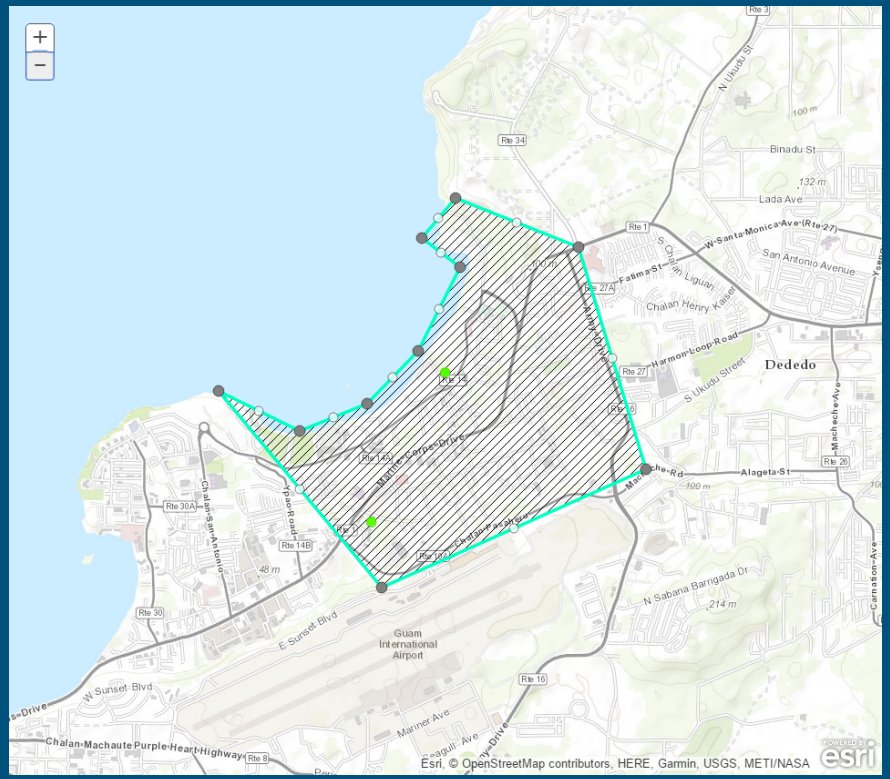
Comprised of Sensitive Sites (points), Containment Booms (lines), Incident Action Plans (polygons) and various related tables

Sensitive Sites with Strategies and Booms

- Environmental
- Economical
- Historical
- Cultural
- Archeological

Incident Action Plan

- Early response coordination
- Fire, Police and Medical resources
- Spill response resources
- Local, Regional and National contacts

