Custom Visualizations And You

A How-To For Developers

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September 25, 2017 | Washington, DC
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About This Session

- Advanced Track
- Developer Focused
- Code Will Be Shown
- Exposure To Following
  - Javascript
  - HTML
  - Web Development
  - CSS
- Be inspired and empowered
About Me

- Principal SE Architect @ Splunk – 4.5 years
- Former Splunk Customer – 2 years
- Tools developer and Javascript tinkerer
- Custom Viz Author
  - Clustered Single Value Map Visualization
  - Custom Image Map Visualization
- Father of 3
- Lifelong A’s fan
Agenda

- Viz Evolution
- Anatomy of a Viz
- API
- Dependencies & Packaging
- Debugging
- Community & Adoption
- Tips & Tricks
Viz Evolution
In The Beginning
There Was Light

- HTML dashboard SplunkJS (Splunk 6.0)
- SimpleXML with Javascript/CSS Extensions
  
  ```html
  <dashboard script="filename.js" stylesheet="filename.css">
  ```

- Challenges
  - Configuration
  - Re-usability
  - Flexibility
  - Maintenance
  - Lacking Standards
A Better Way

- Custom Viz API
- Standardization
- Consistent Behavior
- Packaging and distribution on Splunkbase
- ACL’s & App Context Namespacing
Anatomy Of A Viz
The Big 6

- `src/<visualization_src>.js`
  - Source code for viz – make all edits here

- `visualization.js`
  - Webpack built file for rendering viz

- `formatter.html`
  - HTML for rendering format menu options

- `visualization.css`
  - CSS rules or links to stylesheets

- `README/savedsearches.conf.spec`
  - Config property names and types

- `default/savedsearches.conf`
  - Config property default values
Core Methods

- **updateView** *
  - Called when search results are update or viz format changes
  - *Data* and *config* parameters

- **getInitialDataParams** *
  - Required for data to be returned from search.
  - Specifies data output format and max number of results
    - Column Major, Row Major, Raw

- **formatData**
  - Use to error check/clean/transform data passed into *updateView*

- **setupView**
  - One-time view setup logic
updateDataParams
• Use to process results > 50k events in chunks
• Count and offset parameters

drilldown
• Define drilldown interaction
• Field-value or Geo-spatial
• Supports earliest / latest time modifiers
Formatter API

Customization & Interaction
- Dropdown
- Radio Inputs
- Text Entry
- Text Area
- Color Picker
- Grouping & Tabs

Custom HTML Elements
- Dropdown
- Radio Inputs
- Text Entry
- Text Area
Dependencies & Packaging
NPM & Node.js

Build amazing things

npm is the package manager for JavaScript and the world’s largest software registry. Discover packages of reusable code — and assemble them in powerful new ways.

Sign up for npm

npm Orgs is powerful collaboration — for free

- Encourage code discovery and re-use within teams
- Publish and control access to your own namespace
- Manage public and private code with the same workflow

Sign up for Orgs
or, Learn more about Orgs

https://www.npmjs.com/
Webpack
package.json

```json
{
    "name": "leaflet_maps_app",
    "version": "1.5.7",
    "description": "Leaflet maps app with Markercluster plugin functionality.",
    "main": "visualization.js",
    "scripts": {
        "build": "node .node_modules/webpack/bin/webpack.js",
    },
    "author": "Splunk",
    "license": "MIT",
    "devDependencies": {
        "imports-loader": "^0.6.5",
        "webpack": "^1.12.6"
    },
    "dependencies": {
        "jquery": "^2.2.0",
        "underscore": "^1.8.3",
        "leaflet": "^1.0.3"
    }
}
```
webpack.config.js

```javascript
var webpack = require('webpack');
var path = require('path');

module.exports = {
  entry: 'leaflet-maps',
  resolve: {
    root: [path.join(__dirname, 'src')],
  },
  output: {
    filename: 'visualization.js',
    libraryTarget: 'amd'
  },
  module: {
    loaders: [
      {test: /leaflet\ markercluster\-src\ js$/,
        loader: 'imports-loader?l=leaflet'
      },
      {test: /leaflet\ awesome-markers\ js$/,
        loader: 'imports-loader?l=leaflet'
      },
      {test: /leaflet\ vector-markers\ js$/,
        loader: 'imports-loader?l=leaflet'
      },
      {test: /leaflet\ featuregroup\. subgroup\-src\ js$/,
        loader: 'imports-loader?define=>false'
      },
      {test: /leaflet\ measure\ js$/,
        loaders: ['imports-loader?l=leaflet', 'transform/cacheable!brfs']
      }
    ]
  },
  externals: [
    'api/SplunkVisualizationBase',
    'api/SplunkVisualizationUtils'
  ];
};
```
## Install & Build

```
[root@3b44f0edb9c6 leaflet_maps]# npm install

[root@3b44f0edb9c6 leaflet_maps]# npm run build

> leaflet_maps_app@1.5.7 build
/opt/splunk/etc/apps/leaflet_maps_app/appserver/static/visualizations/leaflet_maps
> node ./node_modules/webpack/bin/webpack.js
```

