

Census Bureau Geography Data Sources and Acquisition

Management Considerations for Transitioning from PAPI to CAPI

Michael Riedman

Geography Division

U.S. Census Bureau

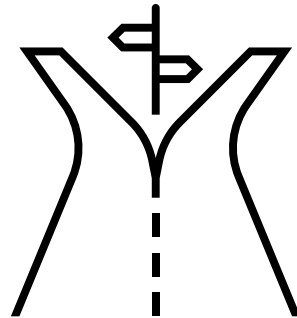
“Count every person once, only once, and in the right location.”

Types of Geographic Data Collected

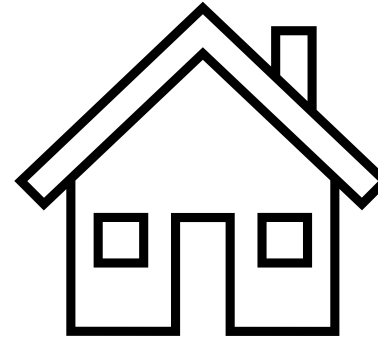
Boundaries



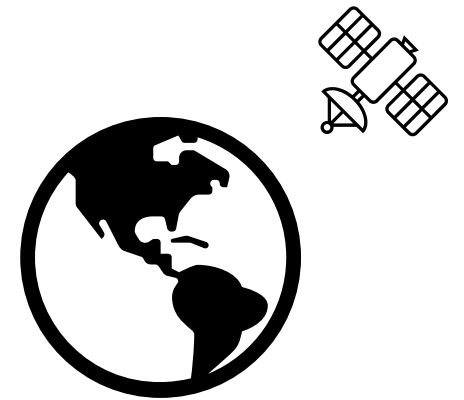
Features



Addresses



Imagery



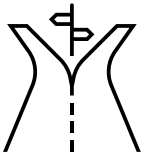
Census Geographic Database



Over **14 million** unique geographic areas



Legal boundaries for approximately **40,000** units of government

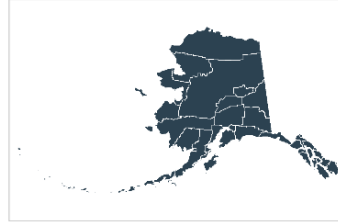


Approximately **7 million** miles of roads

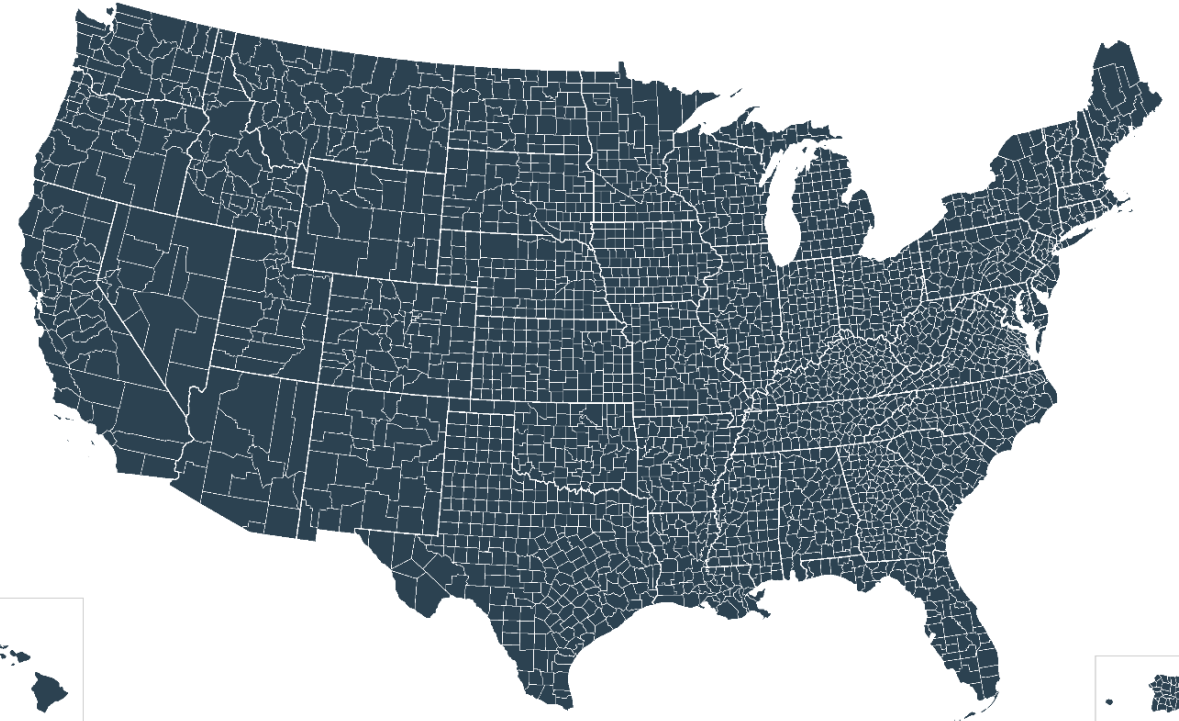


Structure points for over **90% of residential addresses** for the 2020 Census

Boundaries



- The **Country** is divided into **States**, and **States** are divided into **Counties**.
- The Census Bureau relies on State and County governments to provide updates to these and other boundaries.
- Collected through:
 - Tribal, state, and local governments



