

# Using Census Data Within the School District

## Developing an Improved Measure of Socioeconomic Status (SES) for Reporting Purposes

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# Agenda

- Why Geocode
- NAEP Geocoding System Design
- Using the NAEP Geocoding System
- Questions

## What is Geocoding

The process of converting student addresses to an 11-digit U.S. Census community identifier that contains ZIP code and Census Block Group information.

This information, when gathered for a group of students, provides a basis for a demographic profile of the group to emerge.

# Why Geocode (Currently under consideration)

- To improve background variables (socio-economic statistics)
- Uses existing data sources
  - Census 2000 (long form microdata)
  - American Community Survey (ACS)
  - Enhanced Background Questions
  - ECLS-K

# Uses for Geocoded Data

- Schools and Districts can use to perform analyses of individual classes or whole grades
- Provides insights into the economic status of a set of students and may assist in determining programs
- May assist in finding population areas with common SES characteristics to look for groups with improved performance and/or to find programs that raise performance levels

## How NAEP Geocoded Data

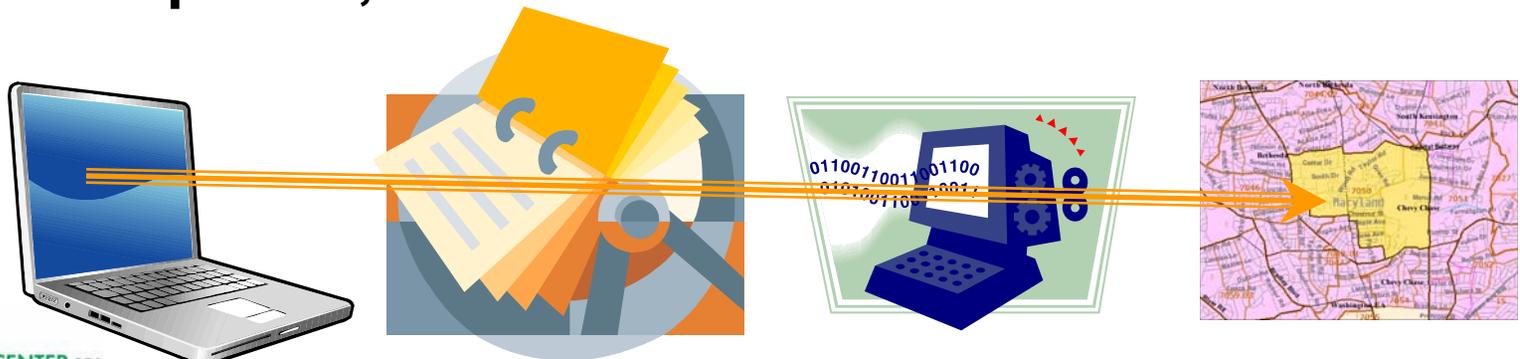
- Enhanced Background Questionnaire used about students and parents.
- Collected address information via school records (No PII collected)
- Surveyed users of the Geocoding software about their experiences

# NAEP's Geocoding Process

- **Converted student addresses to Census community identifiers (i.e., Block Group numbers)**
- **Collected by school, district, or state staff depending upon where student addresses are housed**

*Note: No student addresses leave a school, district, or state.*

- **Linked Census Community Identifiers to Census 2000 data and data from the ACS, such as income, occupation, and education**



# NAEP's Geocoding Process

In order to use NAEP's special software program, the local user had to:

- Download client to a local machine
- Receive address information from a server
- Compare student addresses to Census' TIGER line data and assigned a "community identifier"
- Took approximately 60-90 minutes to geocode addresses depending upon number and quality of addresses being coded

## NAEP's Geocoding Process

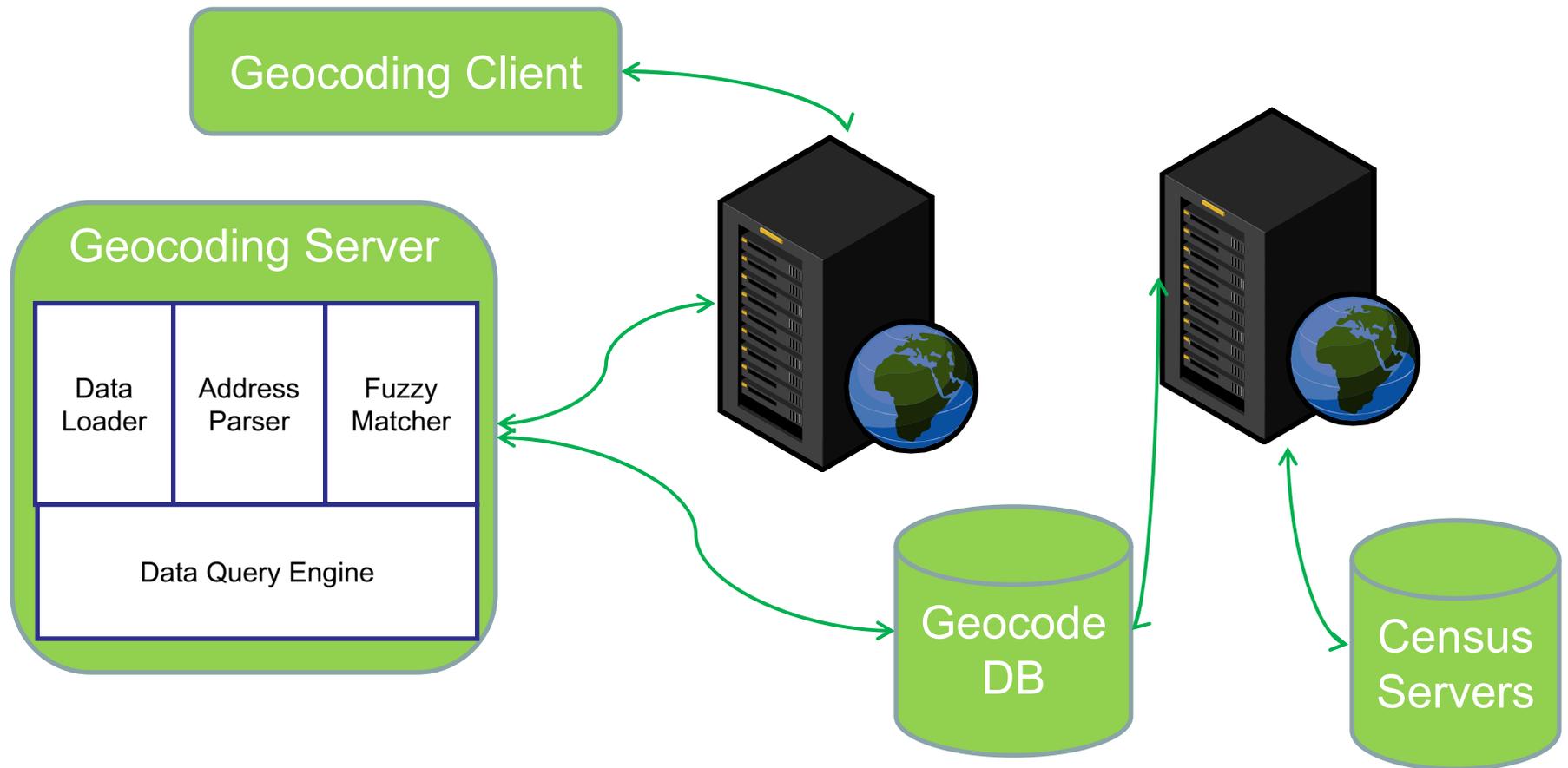
- Addresses are geocoded for all students in selected grade/grades
- Geocode output file can include student names (not for NAEP), birth dates, and community identifiers
- Output remained in the school or district and never saved on NCES servers

