A Comparison of Open Source Viewers

For ArcGIS Server

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ABSTRACT

The ArcGIS API for JavaScript provides an extensive collection of tools, widgets, and code samples. Putting together a cohesive application may require a significant level effort to coordinate a combination of technology options that create a useful suite of GIS tools for the end users. Fortunately there are open source projects that can be implemented which will streamline line the effort while providing a rich set of features through configurable mechanisms. The General Purpose Viewer (GPV) and the Configurable Map Viewer (CMV) open source frameworks will be explored and compared. The results of this effort will be presented to the audience.

https://en.wikipedia.org/wiki/Representational_state_transfer
Agenda

• Background
• Setup
• General Purpose Viewer
• Configurable Map Viewer
The Viewers

- General Purpose Viewer (GPV)
  http://www.appgeo.com/solutions/gpv/
  https://github.com/AppGeo/GPV

- Configurable Map Viewer (CMV)
  http://cmv.io/
  https://github.com/cmv
Background

ArcGIS Server REST Environment

- ArcSDE Geodatabase
- ArcGIS Server
GPV - General Purpose Viewer

- Initially created in 2003 by Applied Geographics, Inc.
- Primarily local government and municipal organizations
- Open Sourced in 2014, currently at Version 5
- ASP.NET application acts as a broker between …
  - Client Browser
  - Database
  - ArcGIS Server
Background

GPV - General Purpose Viewer Environment
CMV - Configurable Map Viewer

- Initially released/open sourced in 2014
- Configurable Javascript Web Application using 
  - Javascript / dojo
  - ArcGIS Javascript API
  - ArcGIS Server / ArcGIS Online
- Currently at Version 1.3.4
Background

CMV - Configurable Map Viewer Environment

[Diagram showing connections between devices and servers with CMV as a central node]
Setup

The Source Data

- Stormwater

- Electric
  http://solutions.arcgis.com/utilities/electric/help/electric-facility-maps/

- Base map
  http://services.arcgisonline.com/ArcGIS/rest/services/
Setup

Data Preparation

• Import Stormwater and Electric Features to ArcSDE

• Adjust MXDs to connect to ArcSDE

• Refine MXDs and publish corresponding Map Services
Viewer Investigation Guidelines

- Features / Capabilities
  - Pan, Zoom
  - Map Tip, Identify, Select
  - Search, Query
  - Layer/Legend Operations
  - Operating Layers
  - Base map Layers

- Basic Site Creation
Installation and Configuration

- **Prerequisites**
  - ArcGIS Server 10.2.2
  - Windows Server 2008 R2
  - SQL Server 2008 R2
  - Microsoft Internet Information Server 7
Installation and Configuration

• Web Application Install
  • Extract application code
  • Configure using IIS Manager
Installation and Configuration

• Database Install
  • Create “GPV50” database
  • Run Scripts
    • `SQLServer_Create.sql`
    • `SQLServer_AddConstraints.sql`
    • `SQLServer_LoadMailingLabels.sql`
    • `SQLServer_InsertPrintTemplate.sql`
Installation and Configuration

Database Design
GPV - General Purpose Viewer

Installation and Configuration

Database Design

Tables for “Basic Viewer”
Installation and Configuration
Load scripts - Setting

```
UPDATE [GPV50].[dbo].[GPV50Setting]
    set [Value] = 'Naperville'
    where [Setting] = 'DefaultApplication'

UPDATE [GPV50].[dbo].[GPV50Setting]
    set [Value] = '-9919232,5056789,-9696189,5185419'
    where [Setting] = 'FullExtent'

UPDATE [GPV50].[dbo].[GPV50Setting]
    set [Value] = 'jdoherity@microdesk.com'
    where [Setting] = 'AdminEmail'

UPDATE [GPV50].[dbo].[GPV50Setting]
    set [Value] = 'yes'
    where [Setting] = 'AllowShowApps'
```
GPV - General Purpose Viewer

Installation and Configuration

Load scripts - Application

```sql
INSERT INTO [dbo].[GPV50Application]
([ApplicationID] , [DisplayName] , [AuthorizedRoles] , [FunctionTabs] ,
 [DefaultFunctionTab] , [DefaultMapTab] , [DefaultSearch] , [DefaultAction] ,
 [DefaultTargetLayer] , [DefaultProximity] , [DefaultSelectionLayer] ,
 [DefaultLevel] , [DefaultTool] , [FullExtent] , [OverviewMapID] ,
 [CoordinateModes] , [ZoneLevelID] , [TrackUse] , [MetaDescription] ,
 [MetaKeywords] , [About] , [Active])
VALUES
('Naperville', 'Naperville, IL', NULL, 'all', NULL, 'Stormwater', NULL, NULL, NULL, NULL, 'Manholes', NULL, NULL, '-99192232,5066789,-9696189,5185419', 'Stormwater', NULL, NULL, 0, NULL, NULL, 'Naperville IL Sample Site', 1)
```
GPV - General Purpose Viewer