Two Types of Boundaries

Legal and Administrative

- Geographic areas that generally originate from legal actions
- Names and boundaries are defined in official documentation
- Usually represented by elected government officials
- Can evolve over time through legislation
- Delineated for the purpose of administration of an activity or governmental program

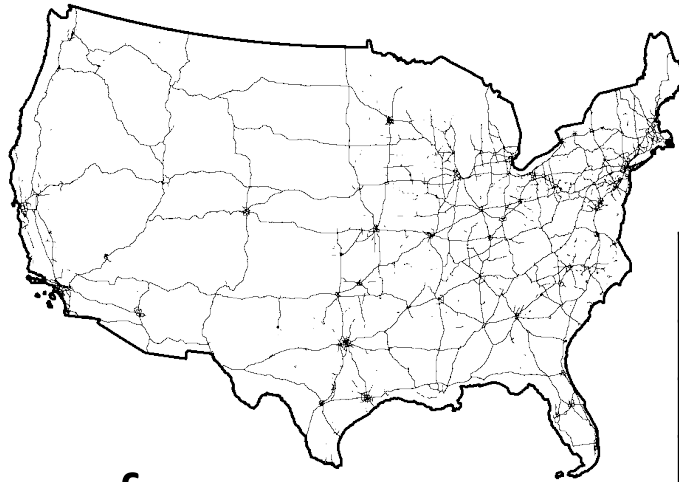
Statistical

- Geographic areas created by the Census Bureau and other stakeholders for data tabulation and presentation purposes
- Can provide coverage in areas where legal and administrative entities are incomplete or nonexistent
- Do not require official legislation for their creation
- Not usually represented by government officials or stakeholders
- Can evolve over time from practice, custom, usage, or need

Examples of Boundaries

Legal and Administrative Boundaries:	Statistical Boundaries:
Nation	ZIP Code Tabulation Areas
States and State Equivalents	Urban Areas
Incorporated Places	Core Based Statistical Areas
Congressional Districts	Metropolitan Divisions
School Districts	Regions
State Legislative Districts	Divisions
Counties and County Equivalents	Census Designated Places
Minor Civil Divisions	Public Use Microdata Areas
Consolidated Cities	Census County Divisions
Voting Districts	Census Tracts
	Census Block Groups
	Census Blocks

Features

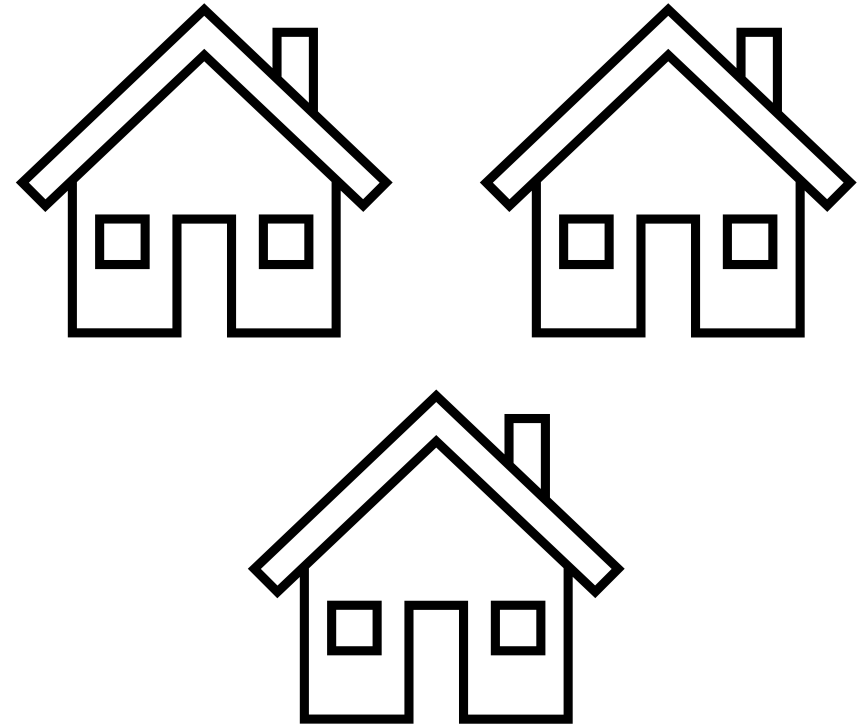


- Points, lines, or polygons.
- Used to verify the locations of addresses, guide field workers, and define geographic areas.
- Collected through:
 - Federal Partnerships
 - Tribal Governments
 - State Governments
 - County Governments