# Requirements for Using NAEP Geocoding Software

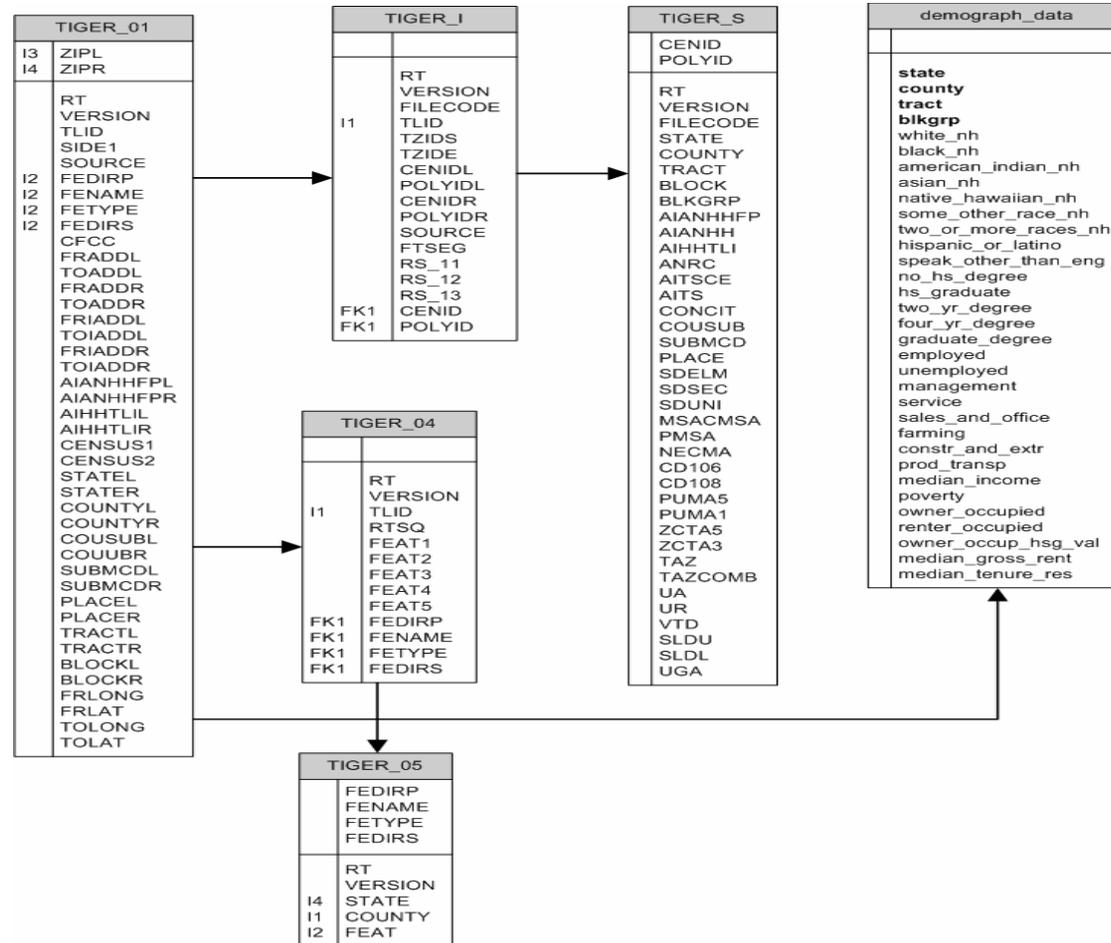
Provided by NCES free of charge and requires

- Java
- Desktop or laptop computer
  - *Runs on Windows or Apple platforms*
- Access to the Internet
- Address files in CSV format
- Ability to store up to 1GB of data to download Census/ACS data

# System Architecture



# Census Repository Database Design



# Census Table Descriptions

Table Name	Description	Keys/Indexes
Tiger_01	This table provides a single record for each unique complete chain in the TIGER/Line file.	TLID
Tiger_I	Used to link complete chain attributes. Links record Tiger_I records to Tiger_S records via TLID. Tiger_I records have a one-to-one relationship with Tiger_01 and a many-to-one relationship with Tiger.	TLID, CENIDR, POLYIDR, CENIDL, POLYIDL
Tiger_S	Provides complete polygon information.	STATE, COUNTY, TRACK
Demograph_data	This data was extracted from the US Census bureau's Census 2000 Database using the xxx utility. It contains demographic data for each US state, county and track.	STATE, COUNTY, TRACK

# Geocoding Client Data Design

statGrps	
grp	
colName	
methodType	
sortOrder	

ZipCodes	
PK	<u>zipcode</u>
	downloaded

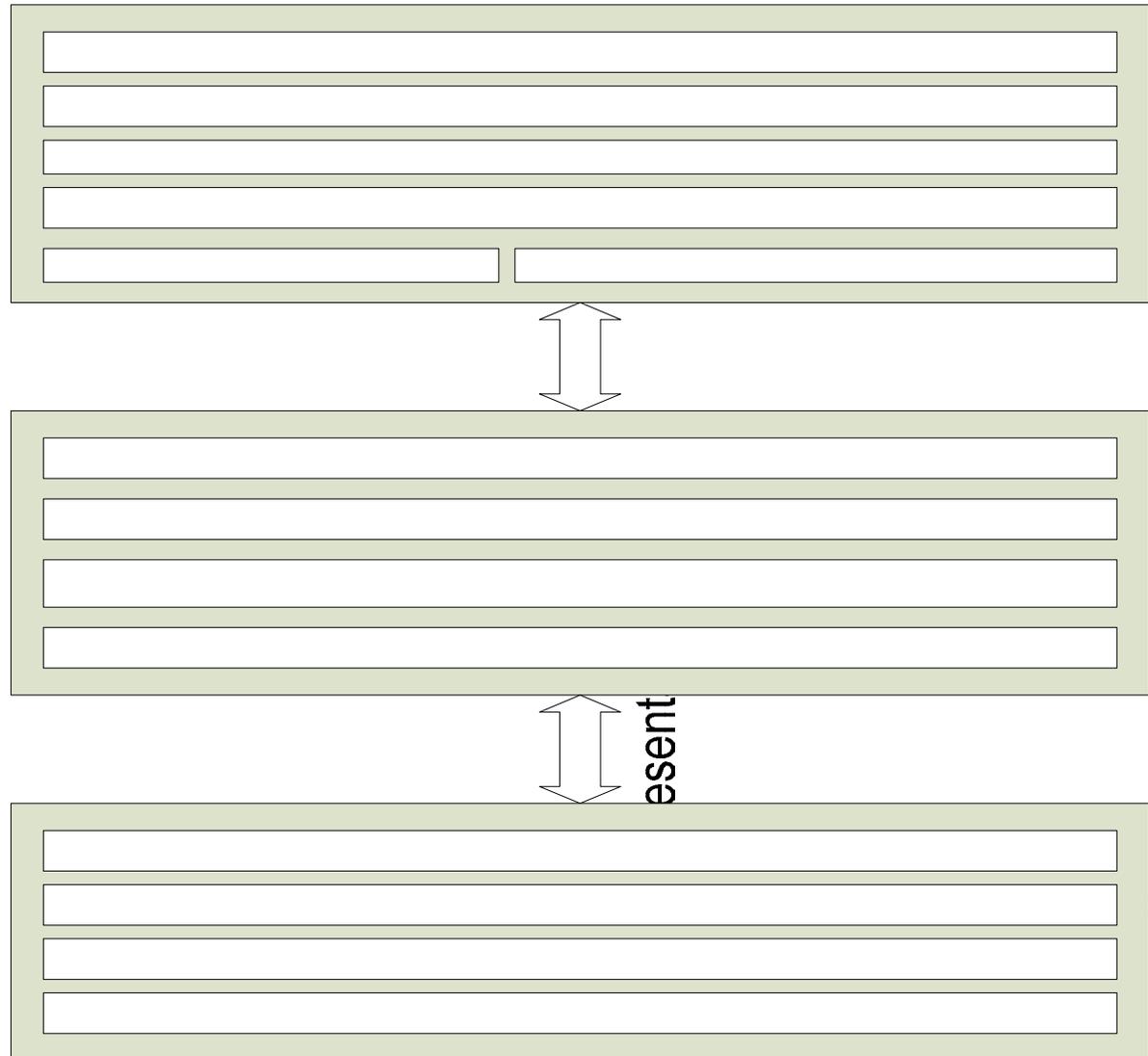
addresses_n	
AddrID	
collectionID	
...	

