

# Modernizing the 2022 Commodity Flow Survey

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EAMS, 4/21/2021

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# Outline

## **Background and Motivation**

Data user needs

Burden

2017 CFS challenges

## **Innovations for 2022 CFS**

New data collection instrument

SCTG ML

Automating editing + review

# Background

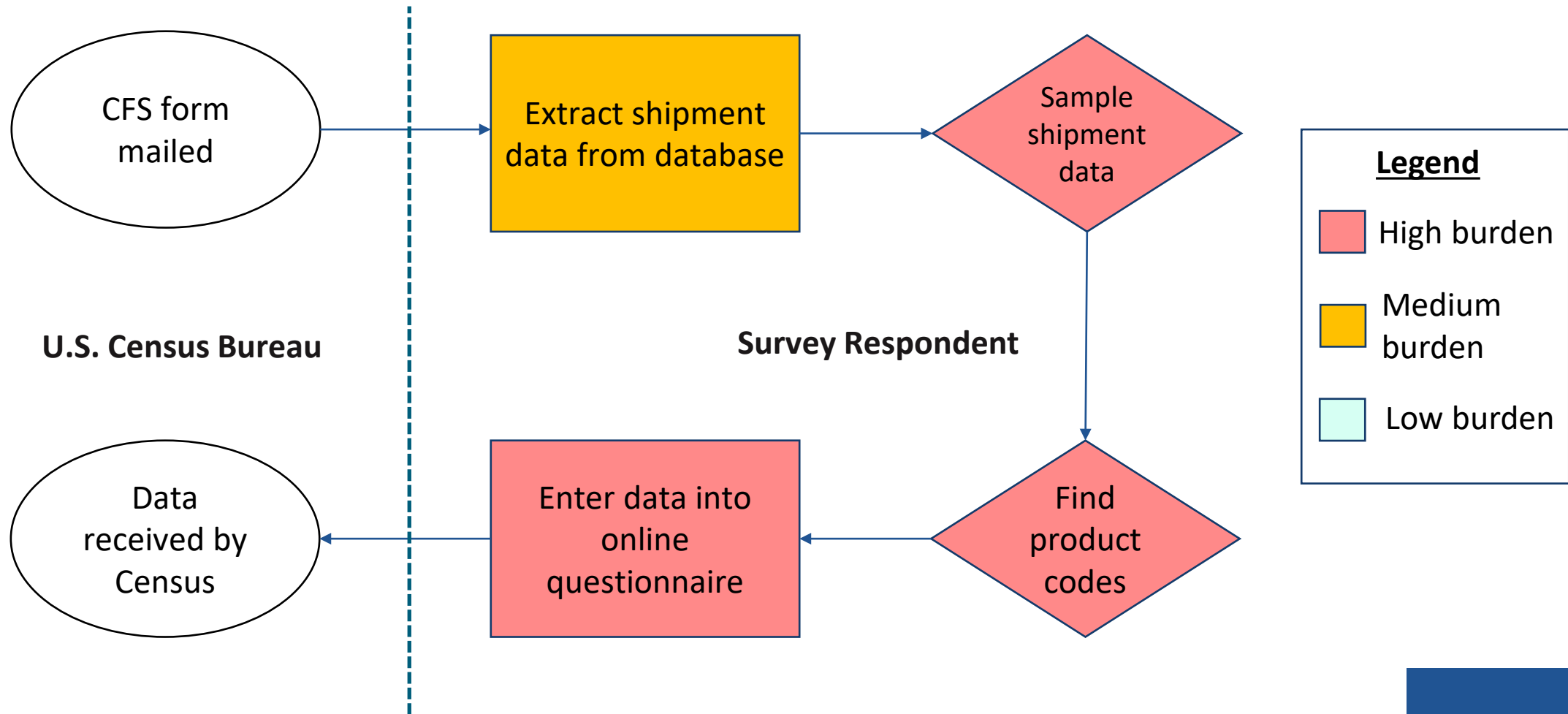
## Commodity Flow Survey

- Joint effort between BTS + Census
- Conducted every 5 years (2017, 2022)
- Produces estimates of domestic freight movement
- Used by federal, state, local infrastructure planners

# Data user needs

- Key product: value, tonnage, ton-miles by origin, destination, commodity, mode of transportation
- **Data user requests for**
  - County-level estimates and more commodity detail.
  - More timely data.