Hash: 882f9a141e227ccd6951
Version: webpack 1.15.0
Time: 1467ms

<table>
<thead>
<tr>
<th>Asset</th>
<th>Size</th>
<th>Chunks</th>
<th>Chunk Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>visualization.js</td>
<td>1.73 MB</td>
<td>0 [emitted] main</td>
<td></td>
</tr>
<tr>
<td>./src/leaflet_maps.js</td>
<td>43.6 kB</td>
<td>{0} [built]</td>
<td></td>
</tr>
<tr>
<td>+ 124 hidden modules</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Debugging
Developer Mode

- $SPLUNK_HOME/etc/system/local/web.conf

[settings]
minify_js = False
minify_css = False
js_no_cache = True
cacheEntriesLimit = 0
cacheBytesLimit = 0
enableWebDebug = True
Community & Adoption
Share & Follow

- Post your visualization to Splunkbase
- Subscribe to your app and follow answers posts
Open Source Your Code

- Use GitHub for
  - Documentation
  - Issue Tracking
  - Feature Requests
  - Collaboration
Get Creative
Nuggets

▶ **formatter.html**

```javascript
{{VIZ_NAMESPACExx}.mapTileOverride._maps_app.leaflet_maps.mapTileOverride
```

▶ **visualization.css**

```css
@import url('./contrib/css/leaflet.css');
```

▶ **formatData**

- Check for empty data
- Check for unexpected values and throw useful errors

```javascript
// Validate we have at least latitude and longitude fields
if(!("latitude" in dataRows[0]) || !("longitude" in dataRows[0])) {
    throw new SplunkVisualizationBase.VisualizationError(
        'Incorrect Fields Detected - latitude & longitude fields required' 
    );
}
```
SplunkVisualizationUtils

- `escapeHtml(inputString)` | Prevent XSS injection
- `makeSafeUrl(inputUrl)` | Strip dynamic content from unsafe URL schemes

default/visualizations.conf

- `supports_drilldown = 0 | 1` (6.6.x)
- `supports_trellis = 0 | 1` (6.6.x)
Leverage Available Resources

- Download Splunk Built Viz
- **Follow the tutorial**
  - https://docs.splunk.com/Documentation/SplunkCloud/6.6.0/AdvancedDev/CustomVizTutorial
- Use NPM
  - Credit 3rd party software
- Learn Webpack loaders
- Gain inspiration
  - D3
  - Leaflet
  - Dygraphs
  - Ember Charts
Custom Image Map Visualization

- Plot markers on any custom image using x,y coordinates

Custom image map visualization to plot x,y coordinates in pixels on a flat image using LastFer Maps.

Have you ever wanted to map people in a building or retail space and trace their path across the store? Are you looking to plot gaming data on a custom game map? If you have an image, data and can convert or specify coordinates in x,y, use this custom visualization!

Release Notes

Version 1.0.1 April 12, 2017

- Added feature to set background color of container for images that don’t fill the entire panel.

VERSION 1.0.1

BUILT BY
Scott Hessel
Clustered Single Value Map Visualization

- Map massive amounts of Individual Points With Clustering
- 600+ Active Installs
- 4,000+ Downloads

Release Notes

Version 1.5.7  July 13, 2017

- Reverted event processing logic to old method due to reports of inconsistent behavior
- Supports version 6.4+ again
Visit Me On GitHub

- Fork and modify my code
- Participate in visualization community
- Explore Kafka integration
Follow My Blogs
https://www.splunk.com/blog/author/shaskell.html
Hands-on Labs

Sandboxing with Splunk (with Docker)

Accept it. You’re afraid to take risks in Splunk. So was I. That is, until Docker came into my life. Join the cult and learn how to rapidly create disposable Splunk sandboxes in...
Thank You

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