



OUTFRONT MEDIA PUTS THE L IN TLC

OUTFRONT/

LOCATION ANALYTICS

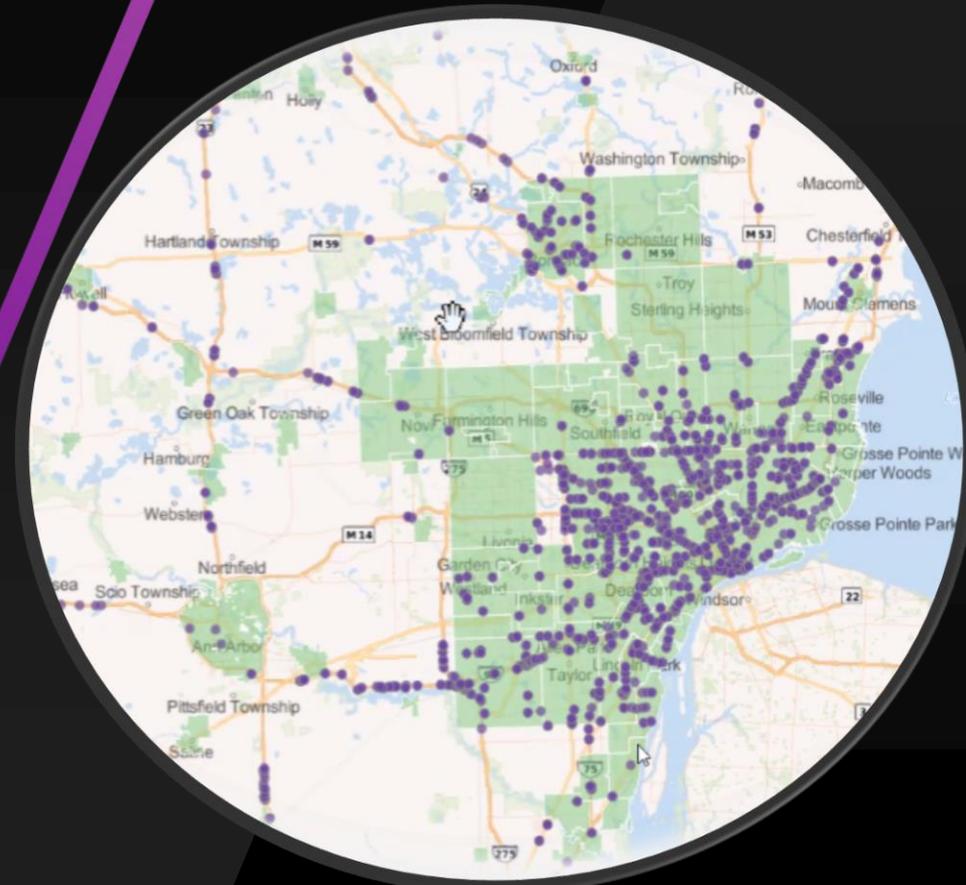
OUTFRONT MEDIA PUTS THE L IN TLC

SCOTT SEARCY
DIRECTOR OF ANALYTICS
OUTFRONT MEDIA

CHRIS SCIULLO
SR ANALYTICS ANALYST
OUTFRONT MEDIA

TIM AND DAN VLAMIS
VP & PRESIDENT
VLAMIS SOFTWARE SOLUTIONS

OCT 19, 2022



PRESENTER BIOS



SCOTT SEARCY
DIRECTOR OF ANALYTICS

- / 10 YEARS AT OUTFRONT
- / 7 YEARS LEADING OUTFRONT ANALYTICS
- / ENTHUSIASTIC SOCCER DAD



TIM VLAMIS
VP & ANALYTICS
STRATEGIST

- / MANY YEARS AT VLAMIS
- / ORACLE ACE DIRECTOR
- / EXPERT IN VISUALIZATION OF DATA AND BUSINESS ANALYTICS STRATEGIES
- / OCCASIONAL YACHT CAPTAIN

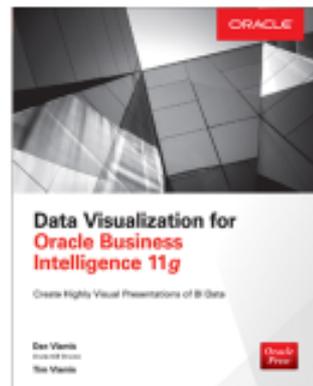


CHRIS SCIULLO
SR ANALYTICS
ANALYST

- / NEW GURU AT OUTFRONT
- / 15 YEARS DATA ANALYST AND DECISION SUPPORT ROLES
- / MOVIE NERD

VlamiS Software Solutions

- VlamiS Software founded in 1992 in Kansas City, Missouri
- Developed 400+ Oracle BI and analytics systems
- Specializes in Oracle-based:
 - Enterprise Business Intelligence & Analytics
 - Analytic Warehousing
 - Machine Learning and Predictive Analytics
 - Data Visualization
 - ETL and data integration
- Multiple Oracle ACEs, consultants average 15+ years
- Creators of the [Force Directed Graph Plugin](#) on [Oracle Analytics Library](#)
- www.vlamiS.com (blog, papers, newsletters, services)
- Co-authors of book “Data Visualization for OBI 11g”



ORACLE
ACE Director



ORACLE
ACE Director



OUTFRONT MEDIA

- / ONE OF THE LARGEST OOH COMPANIES IN NORTH AMERICA
- / CONNECT BRANDS WITH CUSTOMERS
- / BRAND IMPRESSIONS DELIVERED THROUGH BEST ASSET PORTFOLIO

Our Mission: Simple, short, and memorable, grounded by three letters: TLC. We leverage the power of technology, **location** and creativity to deliver impactful and engaging interactions with audiences as they live their lives.