# 2017 CFS Collection - Burden

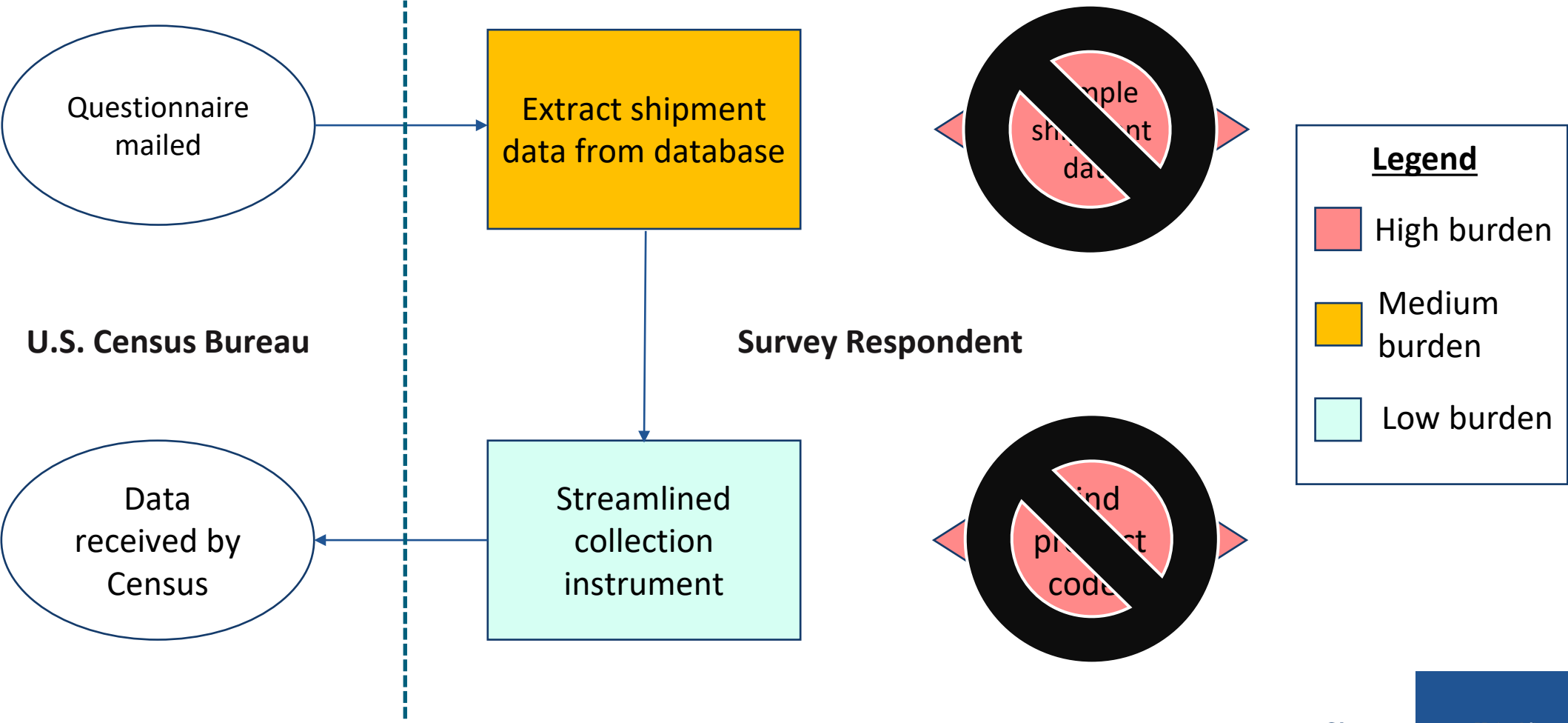


# Motivation

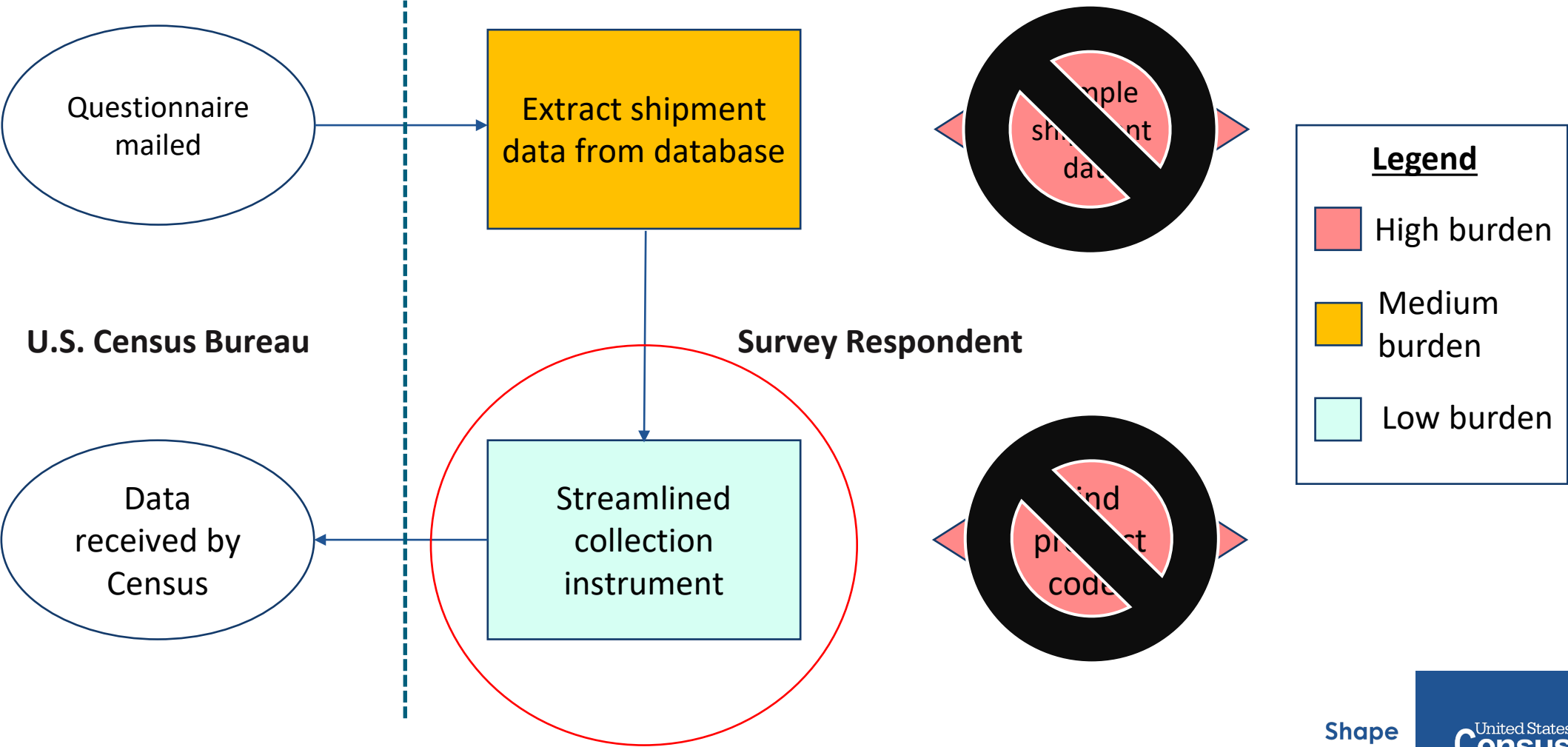
- How might we provide more detail for data users and improve published estimate quality?  
➔ Use more data.
- How might we get respondents to provide more data?  
➔ Reduce respondent burden.