geoResults	
CollectionId	
AddrID	
censusTractCode	
censusBlkGrp	
state	
countyCode	
status	
matchType	
msg	

# Client Table Descriptions

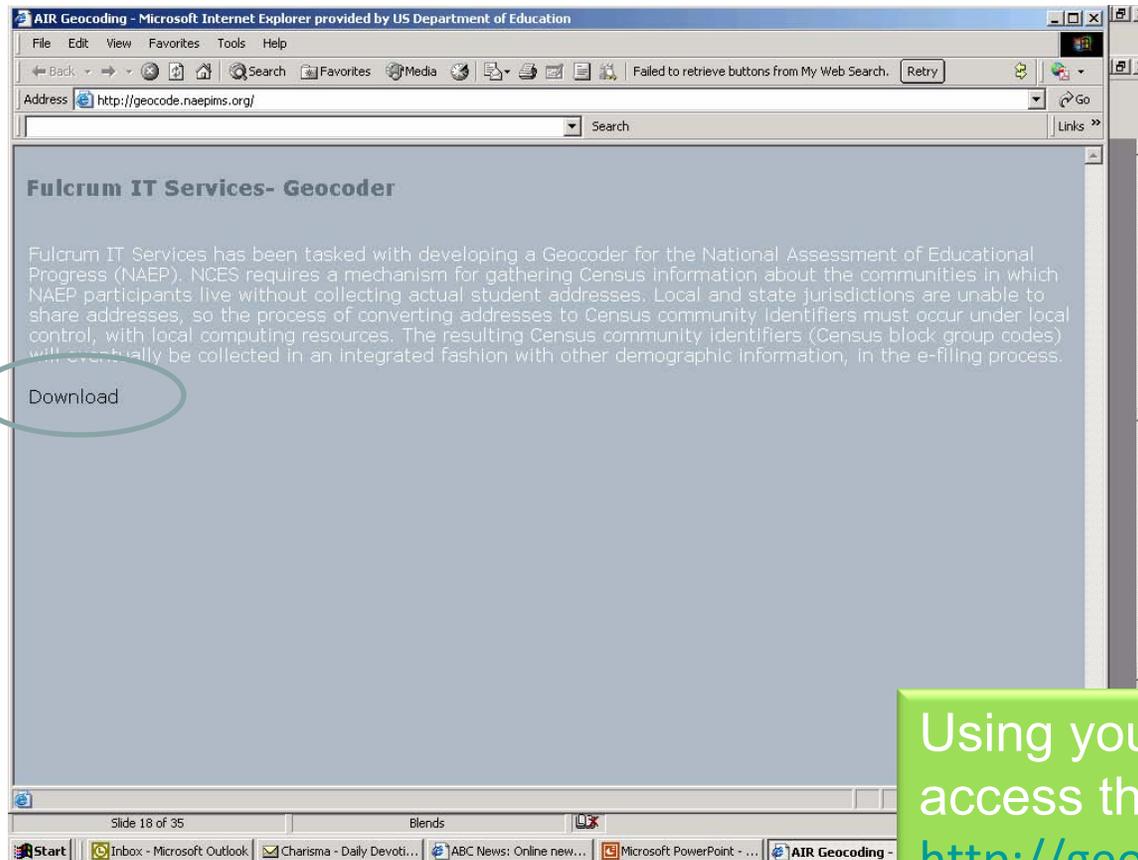
Table Name	Description	Keys/Indexes
statGrps	Provides metadata to the stats class during the calculation of demographic data. The grp column describes the overall type of statistic to be calculated ( Ethnicity, Income, Education, etc). The colName column corresponds with a column in the Demographic_data table.	grp
ZipCodes	Used to record the unique zip codes contained within the address collections. The bool column "Downloaded" indicates if the census data for a zip code was successfully downloaded from the repository.	zipcode
Addresses_n	An addresses table is dynamically built for each address collection built. Its structure and content mimics the imported csv file.	addrID, collectionID
geoResults	Contains the geocoding results for each row in the collections address_n table. The results of this table are appended to the address table when exporting. Additionally, these data are used to retrieve the appropriate demographic data when calculating demographic statistics.	CollectionID, AddrID,

# Geocoding Client Architecture



base Loading

# Getting Started with Geocoding



Using your internet browser,  
access the website:

<http://geocode.naepims.org>

Then click "Download"

# Login to Secure Site

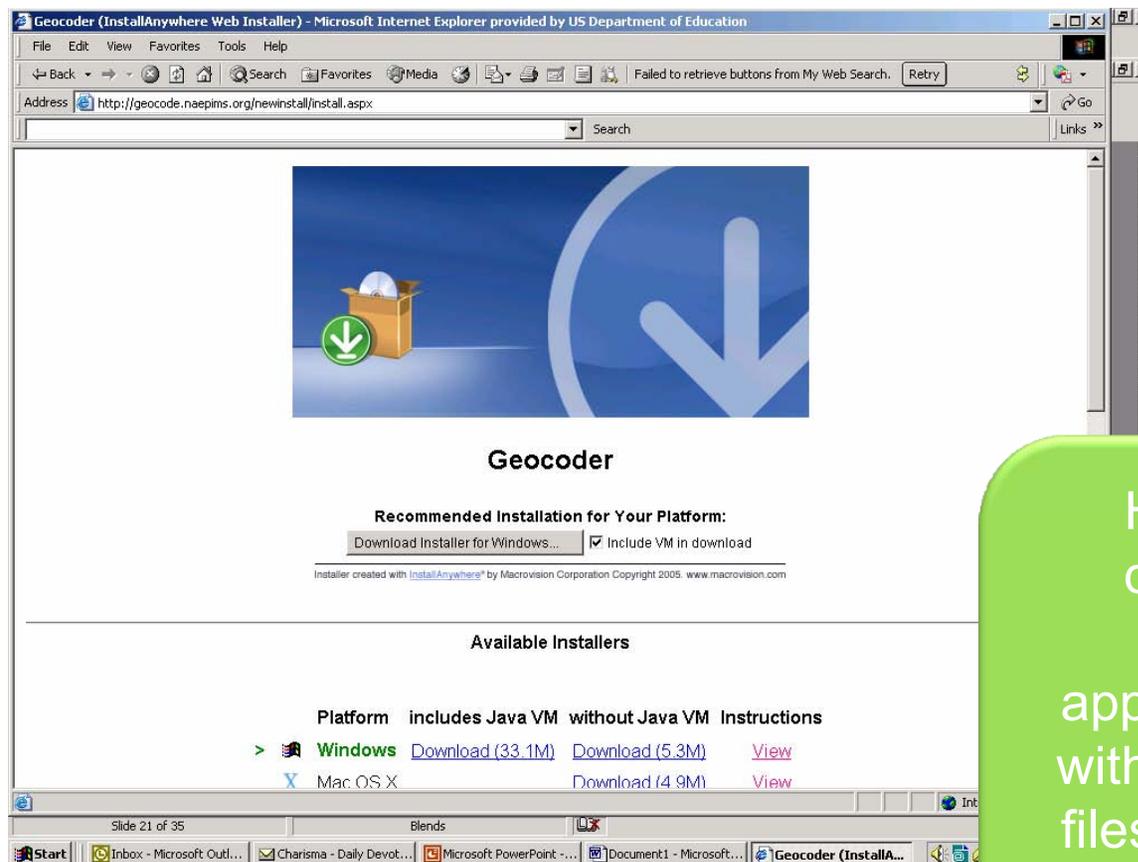
At the “Geocoder Installation” screen,  
type the access information provided  
by NCES:

User Id: \_\_\_\_\_

Password: \_\_\_\_\_

The screenshot shows a Microsoft Internet Explorer browser window titled "Geocoder Installation - Microsoft Internet Explorer provided by US Department of Education". The address bar contains the URL "http://geocode.naepims.org/login.aspx?ReturnUrl=%2fnewinstall%2finstall.aspx". The main content area features a central box with the heading "Geocoder Installation". Below the heading are two input fields: "User Id:" and "Password:". A "Logon" button is positioned below the password field. At the bottom of the box, there is a message: "Trouble logging in? Please contact Alan Wu at awu@fulcrumit.com for access." The browser's status bar at the bottom shows "Done" and "Internet". The Windows taskbar at the very bottom includes the Start button and several open applications: "Inbox - Microsoft Outlook", "Charisma - Daily Devoti...", "Microsoft PowerPoint - ...", "Document1 - Microsoft ...", and "Geocoder Installatio...". The system clock in the bottom right corner displays "8:39 AM".

# Main Download Page



Here you can download the Geocoding application (with or without Java), Help files, and a sample .csv file

# Downloading Installers



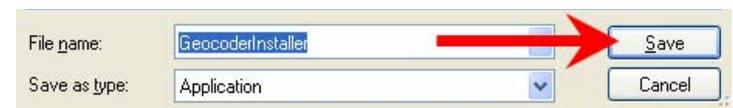
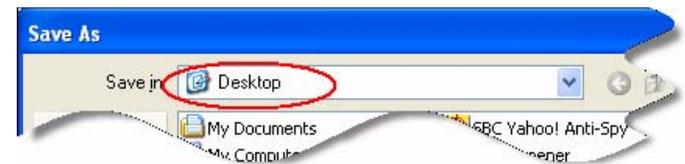
At the “Available Installers” screen, click “Download” for the recommended installation specified by the checkbox near the top of the screen (if in doubt, include Java VM).

# Saving Application on Computer



Click “Save” to store the installer on your PC.

Note: RUN will begin the process immediately



Your computer Desktop is a convenient place to store the installer. Make sure “Save in” specifies where you want to store the downloaded installer.

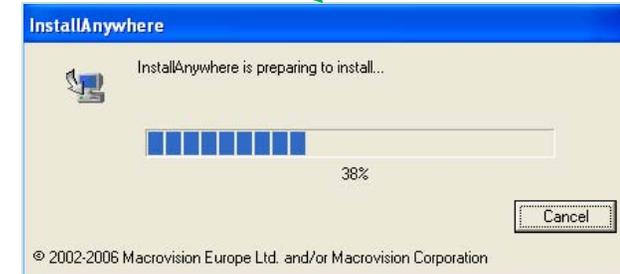
Click “Save” to accept the default file name.

# Install Geocoding Client

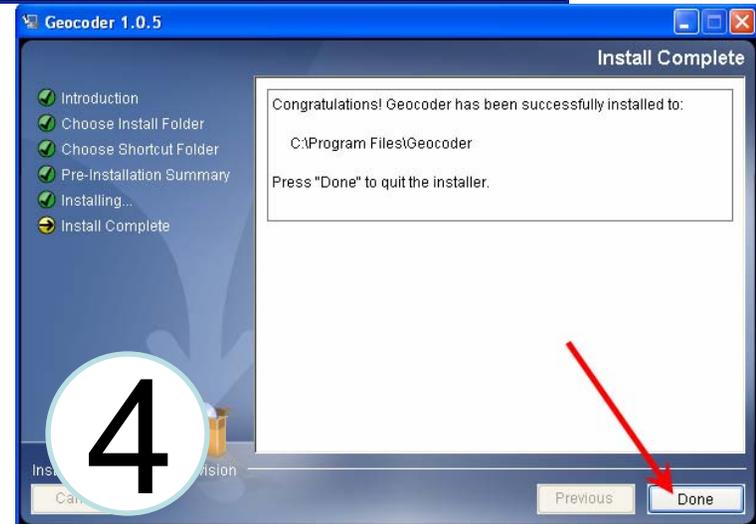
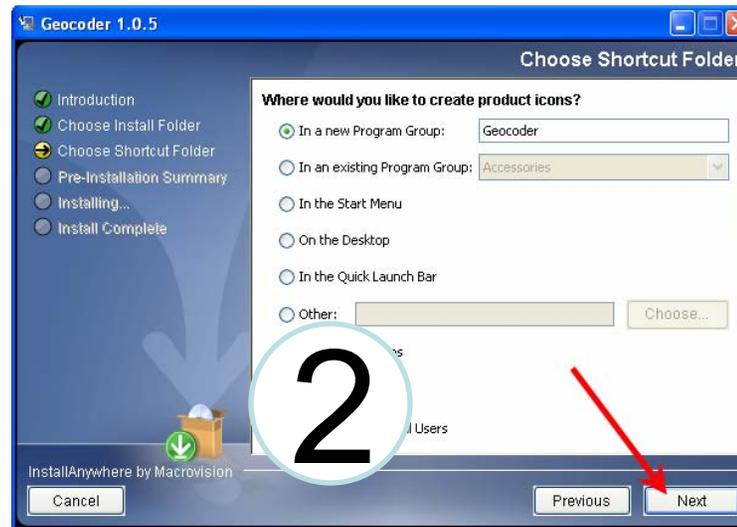
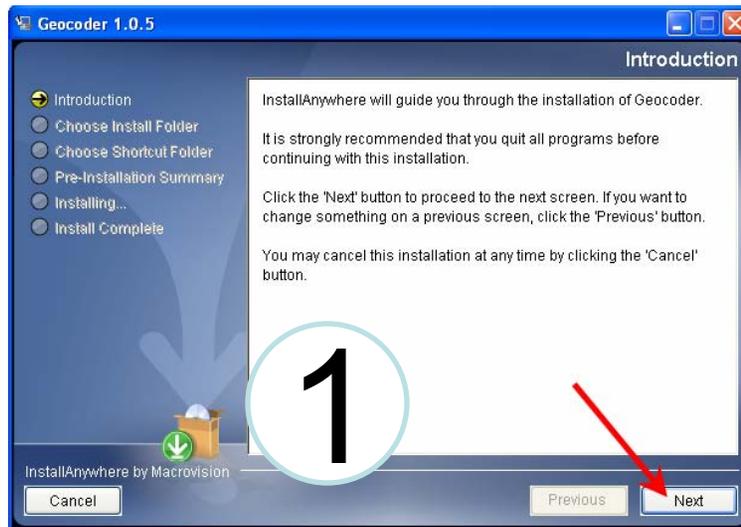


Double-click the Geocoder Installer icon on your desktop.

Click "Run" to begin installation.