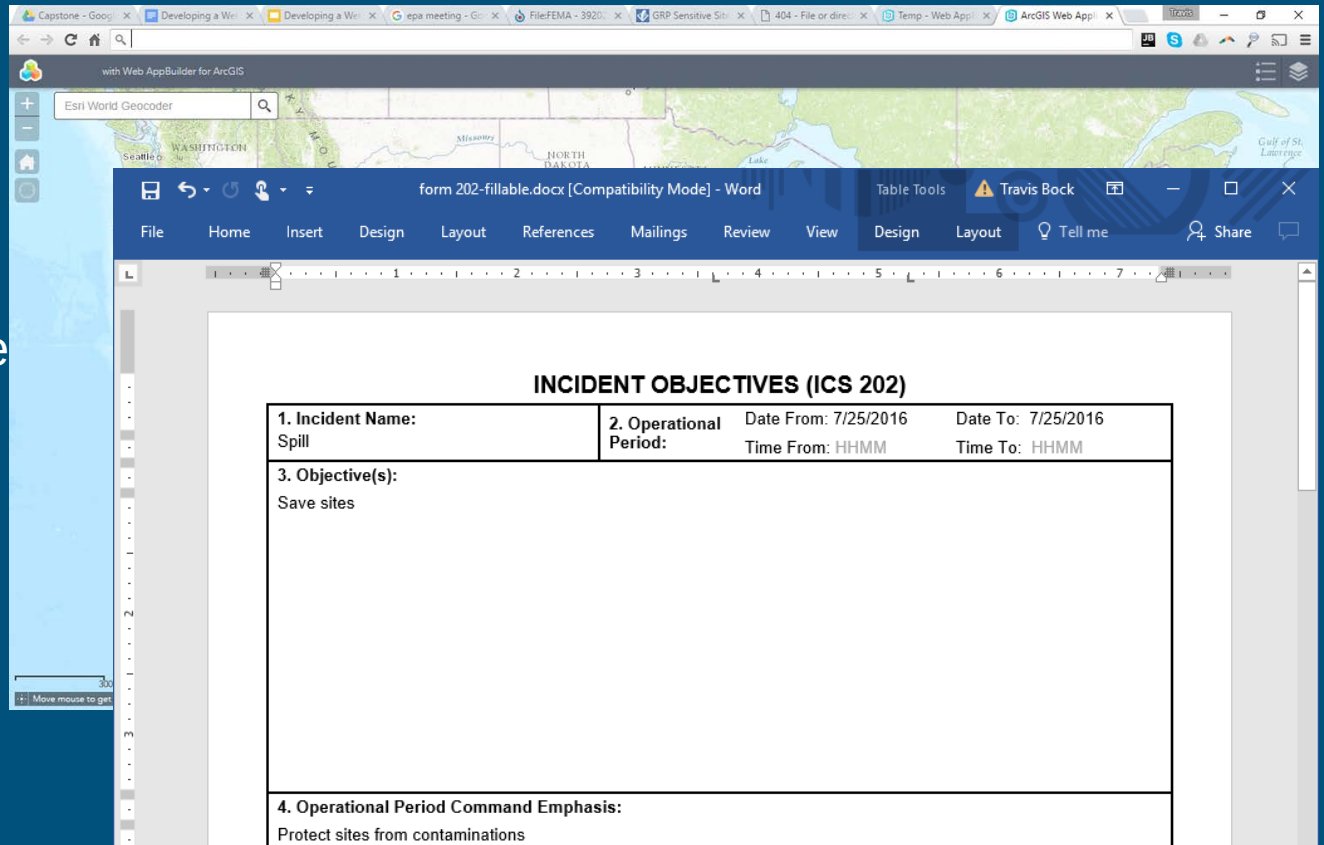


Who creates these plans?

- Federal, State, Territory and Local Emergency Response
- First Responders
- Environmental Scientist
- Local/Regional Experts
- Various subject matter experts

Current tools

- Email
- Microsoft Word
- ESRI Web AppBuilde



Current database

- Single flat table
- Attributes are repeated
- Relationship is 1:7 instead of 1:Many
- Missing lots of information
- No storage of Incident Action Plan in data model

What's wrong with that?

- Spatially enabled in a disconnected manner
- Lack of access controls
- Not centralized (many version could exist)
- Difficult to collaborate
- Poor quality data model

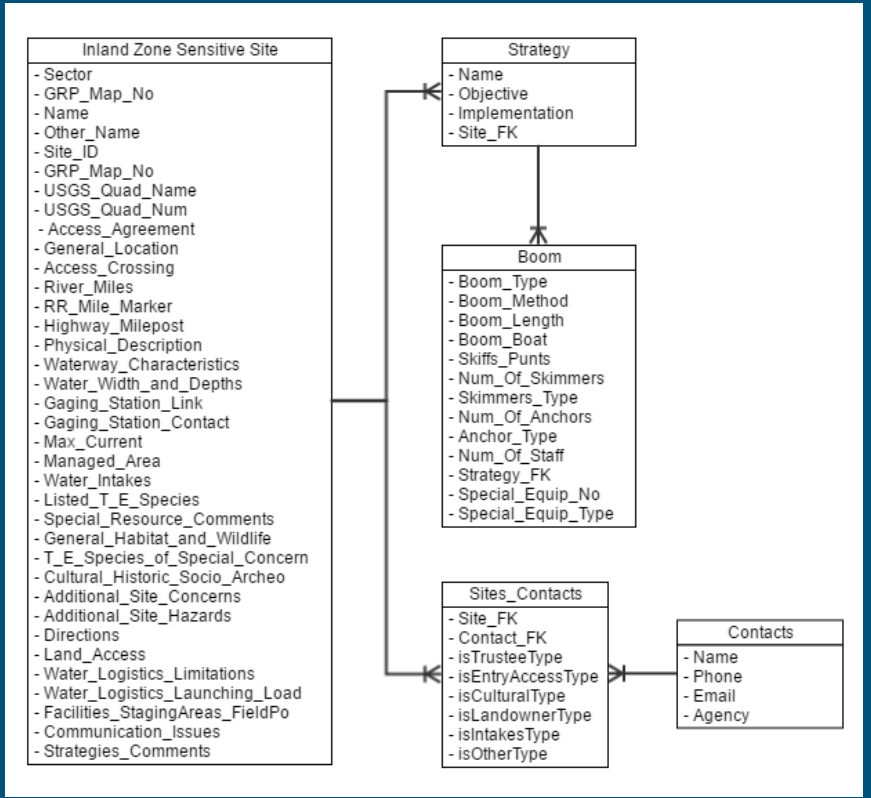
How can we do better?