OUTFRONT MEDIA



Bulletin



Wall



Digital Bulletin



Poster



Transit Station



Bus Shelter



Rail



Bus

Billboards Transit & Other

Displays

46,723

22 Bus/Rail Franchises

465,630

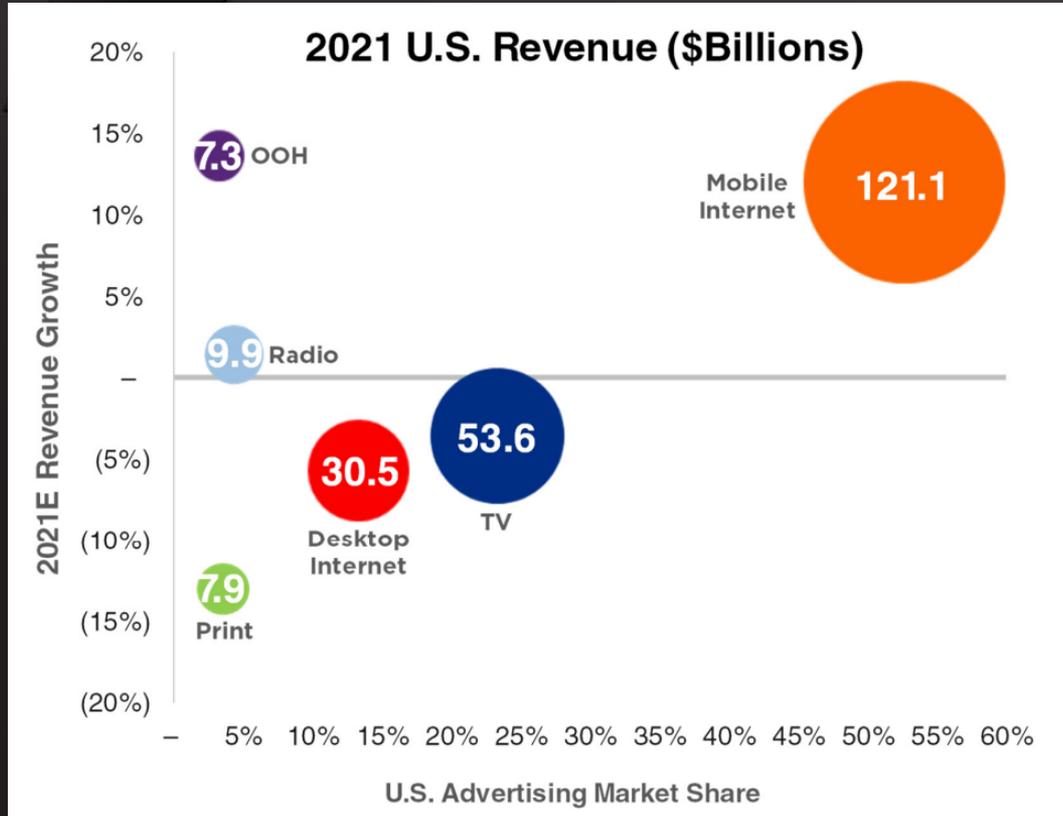
Revenues (\$M)

\$1,190

\$592

Note: All displays and revenues as of and for the year ending December 31, 2019. Transit & Other displays include 22 franchises for bus and rail and an additional transit shelter and bicycle share contracts.

MARKET SHARE SHIFT



/ DRIVE MEDIA ALLOCATION TO
OUTFRONT

/ OOH BOOSTS EFFECTIVENESS
OF OTHER MEDIA

/ TECHNOLOGY TAILWIND FOR
OOH

Source: MAGNA GLOBAL December 2020; OOH includes cinema advertising

USE CASE OVERVIEW

BUSINESS CHALLENGE:

Real Estate Representatives are measured on finding opportunities to build new locations or upgrade existing location to premium assets.

Reps use a combination of tools to manually create data they require for analysis.

GOAL:

Create a real estate tool that allows our reps to explore OUTFRONT assets using a combination of geospatial attributes and data warehouse information to create scenario based 'playbooks'.

KEY ASSUMPTION:

An asset's Latitude and Longitude is highly accurate and we could enhance our data with geospatial attributes that were not well curated in our source data

SOLUTION:

SPATIAL STUDIO + ADW + OAC

CONFIDENCE LEVEL



HOW IT STARTED



IT SEEMED SO SIMPLE

/ Challenges of traditional administrative boundaries in USA

/ State → County → Sub-county

- / Many cities span multiple counties and sub-counties

- / Sub-county administration and governance differ by state

 - / “What does it mean?”