**How might we use more data AND reduce respondent burden?**

# 2022 CFS Collection



# 2022 CFS Collection





# 2022 Collection Instrument


- **Accommodating** of respondent data storage practices.
- **Flexible** instrument.
- **Clear** feedback and error messages.

	A	B	C	D	E	F	G
1	<b>Instructions</b>	<b>Origin_Facility_ID</b>	<b>Shipment_ID</b>	<b>Shipment_Date</b>	<b>Shipment_Value</b>	<b>Shipment_Weight</b>	<b>Shipment_Mode</b>
2	Please fill this spreadsheet with information for each outbound shipment from your active shipping facilities for the given reporting week.	The ID of the facility where this shipment originated. Must be a Facility ID that you provided earlier (listed below).	Your internal identifier (e.g. Invoice # or Shipment #) for this shipment.	Date of shipment, in whatever date/time format is in your database.	Value of shipment, in USD. Only report the net selling value – i.e. the value should not include freight charges or excise taxes	Weight of shipment, in pounds.	Oftentimes called "ship via" or "ship mode" – please include a brief description of the mode(s) of transportation that was (were) used to deliver this shipment.
3							
4	For this pilot, if you do not have a column in your database, you can leave that column blank.						
5	You can also provide a separate spreadsheet or CSV file with these column headers.						
6							
7							

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# 2022 Collection Instrument

 File Uploaded.

## SHIPMENT VALIDATION

We have identified some records in your upload where we need further clarification. Please help us correct these shipment records.

You can either

1. Click the "Fix error" button.
2. Re-upload a new spreadsheet or CSV with these issues corrected. [Click Here to re-upload](#)

Row #	Shipment ID	Facility ID	Date	Column	Cell Value	Error	Fix
1	1000000	MFGSITE37	8/10/2020	Product_Description		Product Description missing	<a href="#">Fix error</a>
2	1000001	MFGSITE37	8/10/2020	Product_Description		Product Description missing	<a href="#">Fix error</a>
4	1000003	MFGSITE37	8/10/2020	Shipment_Value		Value or weight missing	<a href="#">Fix error</a>
9	1000008	MFGSITE37	8/10/2020	Destination_Postcode		Destination information missing	<a href="#">Fix error</a>
10	1000009	MFGSITE37	8/10/2020	Destination_Postcode		Destination information missing	<a href="#">Fix error</a>

\* Data shown are fake/test data or publicly available product descriptions

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# Collection Instrument

### Fix Error ✕ Log out

Row #	1
Facility ID	MFGSITE37
Date	8/10/2020
Dest. City	Fort Plain
Dest. State	NY
Dest. ZIP	13339
Value	1273
Weight	3145
Desc.	

We did not see a product description for this record. Please provide a description of the product being shipped.