Road Feature	Code
Primary Roads	S1100
Secondary Roads	S1200
Local Neighborhood Roads, Rural Roads, or City Streets	S1400
Vehicular Trails	S1500
Ramps	S1630
Service Drives	S1640
Walkways or Pedestrian Trails	S1710
Stairways	S1720
Alleys	S1730
Private Roads	S1740
Internal U.S. Census Bureau Use	S1750
Parking Lot Road	S1780
Bike Path or Trail	S1820
Bridle Path	S1830
Road Median	S2000

Addresses

- Censuses and surveys are sent to residential addresses.
- Protected by law and employees are sworn to never disclose or share any address information.
- Collected through:
 - Census Operations
 - Federal Partnerships
 - Geographic Partnership Programs



Imagery

- Provides a way to verify addresses and boundaries without leaving the office.
- With more data being verified through imagery analysis, less workers need to be in the field.
- Collected through:
 - Federal Partnerships
 - Geographic Partnership Programs

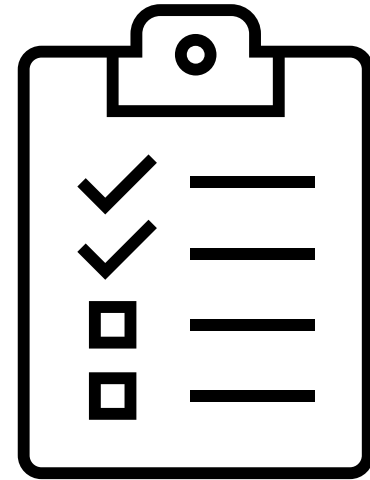
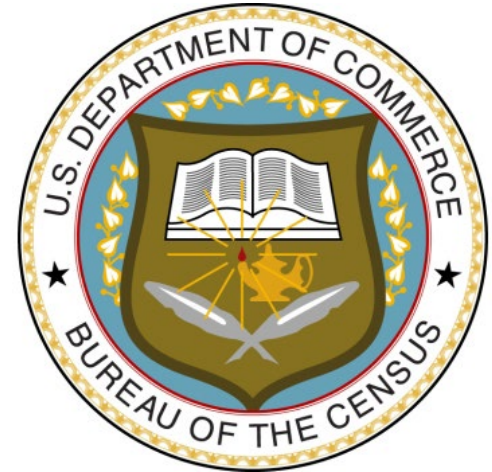


Sources of Geographic Data

Census Operations (internal)	Federal Partnerships	Geographic Partnership Programs
<ul style="list-style-type: none"> Field work 	<ul style="list-style-type: none"> Department of Commerce 	<ul style="list-style-type: none"> Tribal Governments
<ul style="list-style-type: none"> Collaboration between divisions 	<ul style="list-style-type: none"> Department of Transportation 	<ul style="list-style-type: none"> State Governments
	<ul style="list-style-type: none"> Department of Interior 	<ul style="list-style-type: none"> Local Governments
	<ul style="list-style-type: none"> Department of Agriculture 	
	<ul style="list-style-type: none"> Department of Defense 	

Census Operations

- The Geography Division utilizes data collected by other divisions within the Census Bureau.
- Geographic data supports over 130 surveys that occur throughout the decade.
- Collected through:
 - Field work
 - Collaboration between divisions



Federal Partnerships

Addresses	Features	Imagery
United States Postal Service	Department of the Interior	Department of Agriculture
	Department of Transportation	Department of Commerce
	Department of Defense	Department of Defense