# Installation Screens

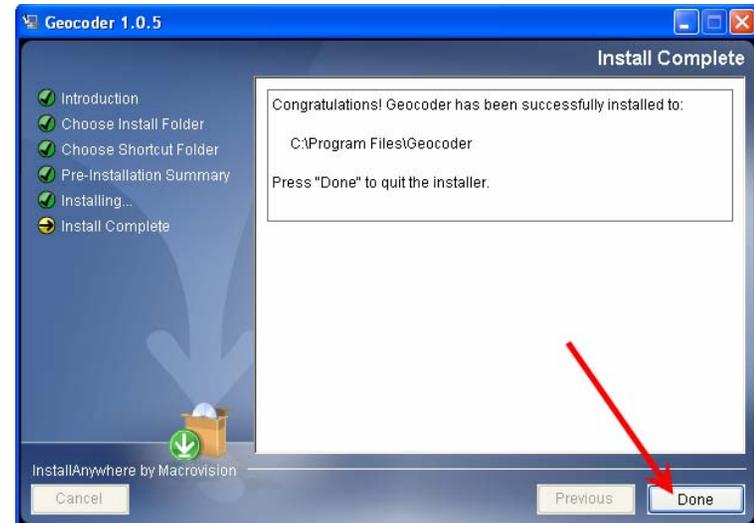


# Finishing Installation

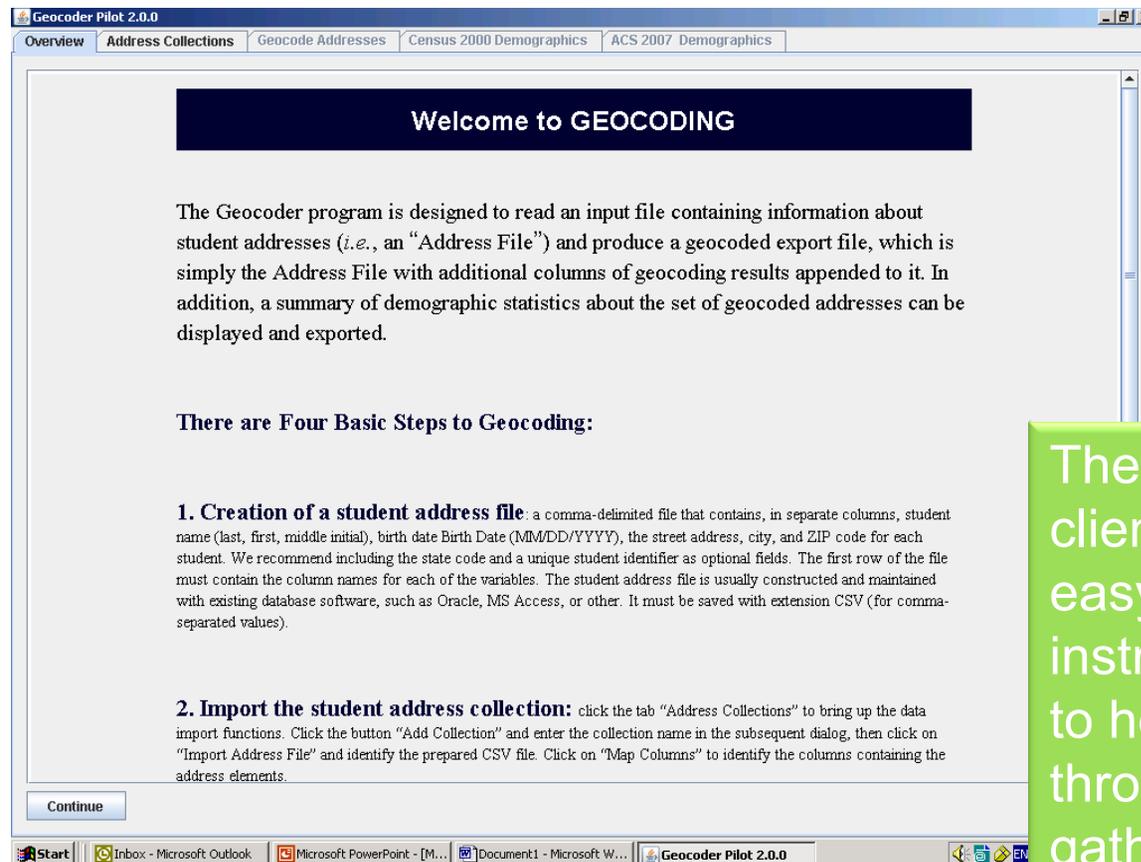


Once through all the installation screens, a bar will appear to tell you that the system is installed.

When the final screen appears, the application is done.

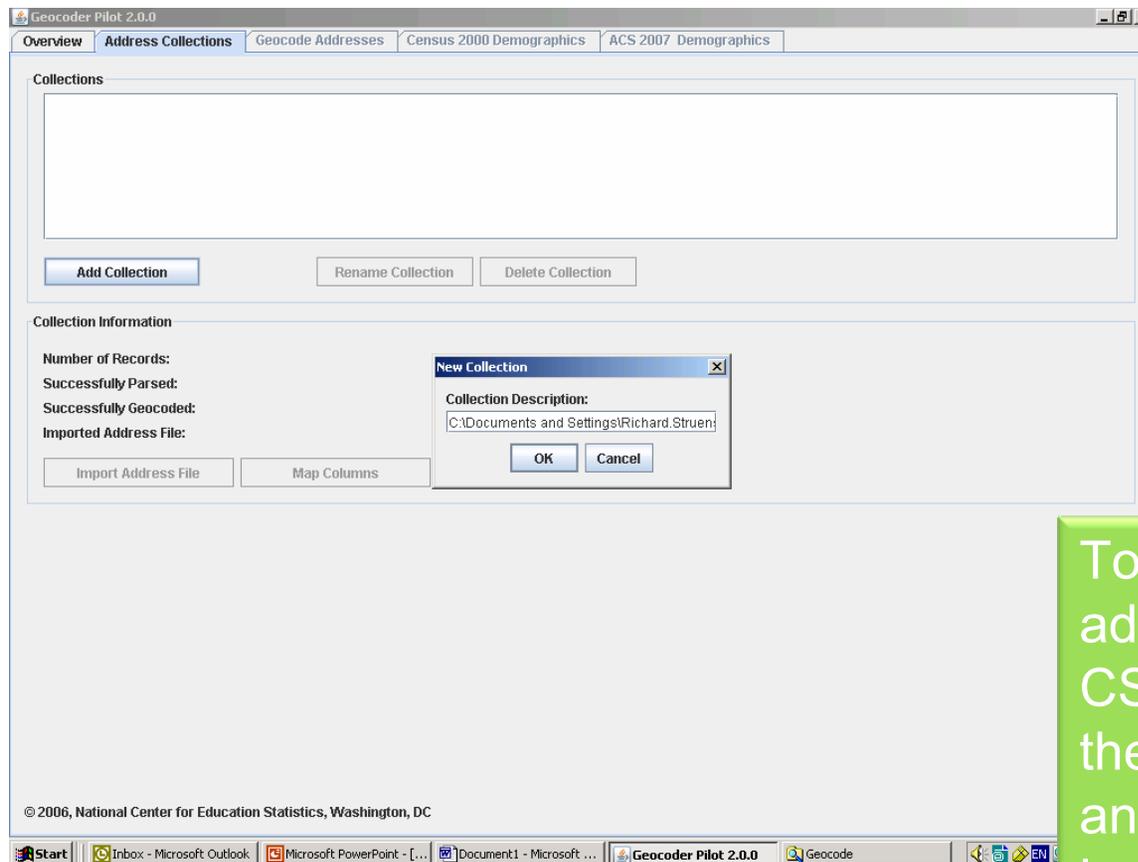


# Using the Geocoding Client



The Geocoding client comes with easy-to-use instructions and tabs to help you navigate through the steps to gather Census and ACS data about your population