- User requirements gathering
- New data model
- Create custom user interface

New Sensitive Site Data Model

Actual 1:Many relationships

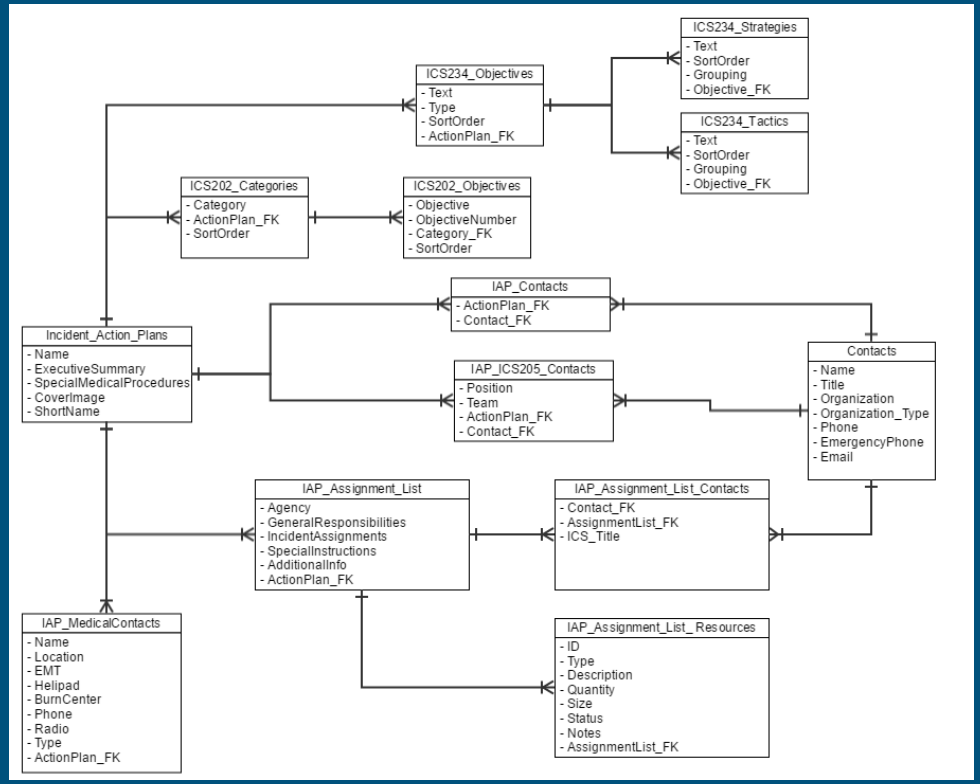
All relevant information is stored in a single place



New Incident Action Plan Data Model

Provides a single location to store plan information

Can be reproduced for many areas without much effort.