**United States
Department of
Agriculture**

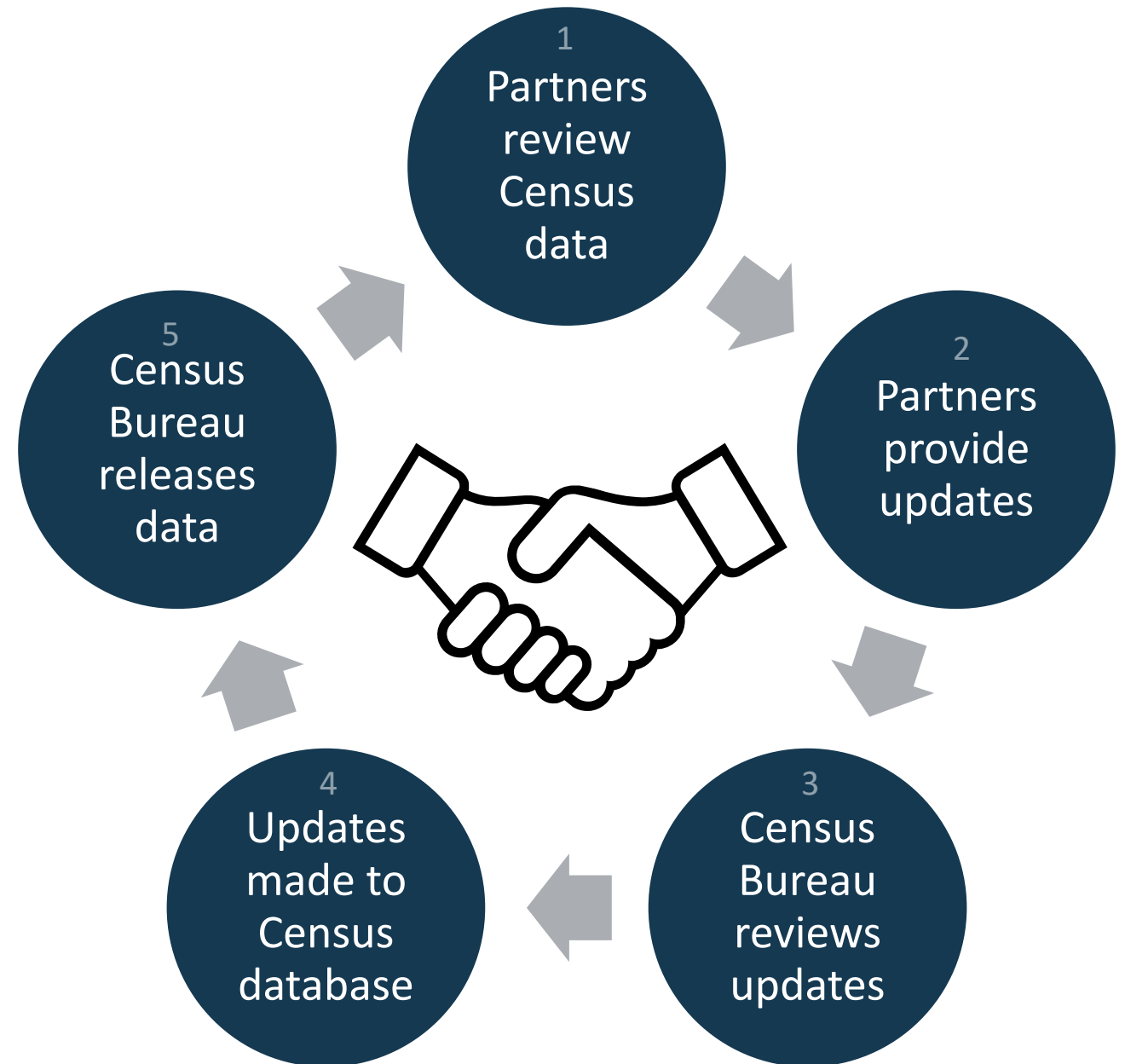


**U.S. Department
of Transportation**

Geographic Partnership Programs

- Main source of geographic data acquisition.
- Reliance on tribal, state, and local governments to provide data.
- Provides an opportunity for tribal, state, and local governments to review, update, or modify:
 - Boundaries
 - Addresses
 - Features
 - Imagery
- The data collected by these programs is critical to the accuracy of data estimates and other surveys produced by the Census Bureau.