- / Incorporated vs unincorporated jurisdictions

- / Lack of national database of codes and rules (different in different places)

/ Challenge of detailed boundaries

- / Need a high degree of detail in some places

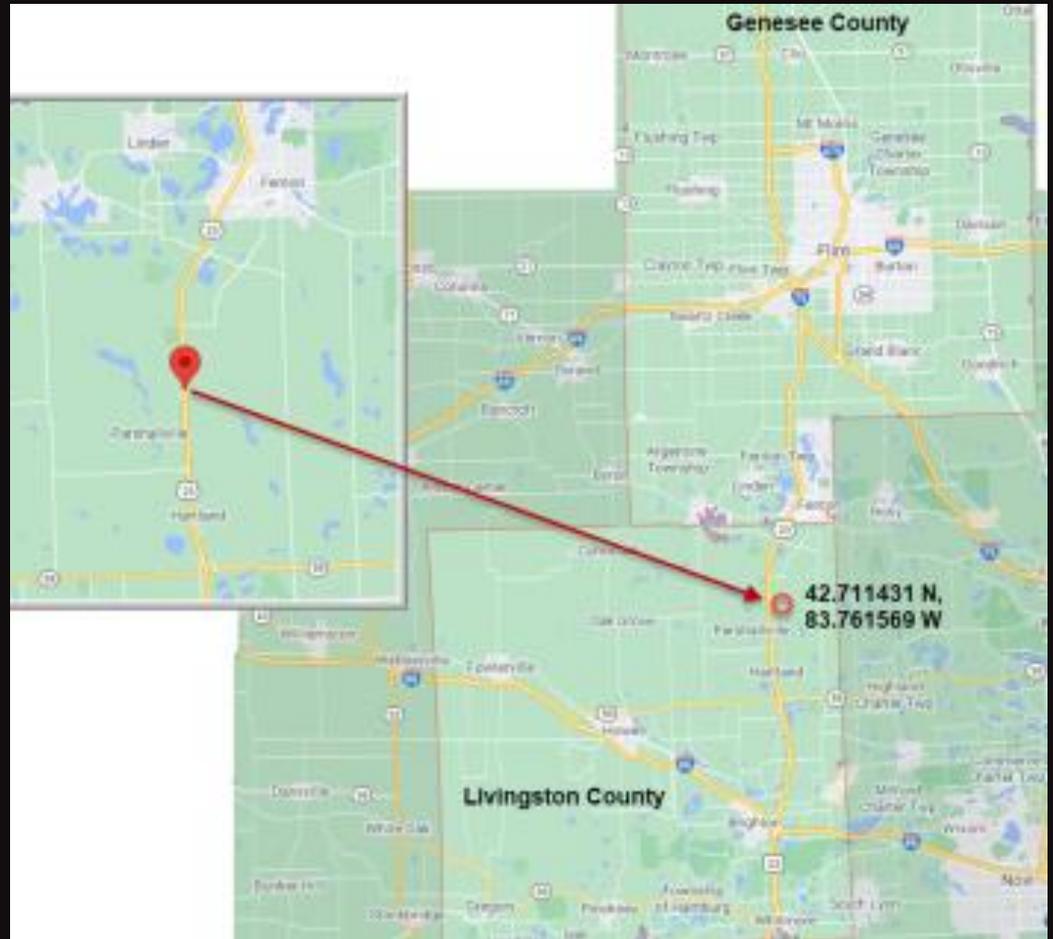
- / Many natural boundaries add unnecessary detail

- / Smoothing can't be universal - “Not geometry”

/ Reverse geo-coding is designed for addresses, not locations

REVERSE GEO CODING ERROR

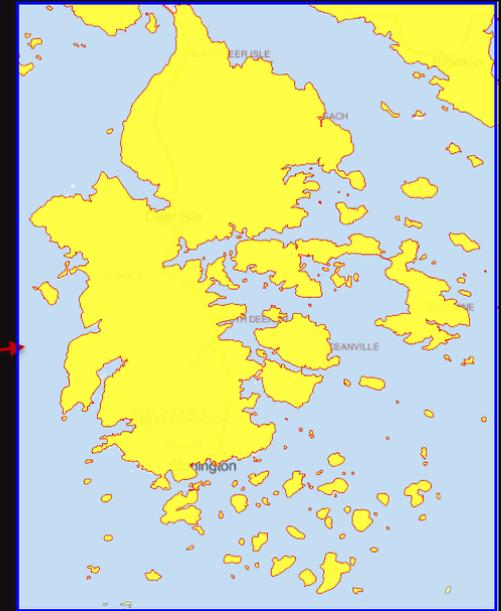
- / Uses inferred address, not geo location from lat/long
- / This asset was placed in the wrong county



SIMPLIFYING COASTLINES USING SPATIAL STUDIO

/ Hancock county ME 41,000+ vertices

/ Eliminating coastal detail reduces vertices by 98%





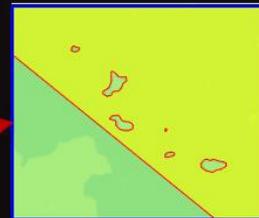
ELIMINATE COASTLINES

KEEP INLAND DETAIL

- / Create rubber band boundaries
- / Remove overlap with bordering counties
- / Layer edited last provides the detailed border

IMPACT

- / Coast border integrity is lost
- / Unsure which islands are in which counties because of rubber band
- / Inland island detail is lost (lakes, islands in rivers, etc.)