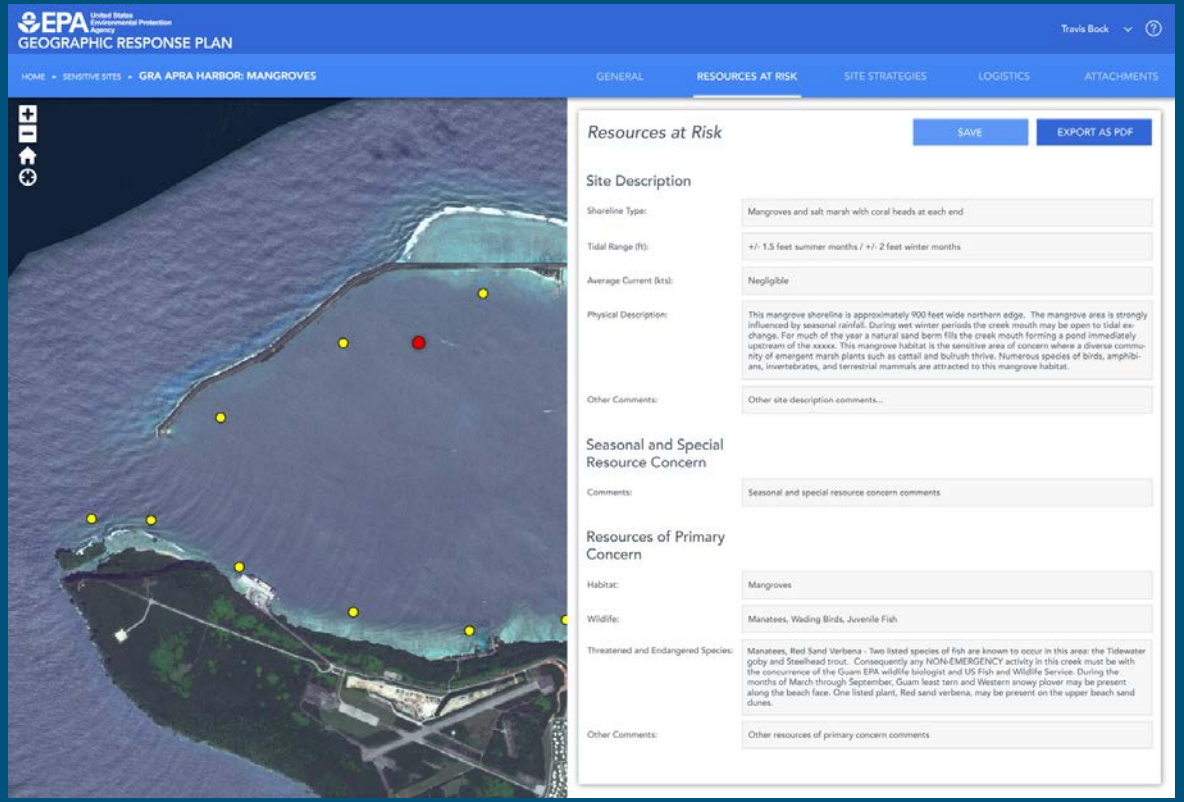
What will this look like

Start from scratch?

Use graphic designer?

Graphic Designers!

- User requirements
- Data structure
- Create static mockup to present to end users for feedback
- Starting point for developing UI