Geographic Partnership Program Cycle

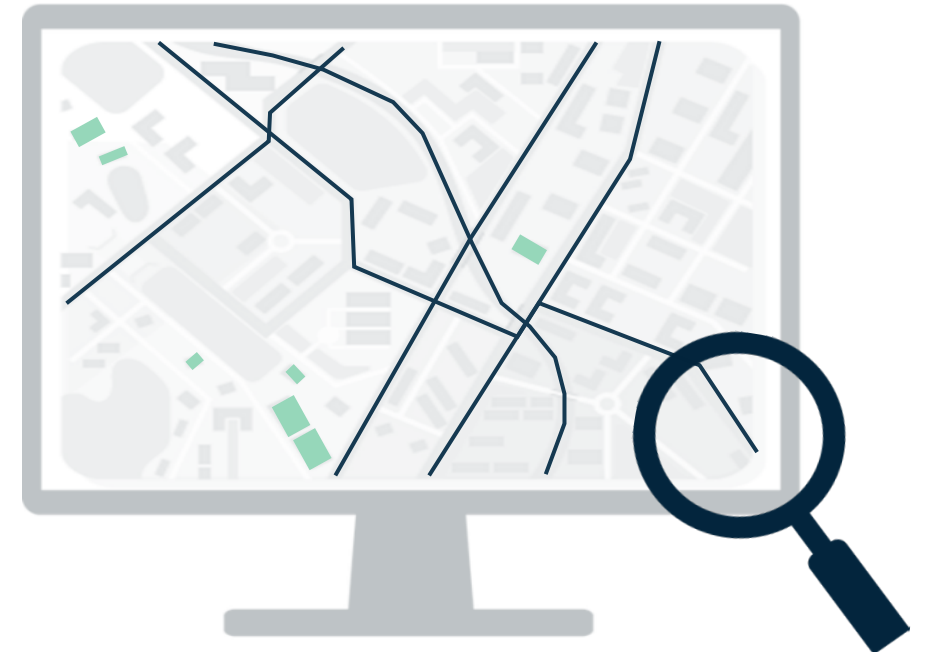


Geographic Partnership Programs

Program	Data Collected	Schedule
Boundary and Annexation Survey (BAS)	Legal Boundaries, Features	Every year
School District Review Program (SDRP)	Legal Boundaries	Every year
Spatial, Address, and Imagery Data (SAID) Program	Features, Imagery, Addresses	Every year
Partnership Statistical Areas Program (PSAP)	Statistical Boundaries	Once a decade
Local Update of Census Addresses (LUCA)	Addresses	Once a decade
New Construction Program (NC)	Addresses	Once a decade
Redistricting Data Program (RDP)	Legal Boundaries	Once a decade
Public Use Microdata Areas (PUMA)	Statistical Boundaries	Once a decade

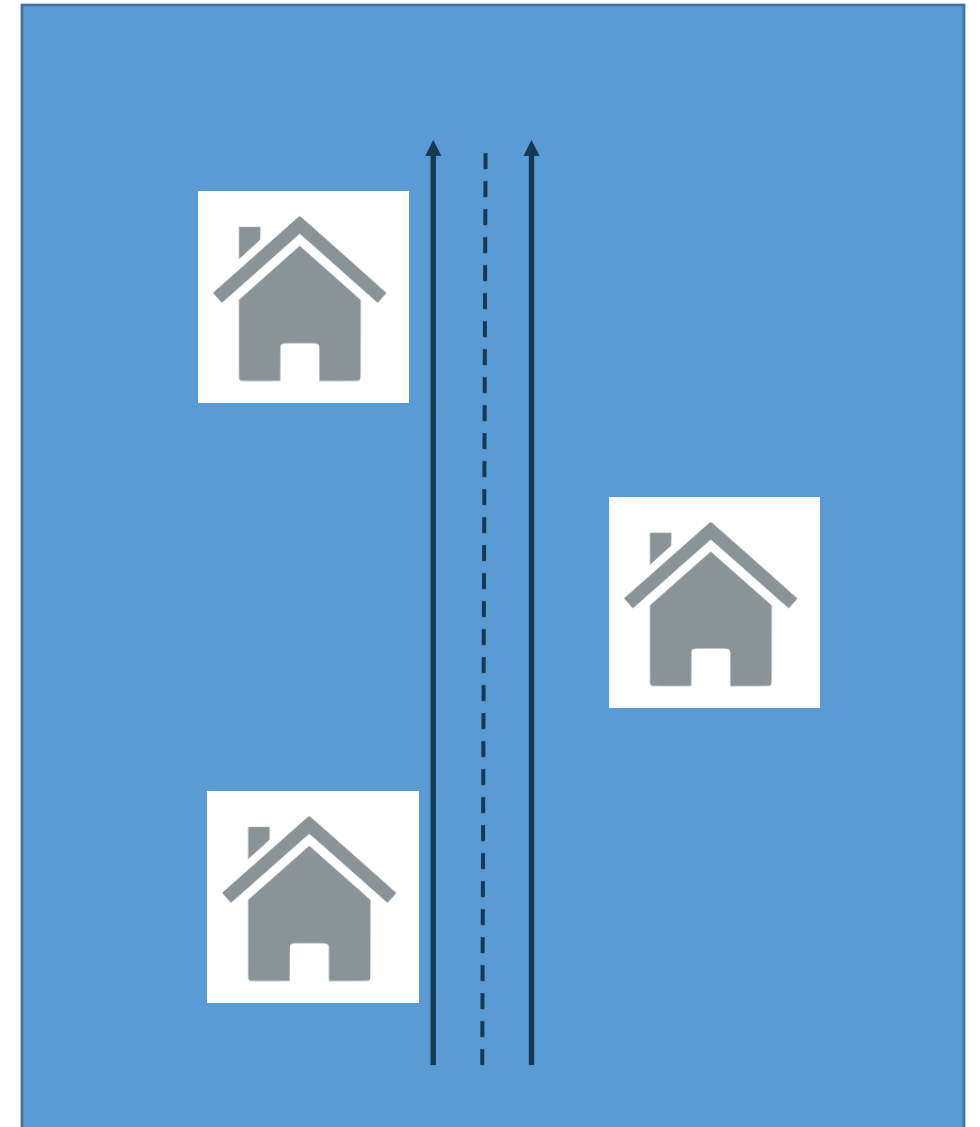
Geographic Information Systems (GIS)

