

Using GIS to Map our Nation's Wastewater Infrastructure Needs – CWNS 2012

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Clean Watershed Needs Survey (CWNS)

The CWNS is a comprehensive assessment of the capital costs (or needs) to meet the water quality goals of the CWA and address water quality and water quality related public health concerns. Every four years, the states, territories, District of Columbia and EPA collect information about:

- Publicly owned wastewater collection and treatment facilities
- Stormwater and combined sewer overflows control facilities

The CWNS 2012 reported needs totaled \$271 billion



A Web Based Approach

- EPA reduced the size of the quadrennial CWNS Report to Congress, but still needed to share the data with Congress and the Public
- Report was reduced from 145 pages to 45 pages saving resources and money
- Previous CWNS Reports to Congress never had a mapping interface to provide users a visual tool for obtaining and viewing their pertinent data
- Finding the data could take a while flipping through the hard-copy report and it wasn't broken down by the most frequently requested data



A Web Based Approach (continued)

The mapping application now becomes the online visual companion to the hard-copy Report to Congress. This web platform allows users to access their most requested data and have those needs further broken down by state, congressional district, county and at the wastewater facility level



A Web Based Approach (continued)

- Uses EPA's internal GeoPlatform to host expose map services
- Uses JavaScript API to develop applications that run in the browser
- Uses Web Services and links to add Additional information from other systems

How can EPA let our users find what they're looking for quickly?



Sequence of Events

- Browser Requests Application
- Server Responds with the Application
- Application Loads and Requests Maps from ArcGIS Server
- ArcGIS Server Responds with Map Tiles
- User Clicks on the Map over a Feature of Interest
- Query Sent to ArcGIS Server to obtain Feature Data
- ArcGIS Server Responds with Features and graphics are added to the map



Sequence of Events (continued)

- Browser requests additional data from Web Server
- Web Service responds with data in ...
- Feature and Web Service Data is loaded into a pop up window for display
- User clicks on graphic added to the map display
- Browser displays pop up window
- Pop up window displays information, hyperlinks to other related data sources, scanned pdfs, and reports



Client Application

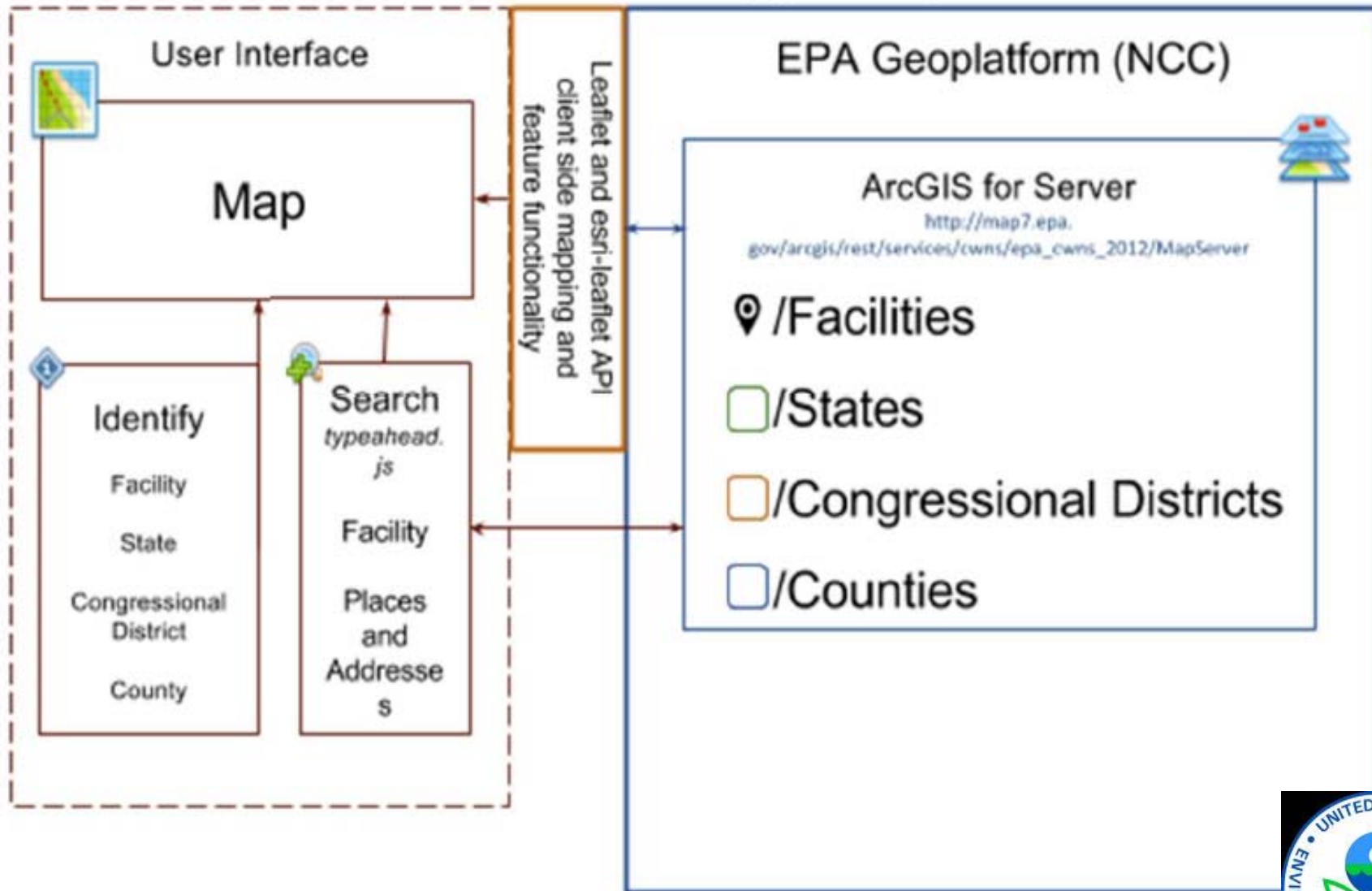
The Client application was developed using open standards including HTML 5, Javascript and CSS 3.

Several Javascript libraries were used to provide application functionality:

- Leaflet JavaScript mapping library provides robust mapping capability and is used extensively throughout the application. Initial deployment included Leaflet v0.7.3
 - ESRI i-leaflet Javascript mapping library provides additional mapping capability that interacts with ArcGIS Server map services. Initial deployment included *ESRI -leaflet* v1.0.0
- Bootstrap front-end framework was used for layout and styling. It provides clean and simple user interaction components as well as a layout framework. Initial deployment included Bootstrap v3.2.0



EPA CWNS Mapper System



Application Hosting

The application is hosted on *EPA's GeoPlatform* housed at the National Computer Center (NCC)



Map Demo

<https://cwns.epa.gov/cwns2012/>



Other Benefits of CWNS Mapping effort

In a recent emergency response exercise, the CWNS map was used to verify locational data as well as to filter existing exercise map data to more accurately define POTW locations that were in the areas of concern.

- By adding additional data layers such as the National Hydrography Dataset Plus (NHD Plus) it becomes a more useful tool for Emergency Response efforts by showing nearby stream data in case of a spill or overflow.



Questions ?

*“Infrastructure is
much more
important than
architecture”*

Rem Koolhaas



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<https://www.epa.gov/cwns>