SDO_GEOM FUNCTIONS USED

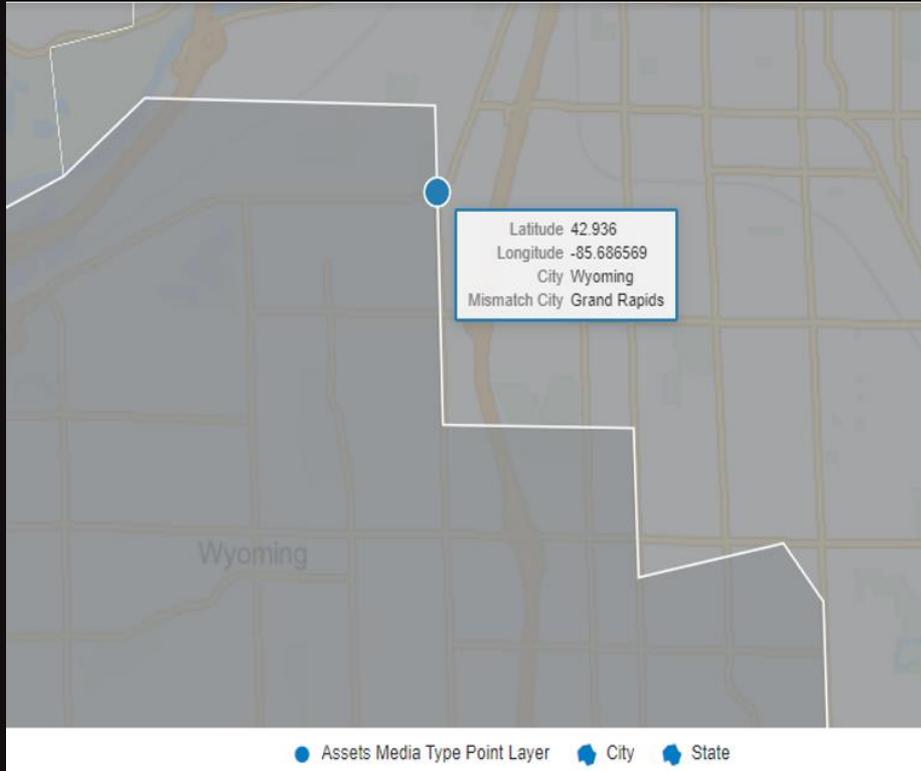
- // Loop #1 to establish inland detailed boundaries
 - // sdo_convexhull target county (rubber band county)
 - // sdo_anyinteract (select bordering counties)
 - // sdo_difference (remove overlap areas of bordering counties)

- // Loop #2 to restore simplified border for overlaps off-shore
 - // Sdo_anyinteract (restore rubber band border for target county)

ROAD TO SOLUTION

- ✓ Resolving Inaccurate Spatial Joins
- ✓ Overcoming Mapping Data Size Issues
- ✓ Data Cleansing
- ✓ Simplifying for Map Layers

INACCURATE SPATIAL JOIN



A screenshot of a mobile map application interface. At the top, a search bar contains the coordinates "42.936 -85.686569". Below the search bar is a street view image of a building. Underneath the image, the coordinates are displayed in both degrees/minutes/seconds and decimal degrees: "42°56'09.6"N 85°41'11.7"W" and "42.936000, -85.686569".

Below the coordinates are five icons with labels:

- Directions
- Save
- Nearby
- Send to your phone
- Share

At the bottom, there are four location-related options:

- 1530 I-196BL, Wyoming, MI 49503
- W8P7+C93 Wyoming, Michigan
- Add a missing place
- Add your business

MAPPING DATA TOO LARGE

The screenshot shows the Overpass Turbo web interface. The browser address bar displays `https://overpass-turbo.eu`. The application header includes a 'Run' button and various utility icons. On the left, a code editor contains the following Overpass QL query:

```
1 //  
2 This has been generated by the overpass-turbo wizard.  
3 The original search was:  
4 //  
5 [out:json][timeout:1000];  
6 [geocodeArea: United States of America];->.searchArea;  
7  
8 relation["admin_level"="8"](area.searchArea);  
9 ;  
10 out body;  
11 >;  
12 out skel qt;
```

The main area of the interface is a map of the United States, showing a network of roads and administrative boundaries. A white dialog box titled 'Ajax Error' is centered on the screen, containing the following text:

Ajax Error

An error occurred during the execution of the overpass query!

Request rejected. (e.g. server not found, request blocked by browser addon, request redirected, internal server errors, etc.)

Error-Code: error (0)

A 'dismiss' button is located at the bottom right of the dialog box.