Fix all instances where Product\_Description is blank

1 of 5

[Submit and Continue](#) [Skip](#)

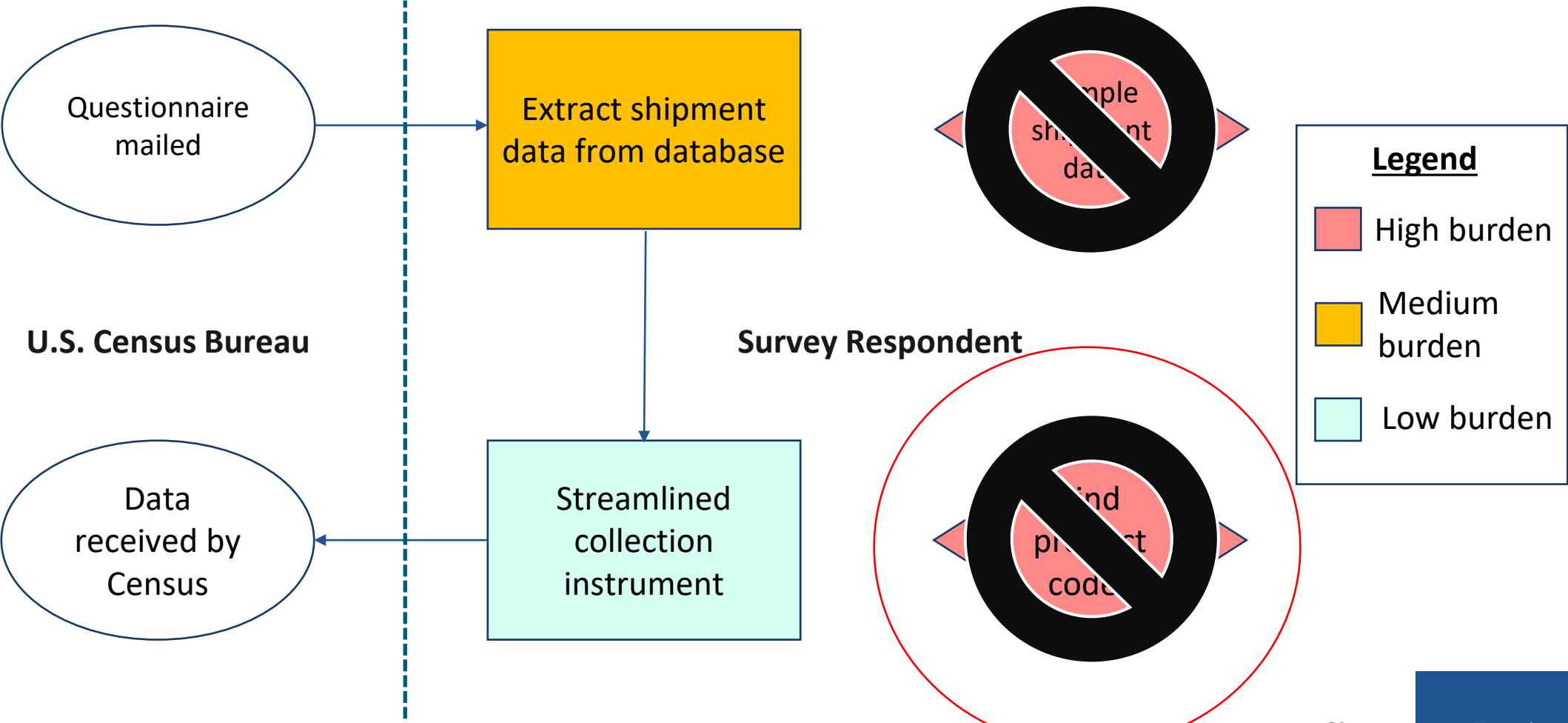
1000000	MFGSITE37	8/10/2020	Product_Description	Product Description missing	<a href="#">Fix error</a>
1000001	MFGSITE37	8/10/2020	Product_Description	Product Description missing	<a href="#">Fix error</a>