Installation and Configuration

Load scripts - Map Tab

```
INSERT INTO [dbo].[GPV50MapTab]
([MapTabID] , [DisplayName] , [MapHost]
, [MapService] , [DataFrame] , [UserName]
, [Password] , [InteractiveLegend] , [Active])
VALUES
(
' Stormwater' , ' Stormwater' ,
' http://appdevgis:6080/arcgis/services' , ' NEARC/Stormwater' ,
NULL, NULL, NULL, 1, 1
)

INSERT INTO [dbo].[GPV50MapTab]
([MapTabID] , [DisplayName] , [MapHost]
, [MapService] , [DataFrame] , [UserName]
, [Password] , [InteractiveLegend] , [Active])
VALUES
(
' Electric' , ' Electric' ,
' http://appdevgis:6080/arcgis/services' ,
' NEARC/Electric' , NULL, NULL, NULL, 1, 1
)
```
Installation and Configuration

Load scripts - Map Tab

- Essential defines the **SOAP** service references to be used to further define layers that are contained within that service and to be displayed in the GPV.

- Tips:
  - The MapHost and MapService fields are only 50 characters, so many of the ESRI sample services are TOO LONG!
  - GPV uses SOAP service end points, **not REST** service end points use the following as reference:

  - REST …
    - http://appdevgis:6080/arcgis/rest/services/NEARC/Stormwater/MapServer
  - SOAP …
GPV - General Purpose Viewer

Installation and Configuration

Load scripts - Layer

```
INSERT INTO [dbo].[GPV50Layer]
([LayerID] , [LayerName] , [DisplayName]
, [MetaDataURL] , [KeyField] , [ZoneField]
, [LevelField] , [MaxNumberSelected] , [MaxSelectionArea]
, [MinNearestDistance] , [MaxNearestDistance] , [Active])
VALUES
[
  'Gravity Mains', 'Gravity Mains', 'Gravity Mains', NULL, 'OBJECTID', NULL, NULL, NULL, NULL, NULL, 1
]

INSERT INTO [dbo].[GPV50Layer]
([LayerID] , [LayerName] , [DisplayName]
, [MetaDataURL] , [KeyField] , [ZoneField]
, [LevelField] , [MaxNumberSelected] , [MaxSelectionArea]
, [MinNearestDistance] , [MaxNearestDistance] , [Active])
VALUES
[
  'Manholes', 'Manholes', 'Manholes', NULL
  , 'OBJECTID', NULL, NULL, NULL, NULL, NULL, 1
]

INSERT INTO [dbo].[GPV50Layer]
([LayerID] , [LayerName] , [DisplayName]
, [MetaDataURL] , [KeyField] , [ZoneField]
, [LevelField] , [MaxNumberSelected] , [MaxSelectionArea]
, [MinNearestDistance] , [MaxNearestDistance] , [Active])
VALUES
[
  'Primary Underground Conductor', 'Primary Underground Conductor', 'Primary Underground Conductor', NULL, 'OBJECTID', NULL, NULL, NULL, NULL, NULL, 1
]```
Installation and Configuration

Load scripts – Map Tab Layer

```sql
INSERT INTO [GPV50].[dbo].[GPV50MapTabLayer]
  ([MapTabID], [LayerID], [AllowTarget], [AllowSelection], [ShowInLegend], [CheckInLegend], [IsExclusive], [ShowInPrintLegend])
VALUES
  ('Stormwater', 'Manholes', 1, 1, 1, 0, 1)

INSERT INTO [GPV50].[dbo].[GPV50MapTabLayer]
  ([MapTabID], [LayerID], [AllowTarget], [AllowSelection], [ShowInLegend], [CheckInLegend], [IsExclusive], [ShowInPrintLegend])
VALUES
  ('Stormwater', 'Gravity Mains', 0, 1, 1, 0, 1)

INSERT INTO [GPV50].[dbo].[GPV50MapTabLayer]
  ([MapTabID], [LayerID], [AllowTarget], [AllowSelection], [ShowInLegend], [CheckInLegend], [IsExclusive], [ShowInPrintLegend])
VALUES
  ('Electric', 'Primary Underground Conductor', 0, 1, 1, 0, 1)
```
GPV - General Purpose Viewer

Installation and Configuration
Load scripts – Application Map Tab

```
INSERT INTO [GPV50].[dbo].[GPV50ApplicationMapTab]
    ([ApplicationID], [MapTabID], [SequenceNo])
VALUES
    ('Naperville', 'Stormwater', 1)