- Partners utilize GIS in order to submit updates.
 - Esri ArcGIS software
 - QGIS open-source software
- Census Bureau provides:
 - Workshops
 - Training videos
 - User guides
 - Email support



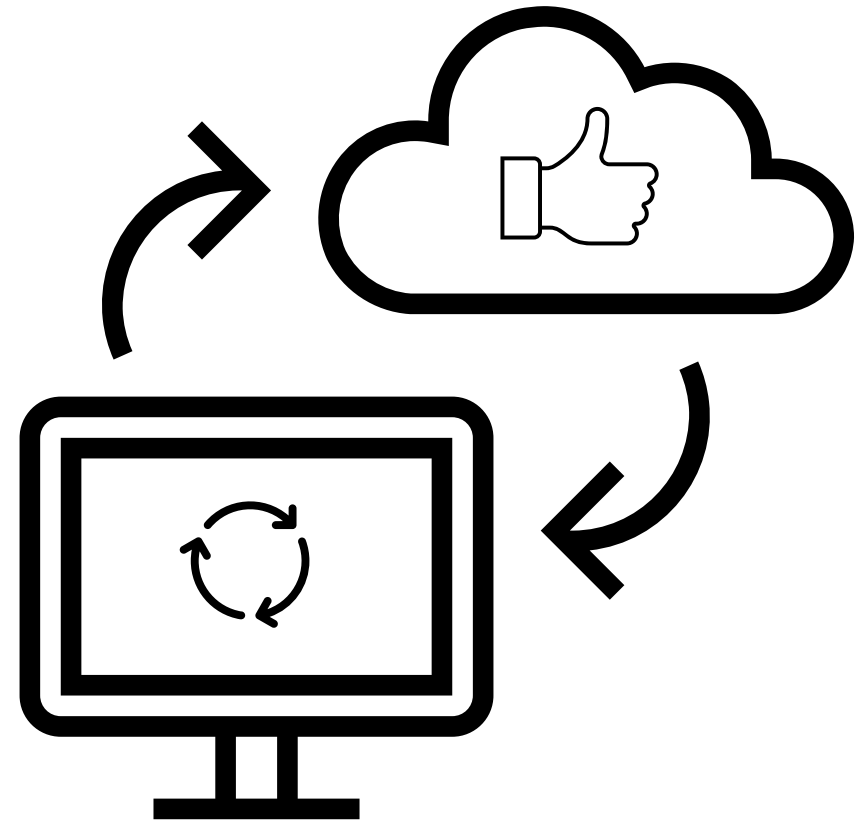
Using Data to Verify Data

- Features
 - Address ranges, provided as an attribute of road features, are used to verify individual addresses
- Geographic Areas
 - Ensure addresses are located within the correct area



Data Standards

- Partners are asked to abide by data standards to ensure the quality of data.
- Data provided requires:
 - Address data guidelines
 - Feature data guidelines
 - Metadata guidelines
 - Legal documentation

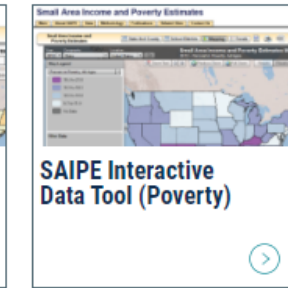
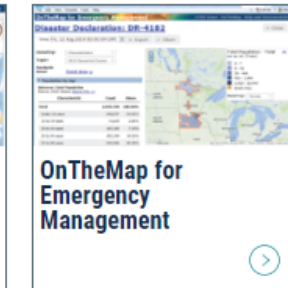
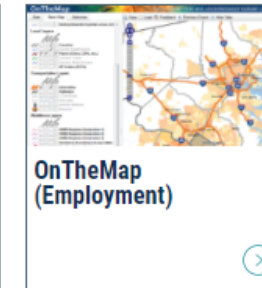
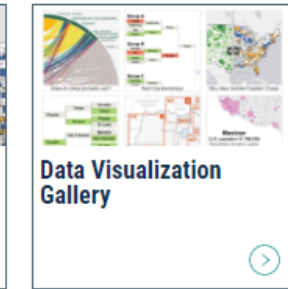
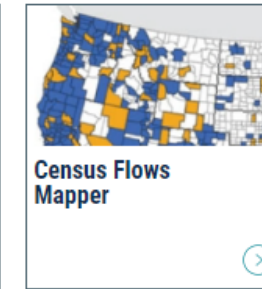
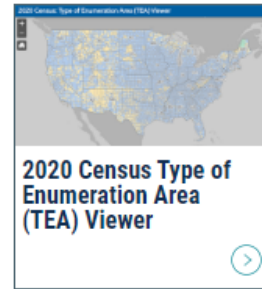
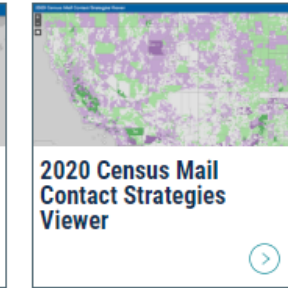
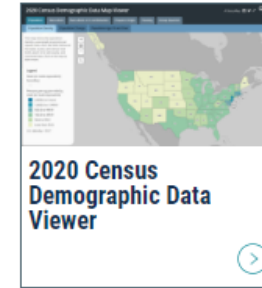
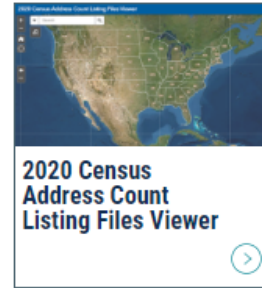