# Adding an Address Collection



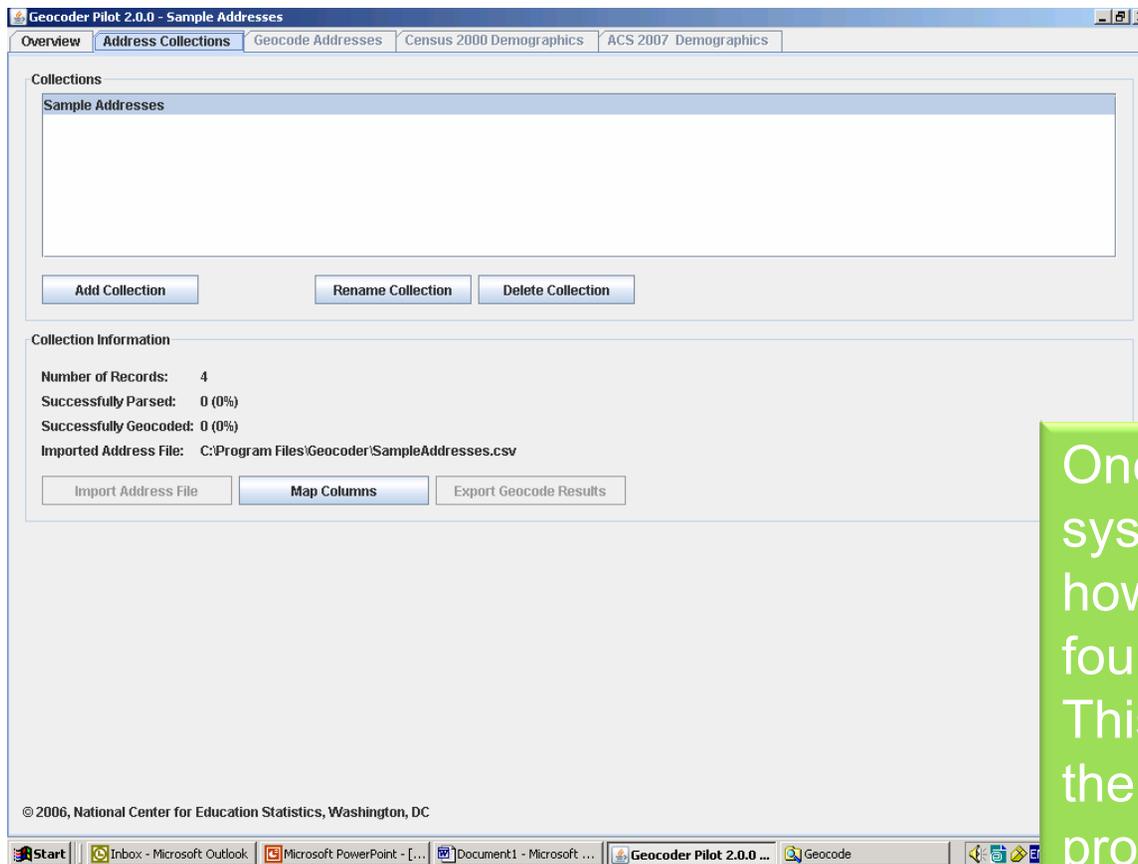
To start geocoding, add a new address CSV file by clicking the “Add Collection” and enter the location of the CSV file.

# What Goes In the CSV File

- In your CSV file, which you can create in a spreadsheet program (e.g., Excel), you need to have the following minimum information:
  - A unique ID for each record (you can make it up).
  - The number and street address for each student.
  - The city, state, and zip code for each address in separate fields.
- The system will then help you map each field to the geocoding data after uploading.

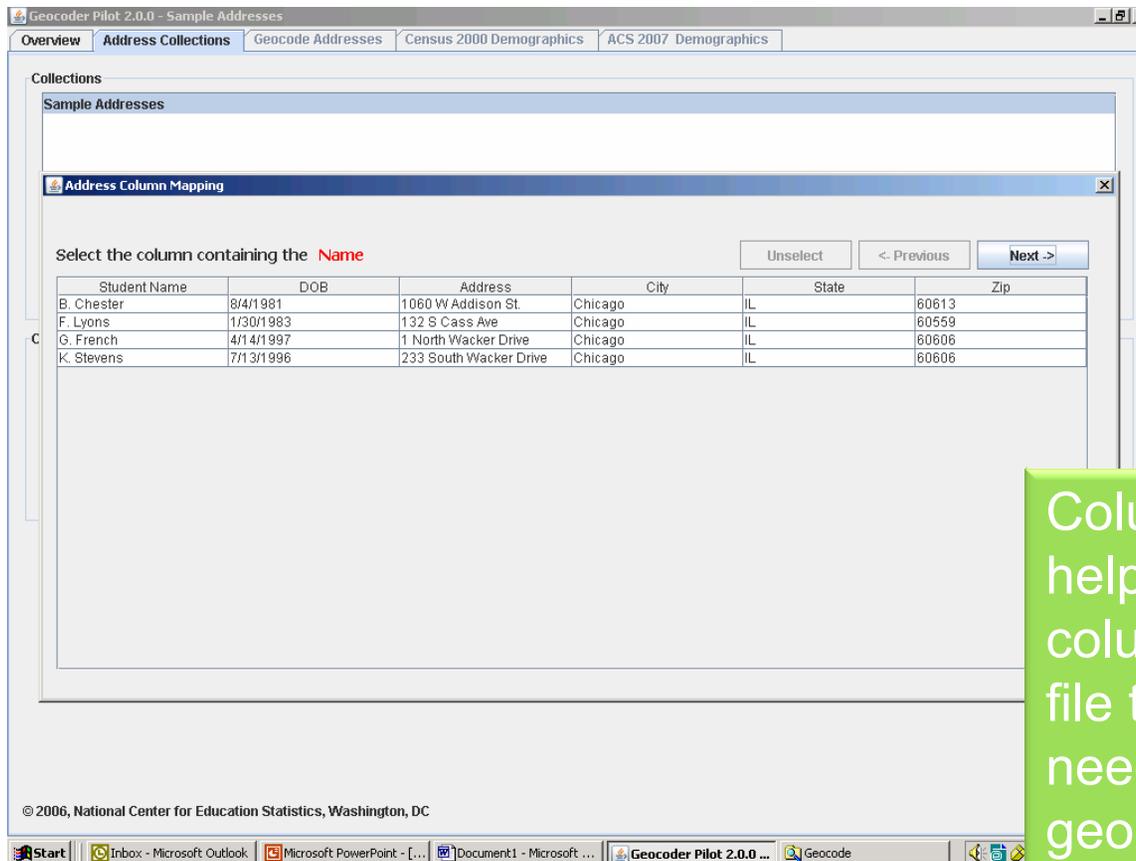
	A	B	C	D	E	F	G	H
1	ID	Primary Address	City Name (Abbr#)	State Abbr#	Zip Code			
2	8001	1919 RUNNELS ST	HOUSTON	TX	77003			
3	8002	4202 CRITES ST	HOUSTON	TX	77003			
4	8003	233 N NAGLE ST	HOUSTON	TX	77003			
5	8004	10 LIVE OAK ALY	HOUSTON	TX	77003			
6	8005	220 HUNT ST	HOUSTON	TX	77003			
7	8006	2113 LEELAND ST	HOUSTON	TX	77003			
8	8007	2717 HADLEY ST	HOUSTON	TX	77004			
9	8008	3307 CRAWFORD ST	HOUSTON	TX	77004			
10	8009	3810 SAN JACINTO ST	HOUSTON	TX	77004			
11	8010	4202 CRAWFORD ST	HOUSTON	TX	77004			
12								
13								

# Uploaded CSV file



Once uploaded, the system will indicate how many records it found in the CSV file. This lets you know if there were any problems importing the file.