DATA CLEANSING

Create dataset from GeoJSON



File: ADMIN_LEVEL_8_1.geojson

Table name: * ADMIN_LEVEL_8_1

Upload to connection: * ----- Select -----

Dataset name: * ADMIN_LEVEL_8_1

Validate geometries

Columns Settings

@id	admin_level	border_type	boundary	name	place	type	wikidata
STRING	STRING	STRING	STRING	STRING	STRING	STRING	STRING
relation/109925	8	city	administrative	Greenville	town	boundary	Q988112
relation/110114	8	town	administrative	Sand Rock	town	boundary	Q66116
relation/110116	8	city	administrative	Centre	village	boundary	Q79650
relation/110118	8		administrative	Cedar Bluff	town	boundary	Q66331
relation/110120	8	city	administrative	Piedmont	village	boundary	Q79213
relation/110122	8		administrative	Heflin	city	boundary	Q79671
relation/110123	8	town	administrative	Eva	town	boundary	Q67461
relation/110125	8	town	administrative	Falkville	town	boundary	Q66979
relation/110127	8	city	administrative	Hartselle	city	boundary	Q79242

Submit

Cancel

CONVERT GeoJSON TO SHAPEFILE

The screenshot shows the mapshaper.org web application interface. The browser address bar displays `https://mapshaper.org`. The main content area is titled "ADMIN_LEVEL_8" and shows a map of the United States with a dense overlay of grey points representing administrative boundaries. A red dot on the map indicates "2696 line intersections".

On the left side, there is a console window with the following text:

```
Enter mapshaper commands or type "tips" for examples and console help
$ merge-layers target=ADMIN_LEVEL_8.6,ADMIN_LEVEL_8.5,ADMIN_LEVEL_8.4,ADMIN_
LEVEL_8.3,ADMIN_LEVEL_8.2,ADMIN_LEVEL_8.1 force
[merge-layers] Warning: Fields [source:population, name:ar, name:hak, name:s
an, name:yue, name:zh-hk, source:ele, state:capital, name:de, name:en, ele:s
ource, addr:postcode, place_name, note, name:rw, gnis:County, gnis:County_nu
m, gnis:ST_alpha, gnis:ST_num, gnis:Class, contact:phone, contact:website, n
ame:1900, name:1917, name:1870-1920, name:1920-1953, name:1953, alt_name:ar,
name:eo, name:zh_pinyin, source:name:roc, fixe, name:cy, name:fa, name:ht, n
ame:it, name:nl, name:pl, name:ro, name:sv, name:uz, name:vi, name:vo, name:
kn, alt_name:vi, name:azb, name:kk-Arab, name:prb, name:ur, int_name, lanes,
name:az-Arab, old_name:es, layer, size, name:etymology, name:etymology:wikid
ata, postal_code, name:af, name:an, name:arz, name:ast, name:bg, name:be, na
me:bg, name:br, name:ceb, name:cs, name:da, name:et, name:eu, name:fi, name:
fy, name:ga, name:gd, name:gl, name:hu, name:ia, name:id, name:io, name:ko,
name:kw, name:lv, name:ng, name:ar, name:mrj, name:nn, name:no, name:sco, na
me:sh, name:sk, name:sr, name:sw, name:szl, name:tl, name:tr, name:tt, name:
vec, name:war, placement, gnis:county_id, gnis:state_id, end_date, name:en:p
ronunciation, name:pcd, name:pronunciation, name:nl, area, name:ikt, descrip
tion, tiger:COBIDFP, tiger:COUNTFP, tiger:COUSBFP, tiger:COUSUBNS, acces
s, leisure, owner, protect_class, name:cro, name:fla, name:kut, route, firea
rms, noexit, zip_left, zip_right, name:zh-tw, name:ka, name:mk, name:th, nam
e:1, census, name:etymology:wikipedia, sassas, sidewalk:bicycle, gnis:state_
alpha, alt_name:es, loc_name, loc_name:pronunciation, shortest_name, old_nam
e:etymology, old_name:etymology:wikidata, boundary:historic, disused:border_
type, disused:boundary, contact:facebook, FIXME, destination, junction:ref,
pop, long_name, wikimedia:commons, addr:country, FIPS, attribution, operato
r, governance.type, protection.object, site.ownership, name:ace, name:ak, na
me:als, name:am, name:ang, name:arc, name:az, name:bar, name:bat-smg, name:b
cl, name:be-tarask, name:th, name:bi, name:bm, name:bn, name:bs, name:bvr, n
ame:cdo, name:ce, name:chy, name:ckb, name:co, name:diq, name:dsb, name:dty,
name:eml, name:ext, name:fy, name:fo, name:frp, name:frr, name:fur, name:ga
n, name:gn, name:got, name:gv, name:ha, name:haw, name:hi, name:hif, name:h
r, name:hsb, name:hy, name:hw, name:ie, name:ig, name:ilo, name:is, name:i
u, name:jam, name:jv, name:kaa, name:kab, name:ki, name:kk, name:kl, name:kr
c, name:ku, name:ky, name:la, name:lad, name:lb, name:ln, name:ll, name:ll
j, name:lmo, name:ml, name:mn, name:ms, name:mwl, name:my, name:myv, name:mz
n, name:na, name:nds, name:nds-nl, name:ne, name:new, name:nov, name:os, nam
e:pa, name:pam, name:pap, name:pcd, name:pis, name:ps, name:qu, name:rm, nam
e:rmv, name:rn, name:roa-rup, name:roa-tara, name:rue, name:sah, name:sc, na
me:scn, name:se, name:sg, name:sl, name:sn, name:so, name:sq, name:srn, nam
e:st, name:stq, name:te, name:tet, name:tg, name:tk, name:tpi, name:tw, nam
e:tzl, name:ug, name:vep, name:wa, name:wuu, name:xh, name:xmf, name:yi, nam
e:yo, name:zu, name:or, name:gu, name:si, name:ja-Hira, name:ja-Latn, name:k
m, name:sd, name:sr-Latn, name:fil, name:ko-Latn, name:lo, name:uz-Latn, one
way, service, default_language, old_name:de, old_name:en, addr:county, addr:
state, name:pa-Arab, website.1, maxspeed, claim_to_fame, facebook, loc_name:
en, loc_name:vi, tagline, email, phone, image, voeid, fax, contact:instagra
m, old_name:1776-1784, old_name:1784-1801, twitter, heritage, historic, old.
```