Products

- Shapefiles
 - Partnership Shapefiles
 - TIGERLine Shapefiles
- Web Map Services
- REST Services
- Interactive Maps
- PDF Maps
- Tabular data files

Interactive Maps

Work with interactive mapping tools from across the Census Bureau.



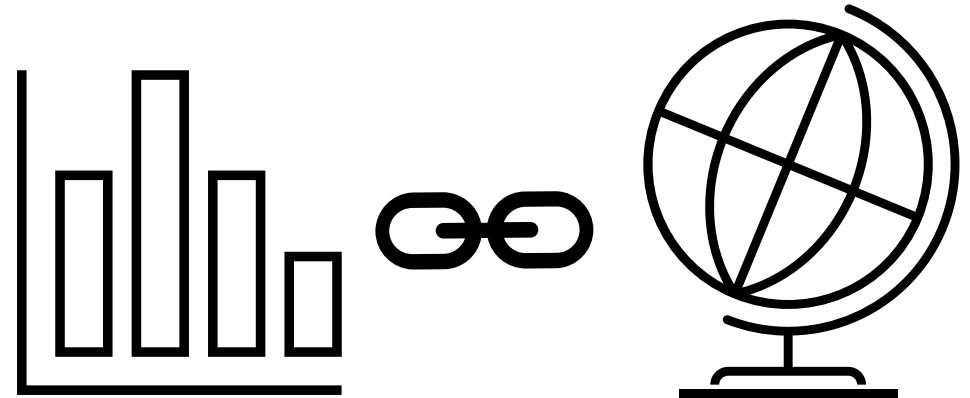
Data Attributes

- After the Census Bureau acquires data through partnerships, geographers standardize the attribute tables.
- Several attributes are added to help make sense of and describe the geographic data.

	MTFCC *	OID *	GEOID *	STATE *	BASENAME *	NAME	LSADC *	FUNCSTAT	REGION	DIVISION	STUSAB
1	G4000	2749065038753	01	01	Alabama	Alabama	00	A	3	6	AL
2	G4000	2749045059742	02	02	Alaska	Alaska	00	A	4	9	AK
3	G4000	27490459971956	60	60	American Samoa	American Samoa	00	A	9	0	AS
4	G4000	274901053753069	04	04	Arizona	Arizona	00	A	4	8	AZ
5	G4000	2749045148374	05	05	Arkansas	Arkansas	00	A	3	7	AR
6	G4000	2749018475066	06	06	California	California	00	A	4	9	CA
7	G4000	2749086215995	08	08	Colorado	Colorado	00	A	4	8	CO
8	G4000	27490460013836	69	69	Commonwealth of th...	Commonwealth of th...	00	A	9	0	MP
9	G4000	27490331955805	09	09	Connecticut	Connecticut	00	A	1	1	CT
10	G4000	27490331618368	10	10	Delaware	Delaware	00	A	3	5	DE
11	G4000	27490331294090	11	11	District of Columbia	District of Columbia	00	A	3	5	DC
12	G4000	2749046365780	12	12	Florida	Florida	00	A	3	5	FL
13	G4000	2749048077737	13	13	Georgia	Georgia	00	A	3	5	GA
14	G4000	27490748116647	66	66	Guam	Guam	00	A	9	0	GU
15	G4000	2749047648128	15	15	Hawaii	Hawaii	00	A	4	9	HI
16	G4000	27490130780184	16	16	Idaho	Idaho	00	A	4	8	ID
17	G4000	27490100360203	17	17	Illinois	Illinois	00	A	2	3	IL
18	G4000	2749051705222	18	18	Indiana	Indiana	00	A	2	3	IN
19	G4000	2749058169487	19	19	Iowa	Iowa	00	A	2	4	IA
20	G4000	2749051425496	20	20	Kansas	Kansas	00	A	2	4	KS
21	G4000	27490100360204	21	21	Kentucky	Kentucky	00	A	3	6	KY
22	G4000	2749052402301	22	22	Louisiana	Louisiana	00	A	3	7	LA
23	G4000	27490100936543	23	23	Maine	Maine	00	A	1	1	ME

Linking Geographic Data to Other Data

- Geographic data and statistical tabular data produced by the Census Bureau contain a shared attribute – GEOID.
- Using this common attribute, geographic data can be joined to statistical data.