# Column Mapping



Geocoder Pilot 2.0.0 - Sample Addresses

Overview Address Collections Geocode Addresses Census 2000 Demographics ACS 2007 Demographics

Collections

Sample Addresses

Address Column Mapping

Select the column containing the **Name**

Unselect < Previous Next ->

Student Name	DOB	Address	City	State	Zip
B. Chester	8/4/1981	1060 W Addison St.	Chicago	IL	60613
F. Lyons	1/30/1983	132 S Cass Ave	Chicago	IL	60559
G. French	4/14/1997	1 North Wacker Drive	Chicago	IL	60606
K. Stevens	7/13/1996	233 South Wacker Drive	Chicago	IL	60606

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Start | Inbox - Microsoft Outlook | Microsoft PowerPoint - [...] | Document1 - Microsoft ... | Geocoder Pilot 2.0.0 ... | Geocode

Column mapping helps you map the columns in your CSV file to the columns needed for geocoding (Address, City, State, Zip) Example names are fictitious.

# Initial Geocode Check

Geocoder Pilot 2.0.0 - Sample Addresses

Overview | Address Collections | **Geocode Addresses** | Census 2000 Demographics | ACS 2007 Demographics

0 (0%) records successfully parsed  
0 (0%) records successfully geocoded

Selected?	name (Student Name)	dob (DOB)	streetAddress (Address)	city (City)	state (State)	zip (Zip)	Geocoded?	Geocode Results	Message
<input checked="" type="checkbox"/>	B. Chester	8/4/1981	1060 W Addiso...	Chicago	IL	60613		60613	
<input checked="" type="checkbox"/>	F. Lyons	1/30/1983	132 S Cass Ave	Chicago	IL	60559		60559	
<input checked="" type="checkbox"/>	G. French	4/14/1997	1 North Wacker...	Chicago	IL	60606		60606	
<input checked="" type="checkbox"/>	K. Stevens	7/13/1996	233 South Wac...	Chicago	IL	60606		60606	

Select All | Unselect All | Add Address | Delete Selected | Geocode Selected

Taskbar: Start | Inbox - Microsoft Outlook | Microsoft PowerPoint - [...] | Document1 - Microsoft ... | Geocoder Pilot 2.0.0 ...

Before getting data from the Geocode server, the client checks and verifies the Zip codes to make sure they are correct. Then the system parses the records into the data elements needed for geocoding. Example names are fictitious.

# Geocoding Data from Servers

The screenshot shows the 'Geocoder Pilot 2.0.0 - Sample Addresses' application. The 'Geocode Addresses' tab is active, displaying a table with the following data:

Selected?	name (Student Name)	dob (DOB)	streetAddress (Address)	city (City)	state (State)	zip (Zip)	Geocoded?	Geocode Results	Message
<input checked="" type="checkbox"/>	B. Chester	8/4/1981	1060 W Addiso...	Chicago	IL	60613		60613	
<input checked="" type="checkbox"/>	F. Lyons	1/30/1983	132 S Cass Ave	Chicago	IL	60559		60559	
<input checked="" type="checkbox"/>	G. French	4/14/1997	1 North Wacker...	Chicago	IL	60606		60606	
<input checked="" type="checkbox"/>	K. Stevens	7/13/1996	233 South Wac...	Chicago	IL	60606		60606	

A 'Load Census Data' dialog box is open, displaying the following text:

Your Census database does not contain information about some of the regions in this address collection. Click the "Start" button to retrieve it now or click the "Cancel" button to continue geocoding without it.

Census Data Retrieved

Start Cancel

At the bottom of the main window, there are buttons for 'Select All', 'Unselect All', 'Add Address', 'Delete Selected', and 'Geocode Selected'.

The system then gets data from the geocode server. This can take a while so please be patient. Example names are fictitious.

# Geocoding Success!

The screenshot shows the 'Geocoder Pilot 2.0.0 - Sample Addresses' application. The 'Geocode Addresses' tab is active, displaying a table with the following data:

Selected?	name (Student Name)	dob (DOB)	streetAddress (Address)	city (City)	state (State)	zip (Zip)	Geocoded?	Geocode Results	Message
<input checked="" type="checkbox"/>	B. Chester	8/4/1981	1060 W Addiso...	Chicago	IL	60613	<input checked="" type="checkbox"/>	60613	
<input checked="" type="checkbox"/>	F. Lyons	1/30/1983	132 S Cass Ave	Chicago	IL	60559	<input checked="" type="checkbox"/>	60559	
<input checked="" type="checkbox"/>	G. French	4/14/1997	1 North Wacker...	Chicago	IL	60606	<input checked="" type="checkbox"/>	60606	
<input checked="" type="checkbox"/>	K. Stevens	7/13/1996	233 South Wac...	Chicago	IL	60606	<input checked="" type="checkbox"/>	60606	

A summary dialog box titled 'Geocoding Selected Addresses' is open, showing a progress bar at 100% and the following statistics:

- Addresses processed: 4
- Addresses parsed: 4
- Addresses geocoded: 2

The dialog box also includes a 'Finish' button. At the bottom of the main window, there are buttons for 'Select All', 'Unselect All', 'Add Address', 'Delete Selected', and 'Geocode Selected'.

If everything is successful, the system will generate a summary report of the number of addresses parsed and geocoded. Example names are fictitious.

# Success Results

Geocoder Pilot 2.0.0 - Sample Addresses

Overview Address Collections Geocode Addresses Census 2000 Demographics ACS 2007 Demographics

4 (100%) records successfully parsed  
2 (50%) records successfully geocoded

Selected?	name (Student Name)	dob (DOB)	streetAddress (Address)	city (City)	state (State)	zip (Zip)	Geocoded?	Geocode Results	Message
<input checked="" type="checkbox"/>	B. Chester	8/4/1981	1060 W Addiso...	Chicago	IL	60613		60613	Geocoding failed
<input checked="" type="checkbox"/>	F. Lyons	1/30/1983	132 S Cass Ave	Chicago	IL	60559		60559	Geocoding failed
<input checked="" type="checkbox"/>	G. French	4/14/1997	1 North Wacker...	Chicago	IL	60606	✓	171031 320200 ...	Geocoding suc...
<input checked="" type="checkbox"/>	K. Stevens	7/13/1996	233 South Wac...	Chicago	IL	60606	✓	171031 320500 ...	Geocoding suc...

Select All Unselect All Add Address Delete Selected Geocode Selected

Once the parsing and geocoding is done, the address screen will show you which addresses have been successfully geocoded. Example names are fictitious.

# Changing Addresses

The screenshot shows the 'geocoder' application window. It has two tabs: 'Geocode/Edit Addresses' (selected) and 'Demographics'. Below the tabs are two progress bars: '% Successfully Geocoded' and '% Successfully Parsed', both showing 100% completion. A 'Geocode All' button is located in the top right. The main area contains a table with columns: Address, City, State, Zip, Status, Geographical Census Data, and Message. Each row has a 'Geocode' button to its right. The status column contains checkboxes, some of which are checked. The message column contains various status messages like 'Exact Match', 'Fuzzy Match', 'Missing Zip Code', and 'Can't Locate'. The address '643 C STREEEEET, NE' is highlighted in blue, and a small edit icon is visible to its left.