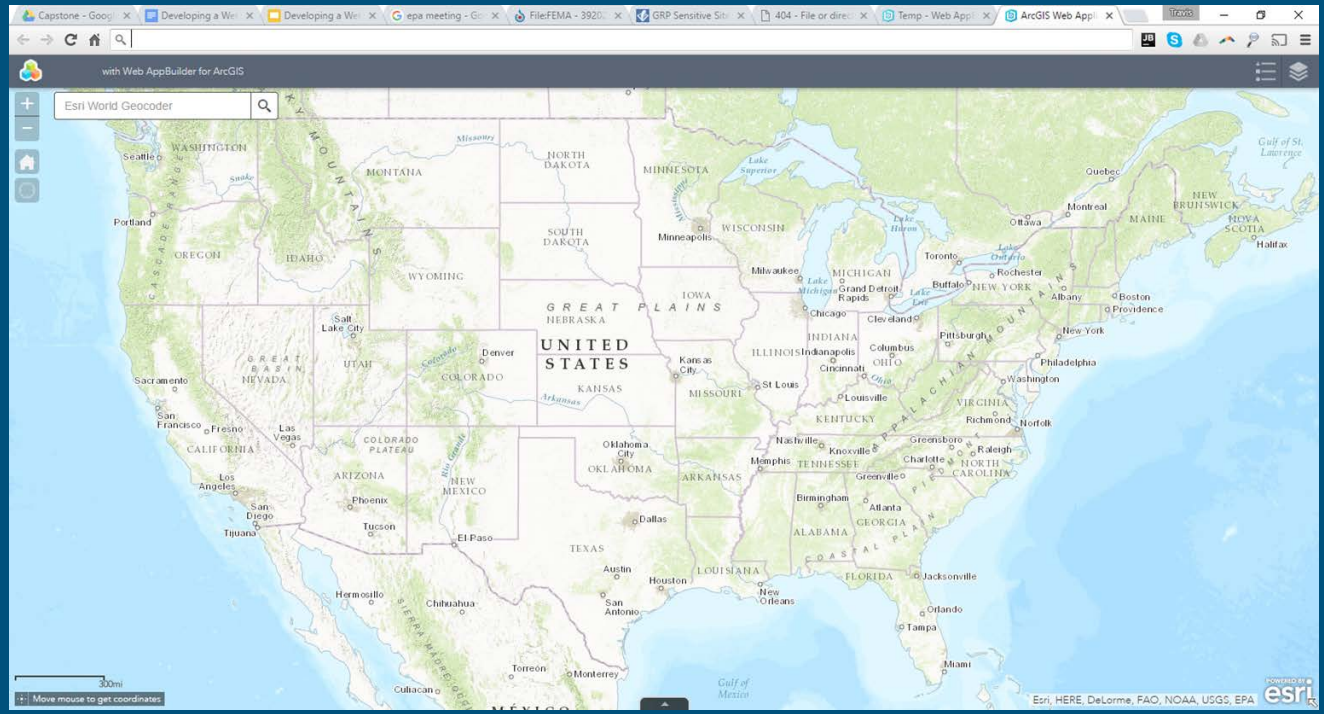


How to build

- Ajax
- Client-side
- HTML
- CSS
- JavaScript
- API’s
- Frameworks

But what about ESRI Web AppBuilder?

- Built using Ajax technology
- Custom Widgets
- Good for visualization
- Bad for data entry



User Interface Frameworks

- Faster than starting from scratch
- Angular Material
- Dojo
- Bootstrap
- Other

dojo toolkit

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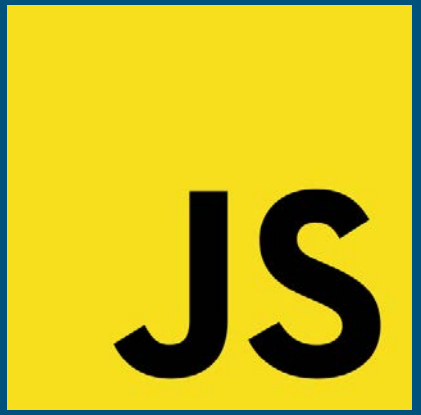
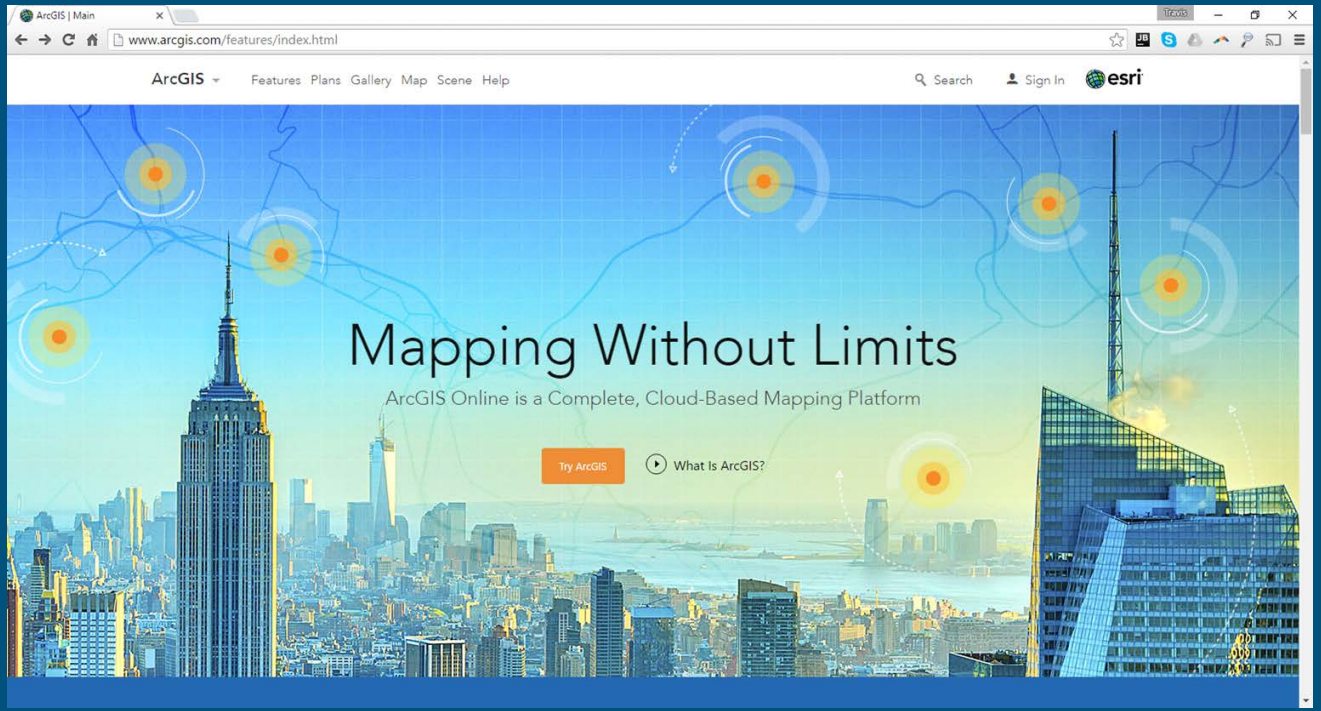