INSERT INTO [GPV50].[dbo].[GPV50ApplicationMapTab]
    ([ApplicationID], [MapTabID], [SequenceNo])
VALUES
    ('Naperville', 'Electric', 2)
```
GPV - General Purpose Viewer

Installation and Configuration

Load scripts – Base map

```sql
-- ---- Tile Group
insert into GPV50TileGroup (TileGroupID, DisplayName)
values ('EsriGroup', 'Esri Street Map')

-- ---- Tile Layer
insert into GPV50TileLayer (TileLayerID, TileGroupID, URL, Attribution, Overlay, SequenceNo)
values (
    'EsriStreetMap', 'EsriGroup',
    'http://services.arcgis.com/ArcGIS/rest/services/World_Street_Map/MapServer/tile/{z}/{y}/{x}',
    '© Esri', 0, 1
)

-- ---- Map Tab Tile Group
insert into GPV50MapTabTileGroup (MapTabID, TileGroupID, CheckInLegend, SequenceNo)
values (
    'Stormwater', 'EsriGroup', 1, 1
)

-- ---- Map Tab Tile Group
insert into GPV50MapTabTileGroup (MapTabID, TileGroupID, CheckInLegend, SequenceNo)
values (
    'Electric', 'EsriGroup', 1, 1
)
```
Installation and Configuration

Load scripts – All the others ....

- Connection
- Data Tab
- Layer Function
- Query
- Search
- Search Input Field
GPV - General Purpose Viewer

Results – Initial View

A screenshot of a map viewer interface with various options such as search, selection, legend, location, markup, and share. The map shows a detailed view of a geographic area with numerous roads and locations marked.
GPV - General Purpose Viewer

Results - Tools
GPV - General Purpose Viewer

Results – Map Tip
GPV - General Purpose Viewer

Results - Selection

[Image of a map with a list of selected facilities]
GPV - General Purpose Viewer

Results - Search
Installation and Configuration

• Prerequisites
  • ArcGIS Server 10.2.2
  • Windows Server 2008 R2
  • SQL Server 2008 R2
  • Microsoft Internet Information Server 7
  • ArcGIS Online Resources
CMV – Configurable Map Viewer

Installation and Configuration

• Web Application Install
  • Extract application code
  • Configure using IIS Manager
  • Test Sample Site
Installation and Configuration

- Code Configuration
  - Copy / Comment Out / Adjust
    - ../js/config/viewer.js
    - ../js/config/find.js
CMV – Configurable Map Viewer

Installation and Configuration

• ../js/viewer.js

```javascript
mapOptions: {
    basemap: 'streets',
    center: [-88.154803, 41.748075],
    zoom: 11,
    sliderStyle: 'small'
},

{
    type: 'dynamic',
    url: 'http://appdevgis:6080/arcgis/rest/services/NEARC/Stormwater/MapServer',
    title: 'Stormwater',
    options: {
        id: 'stormWater',
        opacity: 1.0,
        visible: true,
        imageParameters: imageParameters
    }
},

{
    type: 'dynamic',
    url: 'http://appdevgis:6080/arcgis/rest/services/NEARC/Electric/MapServer',
    title: 'Electric Facilities',
    options: {
        id: 'electricFacilities',
        opacity: 1.0,
        visible: false,
        imageParameters: imageParameters
    }
}
```
CMV – Configurable Map Viewer

Installation and Configuration

- ../js/find.js

```javascript
queries: [
  {
    description: 'Find A Manhole',
    layerIds: [6],
    searchFields: ['OBJECTID','FACILITYID','FLOWDIR'],
    minChars: 2,
    gridColumns: [
      { field: 'OBJECTID', label: 'Name' },
      { field: 'layerName', label: 'Layer', width: 100, sortable: false, resizable: false }
    ],
    sort: [
      {
        attribute: 'Name',
        descending: false
      }
    ],
    prompt: 'OBJECTID,FACILITYID OR FLOWDIR',
    selectionMode: 'Single'
  },
]```
CMV – Configurable Map Viewer

Results – Initial View
CMV – Configurable Map Viewer

Results – Identify / Select
CMV – Configurable Map Viewer

Results – Layers / Base Maps
CMV – Configurable Map Viewer

Results – Layers
CMV – Configurable Map Viewer

Results – Search
CMV – Configurable Map Viewer

Results – Street View
CMV – Configurable Map Viewer

Results – Add Feature
CMV – Configurable Map Viewer

Results – Edit Feature
Summary and Questions

GPV
- In tune with municipal needs
- Isolates access
- Database driven

CMV
- Good tool set
- Good for open access
- Code Required to meet needs

Questions