\* Data shown are fake/test data or publicly available product descriptions

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# 2022 CFS Collection



# SCTG Machine Learning

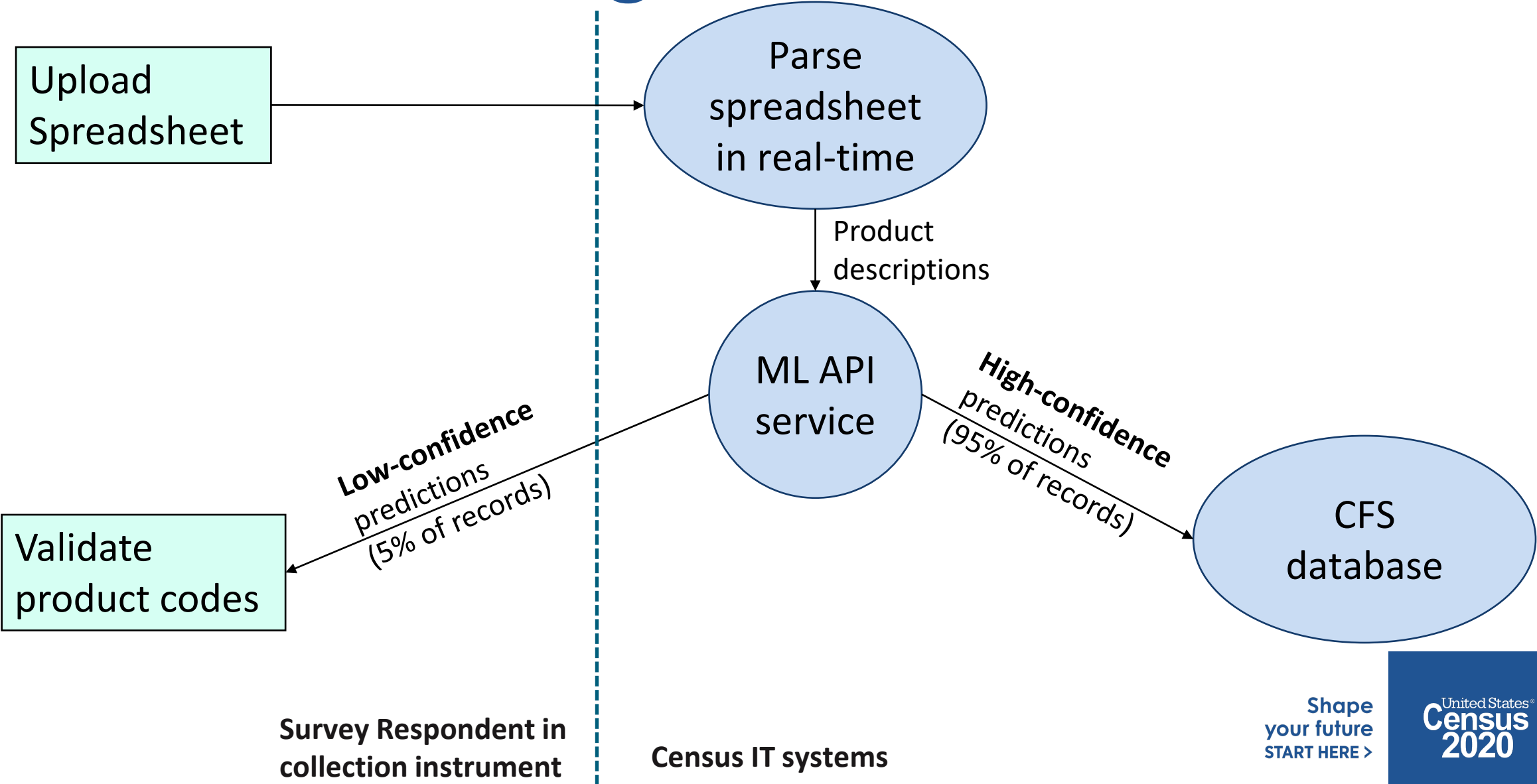
- In 2017, used machine learning (ML) to impute and correct SCTG product codes\* for records.
- For 2022, planning to **eliminate need for respondents to look up SCTG product codes.**

\*SCTG stands for Standard Classification of Transported goods, i.e. the product coding scheme CFS uses for collection and publication of product-level estimates.

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# SCTG ML – during collection



# SCTG ML – during collection

## PRODUCT CODE VALIDATION

We were unable to determine what products these records refer to. Help us identify what these products are.

Row #	Facility ID	Date	Dest. State	Value	Description	Fix
5	MFGSITE37	8/10/2020	SC	1548	Designer 45 in. W Sloping Hood for 21 in. D Extra Wide Designer Wood Locker in Gray	<a href="#">Validate product</a>
7	MFGSITE37	8/10/2020	NJ	2917	Performance 30 Gal. Point-Of-Use 6-Year 2000-Watt Single Element Electric Water Heater	<a href="#">Validate product</a>
18	MFGSITE37	8/10/2020	MN	3338	Alkaline 3 AAA 9 LED Industrial Flashlight	<a href="#">Validate product</a>
20	MFGSITE37	8/10/2020	MS	3029	Stainless Steel Bottom Grid for KHF200-36 Single Bowl 36in. Farmhouse Kitchen Sink, 32 11/16in. x 15 11/16in. x 1 3/8in.	<a href="#">Validate product</a>
39	MFGSITE37	8/10/2020	CO	3227	Southbeach Collection Upright Single Post Toilet Paper Holder in Satin Brass	<a href="#">Validate product</a>
42	MFGSITE37	8/10/2020	IL	920	ANDY-50C-05 ND Filter	<a href="#">Validate product</a>
47	MFGSITE37	8/10/2020	ME	3338	Screwdriver Bit for Electric Drill (Two-Headed)	<a href="#">Validate product</a>
62	MFGSITE37	8/10/2020	WI	695	#8 - 32 in. Stainless Steel Hex Machine Nut (50-Pack)	<a href="#">Validate product</a>
68	MFGSITE37	8/10/2020	GA	627	Personal Alarm Rip Cord Activation Safety Device with LED Flashlight Pink	<a href="#">Validate product</a>
89	MFGSITE37	8/10/2020	NY	1065	62GB2393P20   Mack Connecting Rod Bearing Set	<a href="#">Validate product</a>

# SCTG ML – during collection

### Fix Error

Row #	19
Facility ID	MFGSITE37
Date	8/10/2020
Dest. City	Oakland
Dest. State	CA
Dest. ZIP	94601
Value	1115
Weight	1854
Desc.	Recoil-Free Specialized Size

Which of these categories best describes this product?