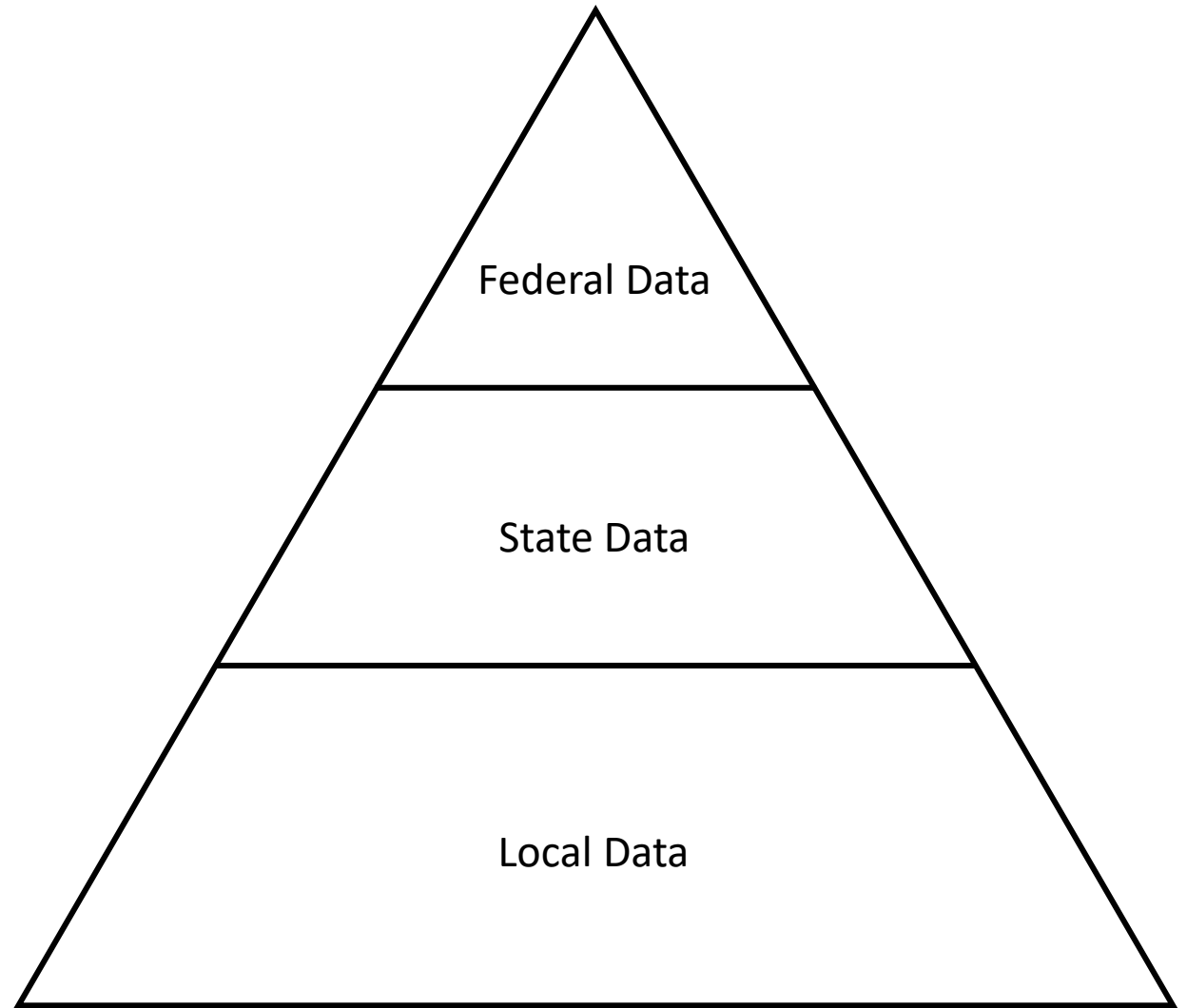
Personally Identifiable Information (PII)

- The Census Bureau does not release any data that contains information that can be used to distinguish or trace an individual's identity.
- Census Bureau employees are sworn to uphold the privacy of their partners, respondents, and data that is collected. Employees face fines, prison, and other penalties if PII is not properly handled.

Additional Resources

- Participation in the U.S. Census Bureau Geographic Programs
 - <https://www.youtube.com/watch?v=74ixu0AslPU>

Geographic Data Source Pyramid



Questions?