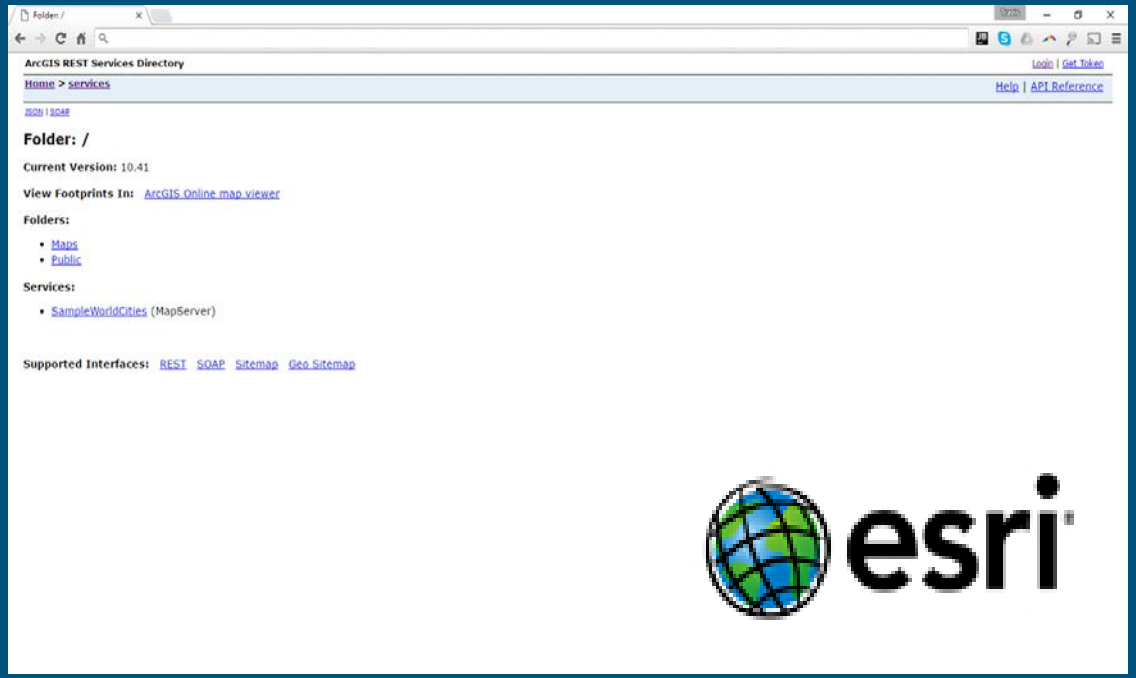
Software as a Service

ArcGIS Online



Still need that server!

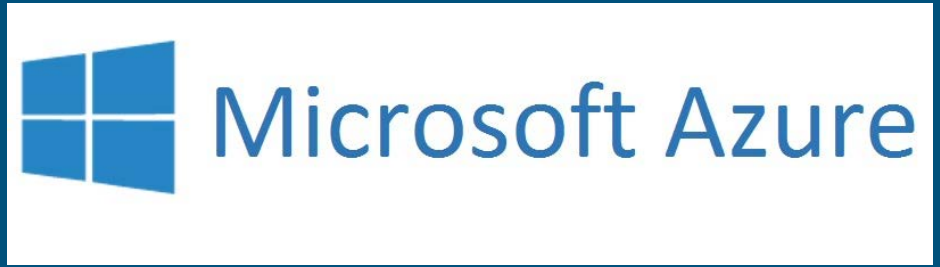
- ArcGIS Server
- Others?
- JSON (ESRI JSON vs GeoJSON)