On the right side, an "Export menu" dialog box is open, showing the following options:

- Layer name: ADMIN_LEVEL_8
- File format:
 - Shapefile
 - GeoJSON
 - TopoJSON
 - JSON records
 - CSV
 - SVG
- export options: [input field]
- Buttons: Cancel, Export

SIMPLIFY FOR MAP LAYER

The screenshot displays the Mapshaper web application interface. The browser address bar shows the URL `https://mapshaper.org`. The application title is "mapshaper". The main content area shows a map of the United States with a dense layer of points and lines, representing a large dataset. A notification in the top left of the map area indicates "848 line intersections". The top right of the interface has buttons for "Simplify", "Console", and "Export".

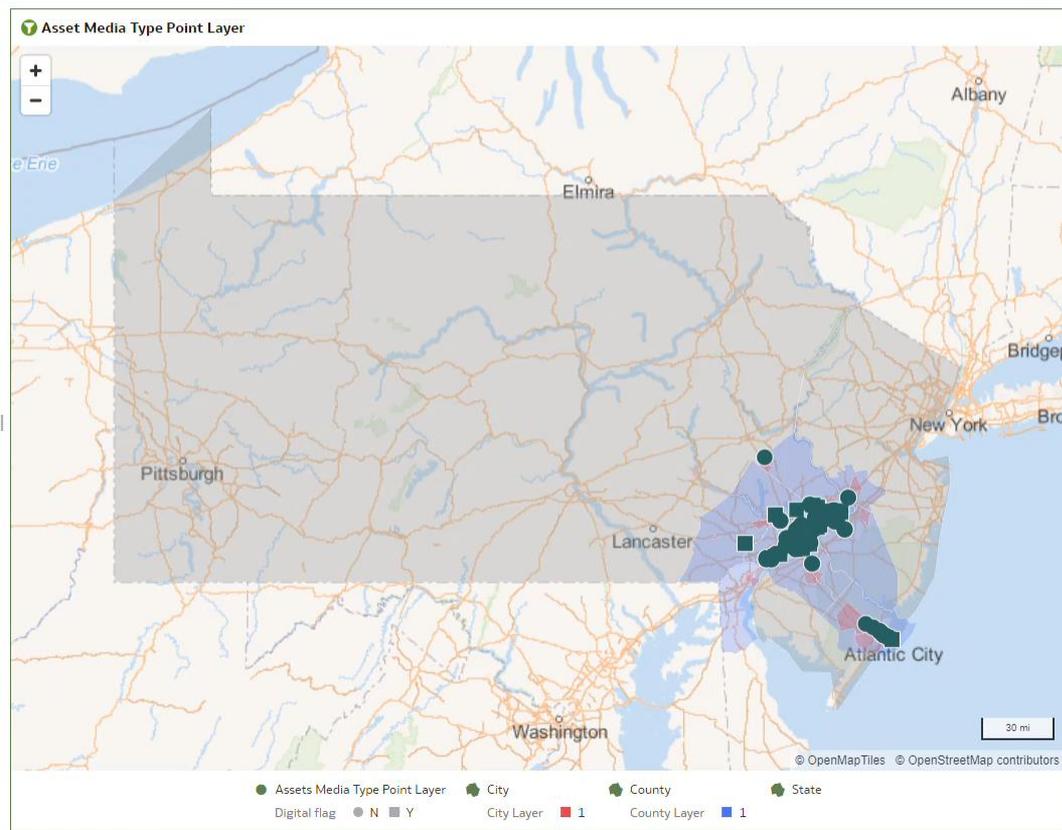
On the left side, a list of field name changes is displayed:

```
Changed field name from "name:ja-latn" to "name:ja-La"
Changed field name from "name:sr-latn" to "name:sr-La"
Changed field name from "name:ko-latn" to "name:ko-La"
Changed field name from "name:uz-latn" to "name:uz-La"
Changed field name from "default_language" to "default_la"
Changed field name from "old_name:de" to "old_name:d"
Changed field name from "old_name:en" to "old_name_3"
Changed field name from "addr:county" to "addr:cou_1"
Changed field name from "name:pa-Arab" to "name:pa_Ar"
Changed field name from "claim_to_fame" to "claim_to_f"
Changed field name from "loc_name:en" to "loc_name:e"
Changed field name from "loc_name:vi" to "loc_name:v"
Changed field name from "contact:instagram" to "contact:in"
Changed field name from "old_name:1776-1784" to "old_name:1"
Changed field name from "old_name:1784-1801" to "old_name_4"
Changed field name from "old_name:fr" to "old_name:f"
Changed field name from "designation" to "designatio"
Changed field name from "population:source" to "populati_2"
Changed field name from "alt_name:en" to "alt_name_1"
Changed field name from "alt_name:zh" to "alt_name:z"
Changed field name from "short_name:en" to "short_na_1"
Changed field name from "name:es:pronunciation" to "name:es:pr"
Changed field name from "name:zh-CN" to "name:zh_CN"
Changed field name from "official_name:en" to "official_1"
Changed field name from "incorporation_type" to "incorporat"
Changed field name from "name:zh-Hant-hk" to "name:zh_2"
Changed field name from "name:zh-Hant-tw" to "name:zh_3"
Changed field name from "source:geometry" to "source:geo"
Changed field name from "nist:fiqs_code" to "nist:fiqs_"
Changed field name from "nist:state_fips" to "nist:state"
Changed field name from "alt_name:gl" to "alt_name:g"
Changed field name from "is_in:municipality" to "is_in:muni1"
Changed field name from "name:cbk-zam" to "name:cbk_z"
Changed field name from "name:prefix" to "name:prefi"
Changed field name from "is_in:urbanization" to "is_in:urba"
Changed field name from "backcountry" to "backcountr"
Changed field name from "drinking_water" to "drinking_w"
Changed field name from "internet_access" to "internet_a"
Changed field name from "picnic_table" to "picnic_tab"
Changed field name from "addr:housenumber" to "addr:house"
Changed field name from "addr:street" to "addr:strae"
Changed field name from "reservation" to "reservatio"
Changed field name from "boundary.type" to "boundary.t"
Changed field name from "gnis:edited" to "gnis:edite"
Changed field name from "operator:type" to "operator:t"
Changed field name from "addr:source" to "addr:sourc"
Changed field name from "addr:source:url" to "addr:sou_1"
[source] truncated 1 string to fit the 254-byte limit
$
```