- Other Printed products, not elsewhere classified, including blank books, binders, and albums
- Hardware or plumbing supplies
- Taps, cocks, valves, and similar appliances for pipes, boiler shells, tanks and vats, or the like, including those for use in plumbing
- Plastics plates, sheets, film, foil, tape, strip, and other flat shapes, including combinations with other materials
- Plastics tubes, pipes, hoses, and fittings, including joints, elbows, and flanges
- None of these. Please describe.

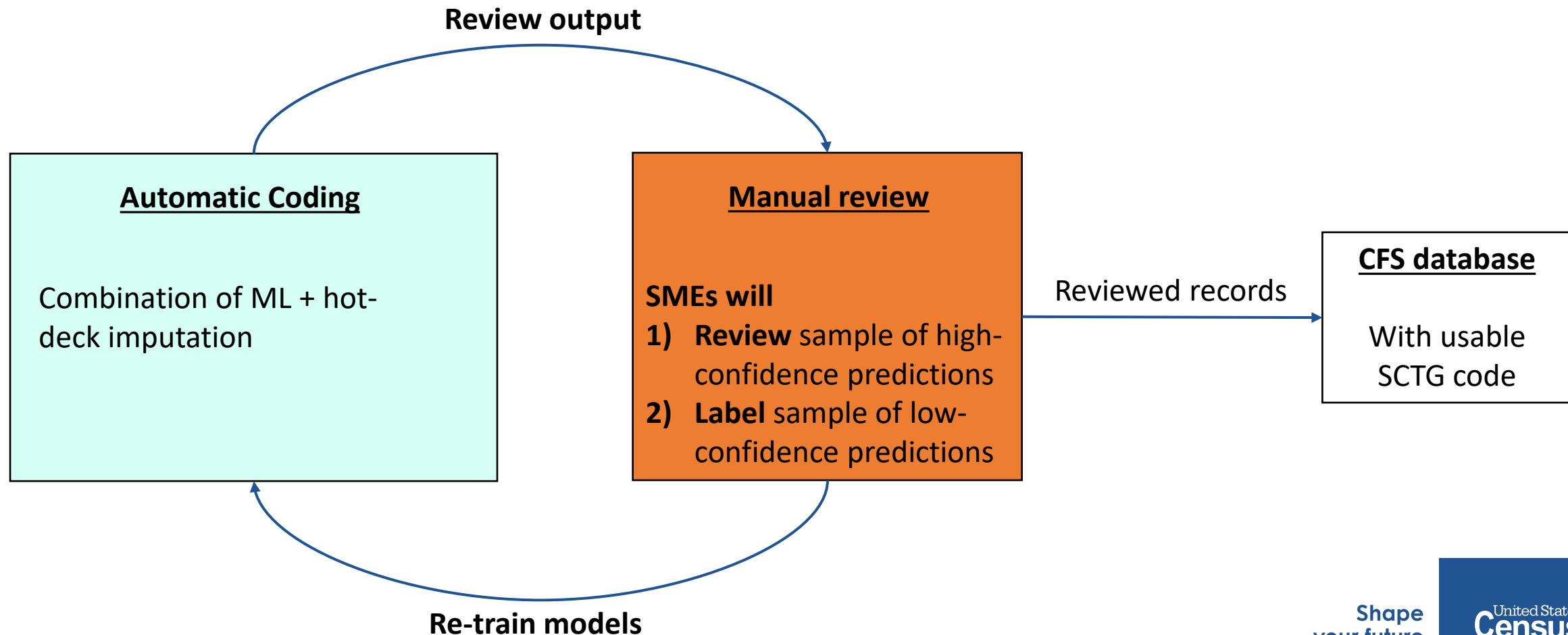
[Submit and Continue](#)

1 of 10 [Skip](#)