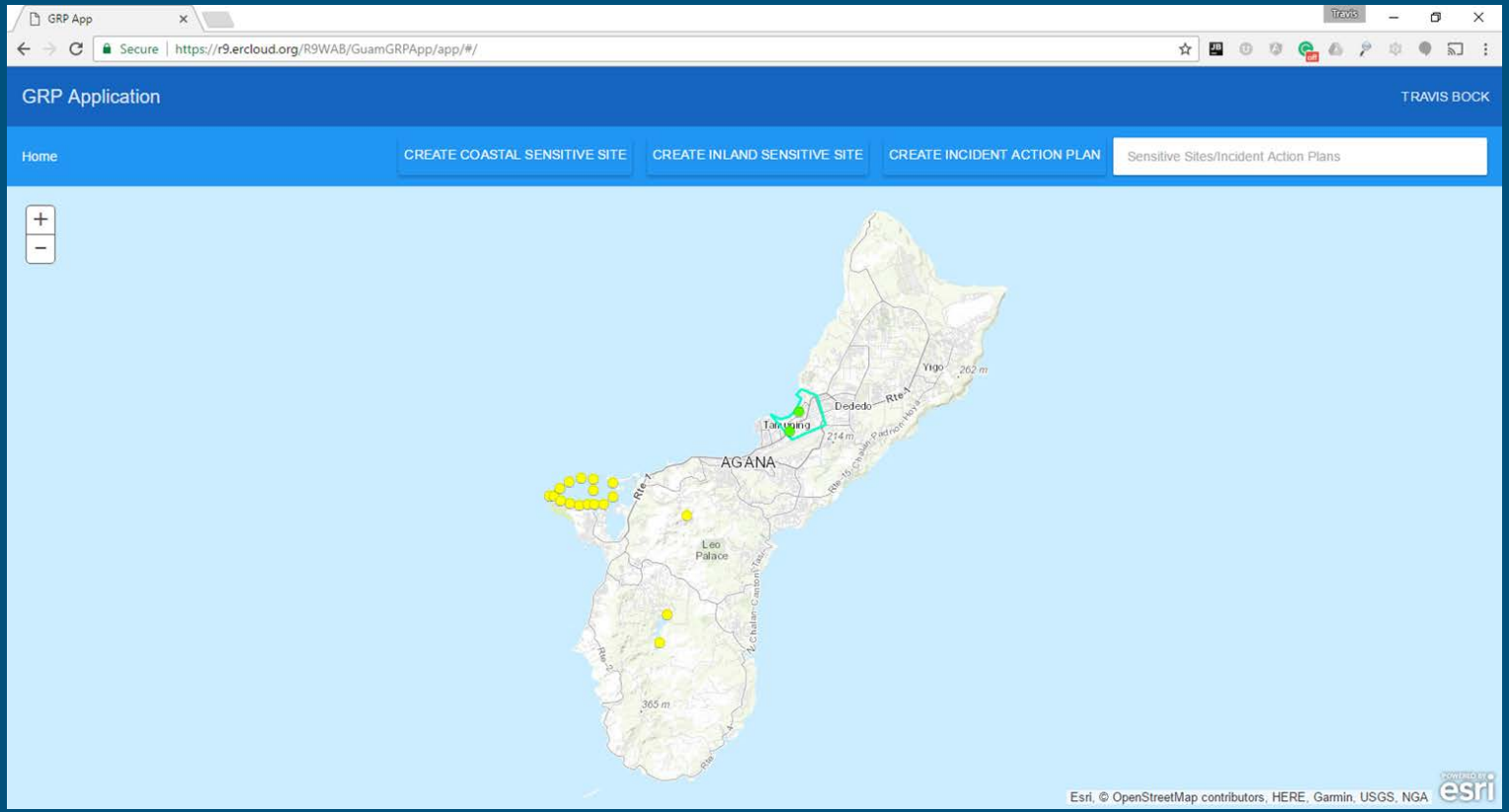
Cloud Based ArcGIS Server

Amazon Web Services

Microsoft Azure



End Product


GRP App
Secure
https://r9.ercloud.org/R9WAB/GuamGRPApp/app/#/
GRP Application
TRAVIS BOCK
Home
CREATE COASTAL SENSITIVE SITE
CREATE INLAND SENSITIVE SITE
CREATE INCIDENT ACTION PLAN
Sensitive Sites/Incident Action Plans
AGANA
Yigo
Dededo
Tamuning
Leo Palace
Esri, © OpenStreetMap contributors, HERE, Garmin, USGS, NGA