HOW IT ENDED



Year: 2021 | State: All | Inv Market Name: Philadelphia | County: All | City: All | Minor Civil Division: All | Inventory: All | Media Name: All | Matched Flag: Y | County: N/A



Inventory Market Details

Inventory	Media Name	County	City	Minor Civil Division	Year	Rent Amt	Revenue	Rent/Revenue %	Occupancy
PH-0000101-O	Bulletins	Delaware County	Upper Chichester Township	Chichester School District	2021	\$7,296	\$24,734	29.50%	94.79%
PH-0000102-O	Bulletins	Delaware County	Upper Chichester Township	Chichester School District	2021	\$6,438	\$31,959	20.16%	94.25%
PH-0000103-O	Bulletins	Delaware County	Upper Chichester Township	Chichester School District	2021	\$0	\$57,774	0.00%	100.00%
PH-0000104-O	Bulletins	Delaware County	Upper Chichester Township	Chichester School District	2021	\$0	\$23,522	0.00%	84.00%
PH-0000107-O	Bulletins	Delaware County	Upland	N/A	2021	\$2,889	\$53,429	5.41%	100.00%
PH-0000108-O	Bulletins	Delaware County	Upland	N/A	2021	\$2,960	\$37,029	7.99%	90.41%
PH-0000109-O	Bulletins	Delaware County	Chester	N/A	2021	\$0	\$12,098	0.00%	100.00%
PH-0000110-O	Bulletins	Delaware County	Chester	N/A	2021	\$0	\$27,715	0.00%	85.21%
PH-0000111-O	Bulletins	Delaware County	Upland	N/A	2021	\$2,685	\$60,533	4.44%	100.00%
PH-0000112-O	Bulletins	Delaware County	Upland	N/A	2021	\$3,164	\$28,418	11.14%	100.00%
PH-0000113-O	Bulletins	Delaware County	Ridley Township	N/A	2021	\$16,500	\$73,130	22.56%	100.00%
PH-0000114-O	Bulletins	Delaware County	Ridley Township	N/A	2021	\$19,500	\$29,734	65.58%	100.00%
PH-0000115-O	Bulletins	Delaware County	Upland	N/A	2021	\$2,677	\$35,928	7.45%	91.75%
PH-0000116-O	Bulletins	Delaware County	Chester	N/A	2021	\$5,172	\$21,780	14.57%	90.14%
PH-0000117-O	Bulletins	Delaware County	Ridley Township	N/A	2021	\$23,958	\$57,522	41.65%	100.00%
PH-0000118-O	Bulletins	Delaware County	Ridley Township	N/A	2021	\$22,042	\$57,514	38.32%	100.00%