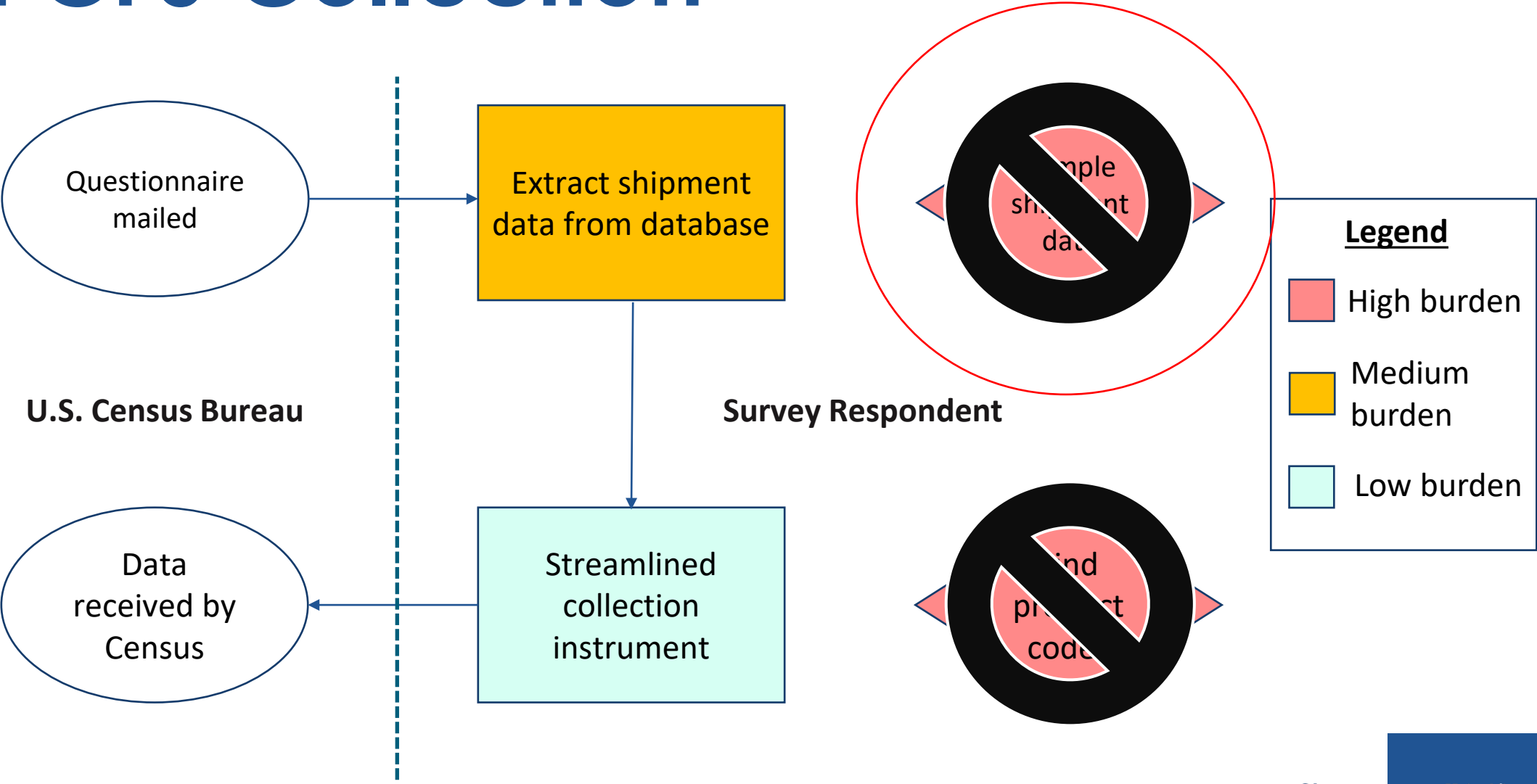
MFGSITE37	8/10/2020	IL	2314	Danze Pull-Out Spray Head	<a href="#">Validate product</a>
MFGSITE37	8/10/2020	NY	1065	62GB2393P20   Mack Connecting Rod Bearing Set	<a href="#">Validate product</a>



# SCTG Machine Learning



# 2022 CFS Collection



# Automating Editing + Review

- For 2022, need to **scale** editing and review processes to handle **10-100x more data**.
- In 2017, most correction + review of records was manual.
  - Some imputation and “ad-hoc” batch correction processes.

# 2017 Editing + Review Process

is Establishment Shipments Destination Geomiler Destination Weighting BTS Shipments Flags Remarks Address/Contacts Audit

ter ID and press enter:  Quarter  Panel  Select Change Source  Save Changes

**Status Codes**

Field	Value
Status-Active Stat	
Status-941	
Estab_Type	
Einunit Id Actv Stat	
Congressional Count	<input type="button" value="Add 1"/>
Mail Group Number	
Mail Status	N
Tabulation Status	
Status Code	Active (0) <input type="text"/>
Status Code Date	
Status Code Changed By	
Current Mail Type	E <input type="text"/>
Account Manager	
NAICS Assignment	
State Assignment	

**Processing Status**

Field	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Panel				
Initial Mail Date				
Follow-up Mail Date				
Set Record for Remail	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Date of Last Remail				
Check-In Date				
Check-In Status Code				
Dup-Check In Date				
Dup-Check In Status Code				
Data Load Source				
Response Load Date				
Upload Spreadsheet Source				
iCADE batch information				
Reported Shipment Quantity				
Valid Shipment Quantity				
Usable Shipment				
Shipment With Mileage				
Shipment In Tabulation				
Call Attempt Quantity				
Response File Name				