GRP App

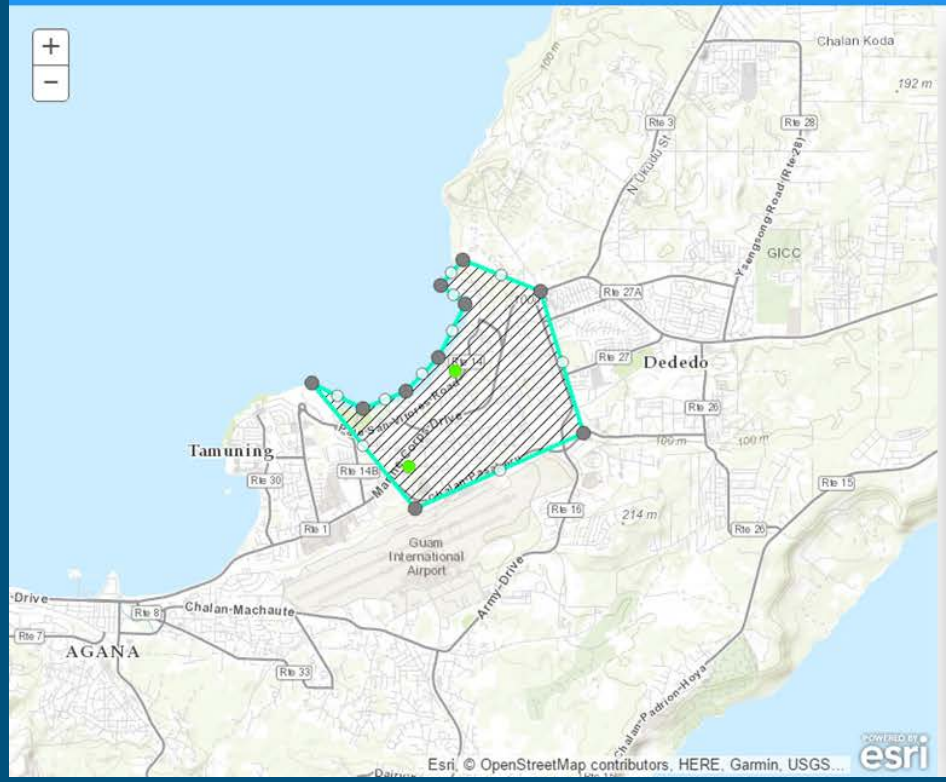
Secure | https://r9.ercloud.org/R9WAB/GuamGRPApp/app/#/iap/%7B3525A0F7-BB3D-4A56-AE75-E0CD5F6BE016%7D/general

GRP Application

TRAVIS BOCK

Home > Incident Action Plan > Tumon Area Release IAP

GENERAL | OBJECTIVES (ICS 202) | WORK ANALYSIS MATRIX (ICS 234) | ASSIGNI



General

BACK | SAVE | DELETE | EXPORT PDF

Name: *
Tumon Area Release IAP

Short Name:
Tumon Incident IAP

Executive Summary:
TB added

Cover Image:

Factory Pattern with esriLoader.require()

```
angular.module('GRPApp').factory('relatedFeatureFactory',
    function ($q, esriLoader, $mdToast, $filter, $mdDialog, $state, esriAuth) {
        'use strict';
        var relatedFactory = function (feature, foreignKeyField, foreignKey) {
            var deferred = $q.defer(),
                Query,
                Graphic,
                arcgisService;

            esriLoader.require(['esri/tasks/query', 'esri/graphic'],
                function (_Query, _Graphic) {
                    Query = _Query;
                    Graphic = _Graphic;
                    deferred.resolve();
                });
```

Factory Pattern with esriLoader.require() cont’d

```
function isLoaded() {
    return deferred.promise;
}
```

```
get: function (globalId, objectId) {
  isLoaded().then(function () {
      var query = new Query(),
```

Using field metadata in template

```
function initFields(obj) {
    angular.forEach(obj.layer.fields, function (field) {
        obj.fields[field.name] = field;
    });
}
```

```
<md-input-container>
    <label>{{coastalSites.site.fields.Site_ID.alias}}:</label>
    <input type="text" ng-model="coastalSites.site.attributes.Site_ID"
           maxlength="{{coastalSites.site.fields.Site_ID.length}}">
</md-input-container>
```

Conclusion

Web based spatially enabled tools will increase planning participation and collaboration

Collaboration increases the quality of information in the plan

Always available applications will increase the likelihood of having current information

Web base client side applications backed by cloud based services insures data will always be available.

Questions?