Address	City	State	Zip	Status	Geographical Census Data	Message
2151 CALIFORNIA STREET, NW	WASHINGTON	DC	20008	<input checked="" type="checkbox"/>	60871214032 20008	Exact Match
5215 CHEVY CHASE PKWY.	WASHINGTON	DC	20015	<input checked="" type="checkbox"/>	60871214033 20015	Exact Match
5516 30TH STREET, NW	WASHINGTON	DC	20015	<input checked="" type="checkbox"/>	60871008006 20015	Exact match
1818 INGLESIDE TERRACE, NW	WASHINGTON	DC	20010	<input checked="" type="checkbox"/>	60871210003 20010	Fuzzy Match
2844 WISCONSIN AVE, NW	WASHINGTON	DC		<input type="checkbox"/>		Missing Zip Code
1313 FLORIDA AVE., NW	WASHINGTON	DC	20009	<input checked="" type="checkbox"/>	60871216004 20009	Exact match
3426 16TH STREET NW	WASHINGTON	DC	20010	<input checked="" type="checkbox"/>	60871210003 20010	Exact match
2000 CONNECTICUT AVENUE, NW	WASHINGTON	DC	20008	<input type="checkbox"/>		Can't Locate
514 NICHOLSON STREET, NE	WASHINGTON	DC	20011	<input checked="" type="checkbox"/>	60871218003 20011	
338 M STREET SW	WASHINGTON	DC	20024	<input checked="" type="checkbox"/>	60871220031 20024	
<u>643 C STREEEEET, NE</u>	WASHINGTON	DC	20002	<input type="checkbox"/>		
5361 MACARTHUR BOULEVARD, NW	WASHINGTON	DC	20016	<input checked="" type="checkbox"/>	60871214021 20016	

If, for some reason you need to change an address, you can always edit the addresses in the current record from within the system. Example names are fictitious.

# Census 2000 Demographic Data

Geocoder Pilot 2.0.0 - Sample Addresses

Overview Address Collections Geocode Addresses **Census 2000 Demographics** ACS 2007 Demographics

**Student Demographic Profile**  
Based on 2 (50.00%) successfully geocoded addresses of 4 processed  
**Warning: Only 50.00% of addresses successfully geocoded.**  
**The demographic information may not be accurate.**  
Approximations based on Census 2000 block group information

Export Statistics

Race/Ethnicity, Percent		Occupational Status, Employed civilian population 16 years and over, Percent	
White	43.5%	Management, professional, and related occupations	23.2%
Black or African American	0.0%	Service occupations	8.4%
Native American and Alaskan	0.0%	Sales and office occupations	31.3%
Asian	5.2%	Farming, fishing, and forestry occupations	0.0%
Hawaiian and Pacific Islander	0.0%	Construction, extraction and maintenance occupations	1.0%
Some other race	0.0%	Production, transportation, and material moving occupations	36.0%
Two or more races	0.0%		
Hispanic or Latino	51.4%		
Speak a language other than English at home, Population 5 and over, Percent	0.0%	Median Household Income, Dollars	\$73,883.50
Educational Attainment, Population 25+, Percent		Poverty Status in 1999, Families with related children 18 years, Percent	
No high school graduate	50.0%	Below poverty level	0.0%
High school degree	11.7%		
Two-year college degree	0.0%	Occupied Housing, Percent	
Four-year college degree	18.1%	Owner occupied	83.4%
Graduate degree	20.2%	Renter occupied	16.6%
Employment Status, Population 16 years and over, civilian labor force, Percent		Median Value, Owner occupied housing, Dollars	\$194,300.00
Employed	100.0%	Median Gross Rent, Dollars	\$719.00
Unemployed	0.0%	Median Tenure in Residence, Years	2.0

Windows taskbar: Start | Inbox - Microsoft Outlook | Microsoft PowerPoint - [...] | Document1 - Microsoft ... | Geocoder Pilot 2.0.0 ...

Based on the addresses you provided, you will receive a summary of Census 2000 statistics about the socio-economic status of that area.

# ACS 2007 Demographic Data

Geocoder Pilot 2.0.0 - Sample Addresses

Overview Address Collections Geocode Addresses Census 2000 Demographics **ACS 2007 Demographics**

**Student Demographic Profile**  
Based on 2 (50.00%) successfully geocoded addresses of 4 processed  
**Warning: Only 50.00% of addresses successfully geocoded.**  
**The demographic information may not be accurate.**  
Approximations based on 2007 American Community Survey 1 year county estimates

Export Statistics

Race/Ethnicity, Percent		Occupational Status, Employed civilian population 16 years and over, Percent	
White	51.1%	Management, professional, and related occupations	35.0%
Black or African American	25.5%	Service occupations	16.9%
Native American and Alaskan	0.2%	Sales and office occupations	26.5%
Asian	5.7%	Farming, fishing, and forestry occupations	0.1%
Hawaiian and Pacific Islander	0.1%	Construction, extraction and maintenance occupations	7.4%
Some other race	15.9%	Production, transportation, and material moving occupations	14.1%
Two or more races	1.6%		
Hispanic or Latino	0.0%		
Speak only English at home, Population 5 and over, Percent	66.3%	Median Household Income, Dollars	\$52,564.00
Educational Attainment, Population 25+, Percent		Poverty Status in 2007, Percent	
No high school graduate	17.6%	Below poverty level	14.6%
High school degree	27.2%	Occupied Housing, Percent	
Two-year college degree	26.0%	Owner occupied	62.3%
Four-year college degree or higher	29.2%	Renter occupied	37.7%
Employment Status, Population 16 years and over, civilian labor force, Percent		Median Value, Owner occupied housing, Dollars	\$281,800.00
Employed	92.1%	Median Gross Rent, Dollars	\$852.00
Unemployed	8.0%		

Windows taskbar: Start | Inbox - Microsoft Outlook | Microsoft PowerPoint - [...] | Document1 - Microsoft ... | Geocoder Pilot 2.0.0 ...

Likewise, using the addresses you provided will give you a summary of American Community Survey (ACS) 2007 statistics about the socio-economic status of that area.

# What's In the Census/ACS Data

- Background information about the set of addresses such as:
  - Race/Ethnicity of the population
  - Marital status of the parents
  - Economic status/average salary
  - Home ownership
  - Occupations of population

# Exporting Data

Student Demographic Profile  
Based on 2 (50.00%) successfully geocoded addresses of 4 processed  
**Warning: Only 50.00% of addresses successfully geocoded.  
The demographic information may not be accurate.**  
Approximations based on Census 2000 block group information

Export Statistics

	A	B	C	D	E
1	ethnicity	White	65.10%		
2	ethnicity	Black or African American	0.60%		
3	ethnicity	Native American and Alaskan	0.00%		
4	ethnicity	Asian	4.30%		
5	ethnicity	Hawaiian and Pacific Islander	0.00%		
6	ethnicity	Some other race	0.00%		
7	ethnicity	Two or more races	0.20%		
8	ethnicity	Hispanic or Latino	29.80%		
9	language	Speak a language other than Engli	16.30%		
10	education	No high school graduate	29.70%		
11	education	High school degree	21.90%		
12	education	Two-year college degree	2.60%		
13	education	Four-year college degree	29.10%		
14	education	Graduate degree	16.70%		
15	employment	Employed	98.60%		
16	employment	Unemployed	1.40%		
17	occupation	Management, professional, and p	25.10%		

Users can export the Census and ACS data to a CSV file which can then be imported into a spreadsheet. Each element of the displayed Census/ACS geocoded information is provided in a single spreadsheet row, including:

- Ethnicity.
- Language.
- Education.
- Employment.
- Occupation.
- Income.
- Housing Price and Tenure.

# How to Start Geocoding by Example with a Live Demonstration

# Geocoding Software Support

- Geocoding software training
- Geocoding manual and FAQs
- Help Desk by email
- NSSC Tigers

## Geocoding Software

- The URL is <http://geocode.naepims.org> with a user ID of “cold” and the password is “latte”
- Can be demonstrated via the internet

## Associated Web Sites

- National Center for Educational Statistics
  - <http://www.nces.ed.gov/>
- National Assessment of Educational Progress
  - <http://www.nces.ed.gov/nationsreportcard/>
- Nations Report Card
  - <http://www.nationsreportcard.gov/>

# Questions