**Sample Information**

Field	Value
Measure of Size Amount	
Measure of Size Code	
Sample NAICS	

- View, edit, correct records one-at-a-time
- Very “manual” process

# 2022 Editing + Review Process

Total Shipments Shown

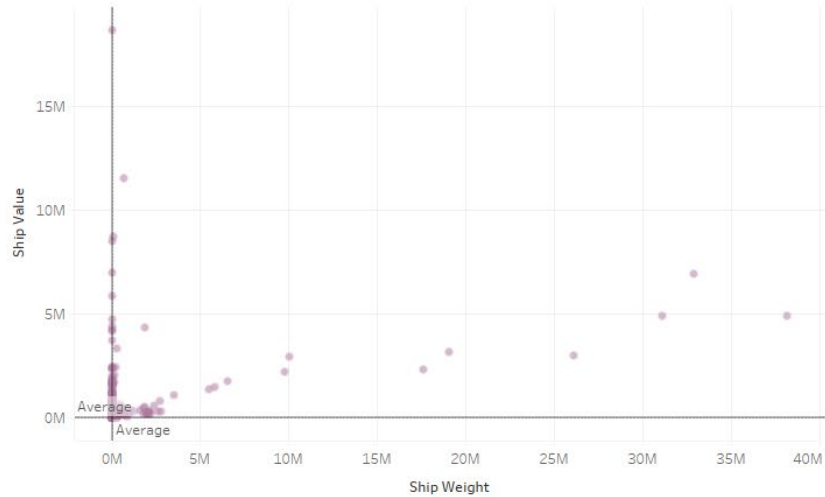
144,356

Unique Shippers Shown

1

Average Value to Weight Ratio:

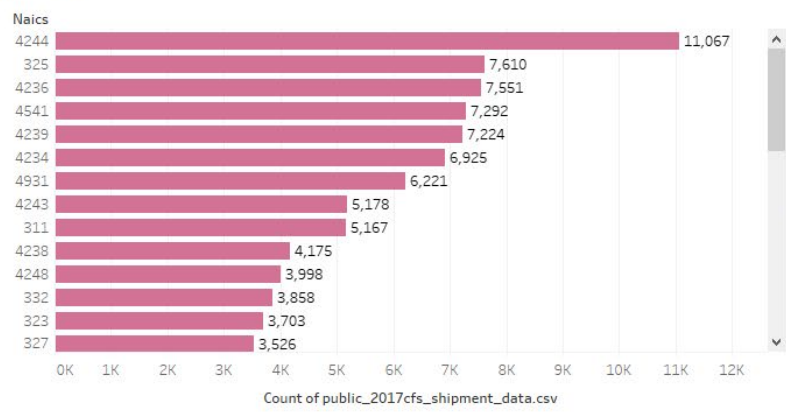
140.615



SCTG List

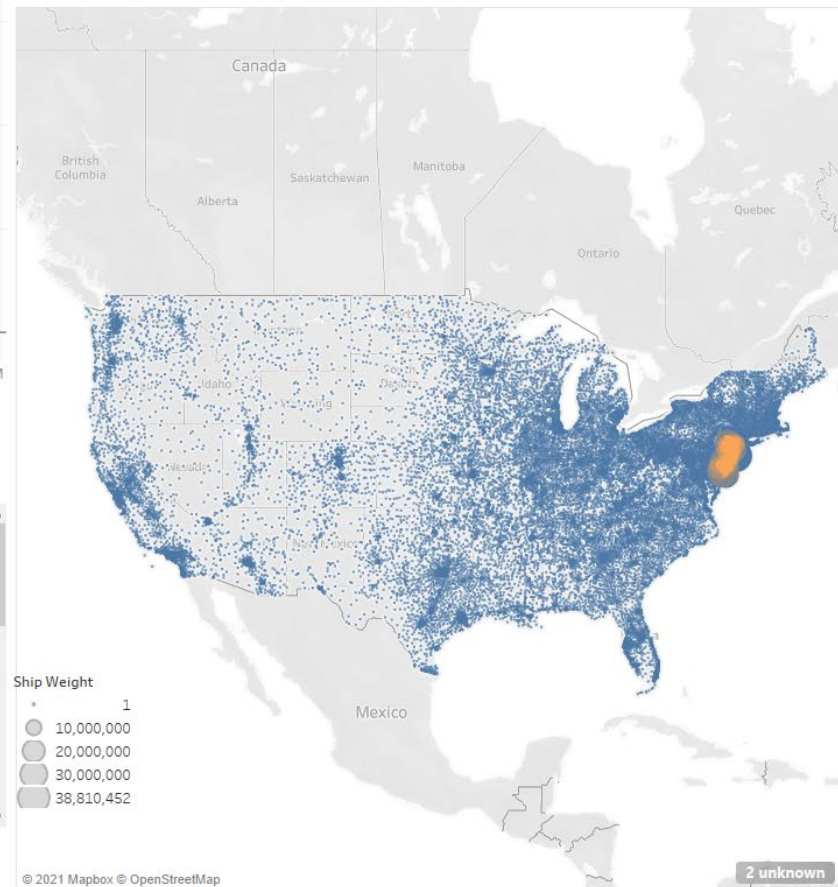
sctg_firs..	Ship Sctg	
Null	Null	189
2	2	99
3	3	1,482
4	4	305
5	5	2,373
6	6	3,075
7	7	8,450
8	8	4,695
9	9	483
10	10	196
11	11	1,101
12	12	601
13	13	308
14	14	45
17	17	854
18	18	2,895
19	19	2,020
20	20	3,538
21	21	3,996
22	22	263
23	23	6,834

Naics Codes



Export City: Not available. Exp State: Not available.  
 Dest City: Not available. Dest State: Not available.

Dest & Exp Zip



# Thank you!

**Email:** [Christian.L.Moscardi@census.gov](mailto:Christian.L.Moscardi@census.gov)