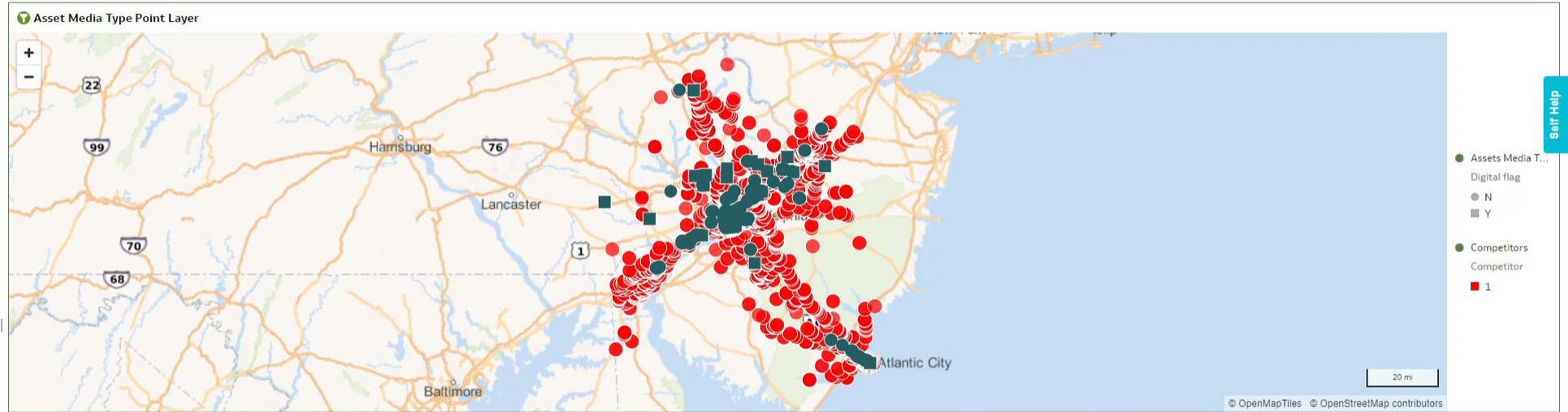
FUTURE ENHANCEMENTS

// ADDING COMPETITOR DATA – NEAREST COMPETITOR

// OAC ENHANCEMENTS

**// ADDITIONAL BOUNDARIES SUCH AS ZONING AND
POLITICAL**

Year: 2021 State: All Inv Market Name: Philadelphia County: All City: All Minor Civil Division: All Inventory: All Media Name: All Matched Flag: Y County: N/A Inv Market: Philadelphia



Inventory Market Details

Inventory	County	Digital flag	Media Name	Year	Rent Amt	Revenue	Rent/Revenue %	Occupancy
PH-0000101-O	Delaware County	N	Bulletins	2021	\$7,296	\$24,734	29.50%	94.79%
PH-0000102-O	Delaware County	N	Bulletins	2021	\$6,438	\$51,939	20.16%	94.25%
PH-0000103-O	Delaware County	N	Bulletins	2021	\$0	\$57,774	0.00%	100.00%
PH-0000104-O	Delaware County	N	Bulletins	2021	\$0	\$23,522	0.00%	84.00%
PH-0000107-O	Delaware County	N	Bulletins	2021	\$2,889	\$53,429	5.41%	100.00%
PH-0000108-O	Delaware County	N	Bulletins	2021	\$2,960	\$37,029	7.99%	90.41%
PH-0000109-O	Delaware County	N	Bulletins	2021	\$0	\$12,098	0.00%	100.00%
PH-0000110-O	Delaware County	N	Bulletins	2021	\$0	\$27,715	0.00%	85.21%

Competitor Data

Frame ID	County Name	Competitor Name	Digital	Media Name	Media Type	Classification
30664012	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30664011	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30664004	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30664005	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30664002	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30664000	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
30663999	Camden County	AR James & Company,	N	Junior Posters	Junior Poster	Roadside
625892	Bucks County	Adams	N	Posters	Poster	Roadside



Analytics and Data
ORACLE USER COMMUNITY

Analytics and Data Summit 2023

March 14-16, 2023

Oracle Conference Center
Redwood Shores, California

Call for abstracts is open!

www.andouc.org



QUESTIONS

Clark St

Prince

the most searched guitar solo

See more of America's most searched moments at g.co/tracksourcsmoments

Google

A billboard advertisement for Prince's guitar solo. The billboard features a photograph of Prince playing a guitar. The text on the billboard includes the name "Prince", the phrase "the most searched guitar solo", a link to "g.co/tracksourcsmoments", and the Google logo. The billboard is mounted on a structure above a street.

OUTFRONT

San Vicente Blvd

POP MUSIC
THE HOT DOGS
Jay Luchs

I AM NOT
ORAY
WITH THIS