Building APIs in Government for Social Good

Tyrone Grandison PhD

www.tyronegrandison.org @tyrgr

My Time In Government

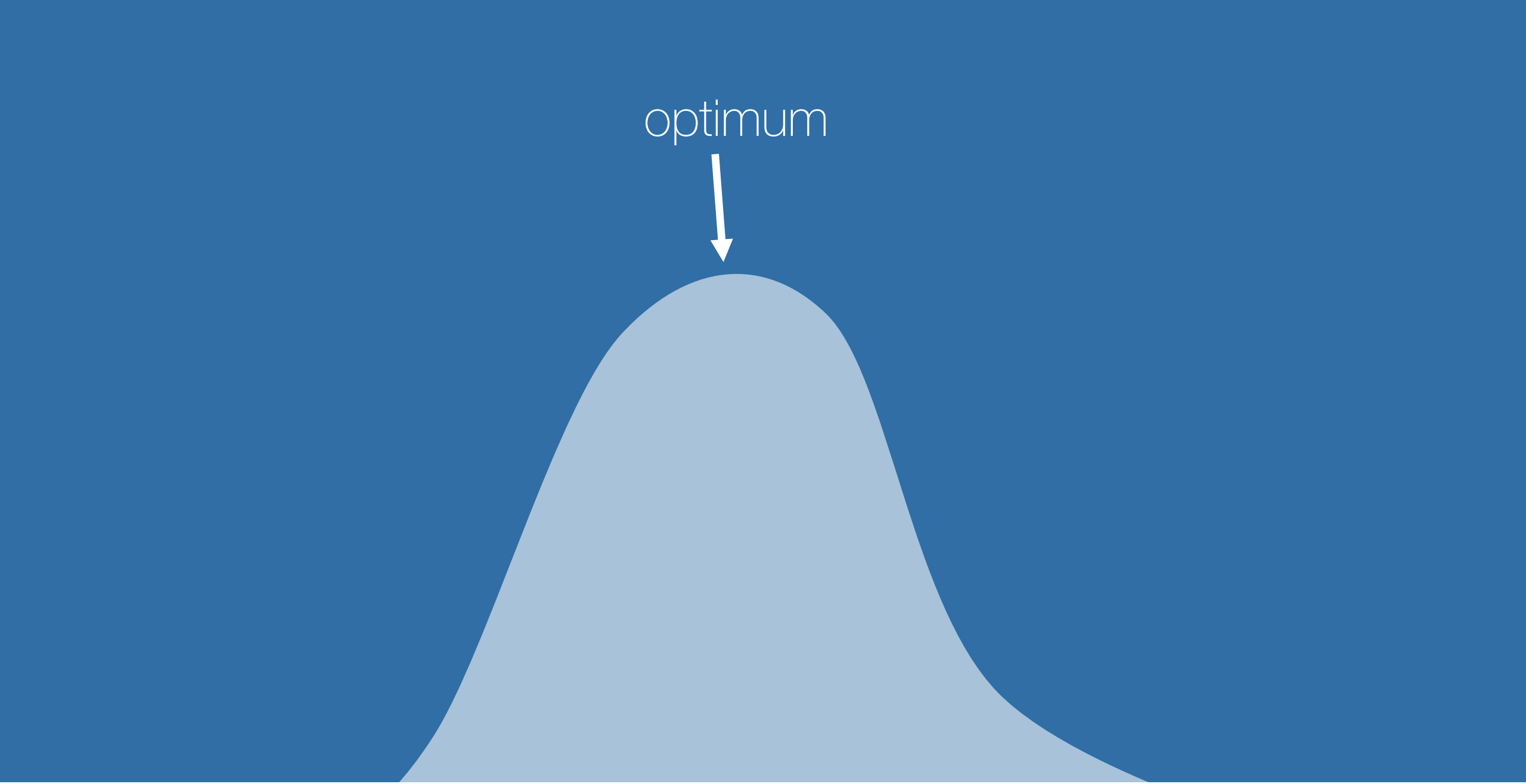
Deputy Chief Data Officer,
US Department of Commerce (2015-16)

White House Presidential Innovation Fellow,
Department of Labor & US Census Bureau (2014-15)

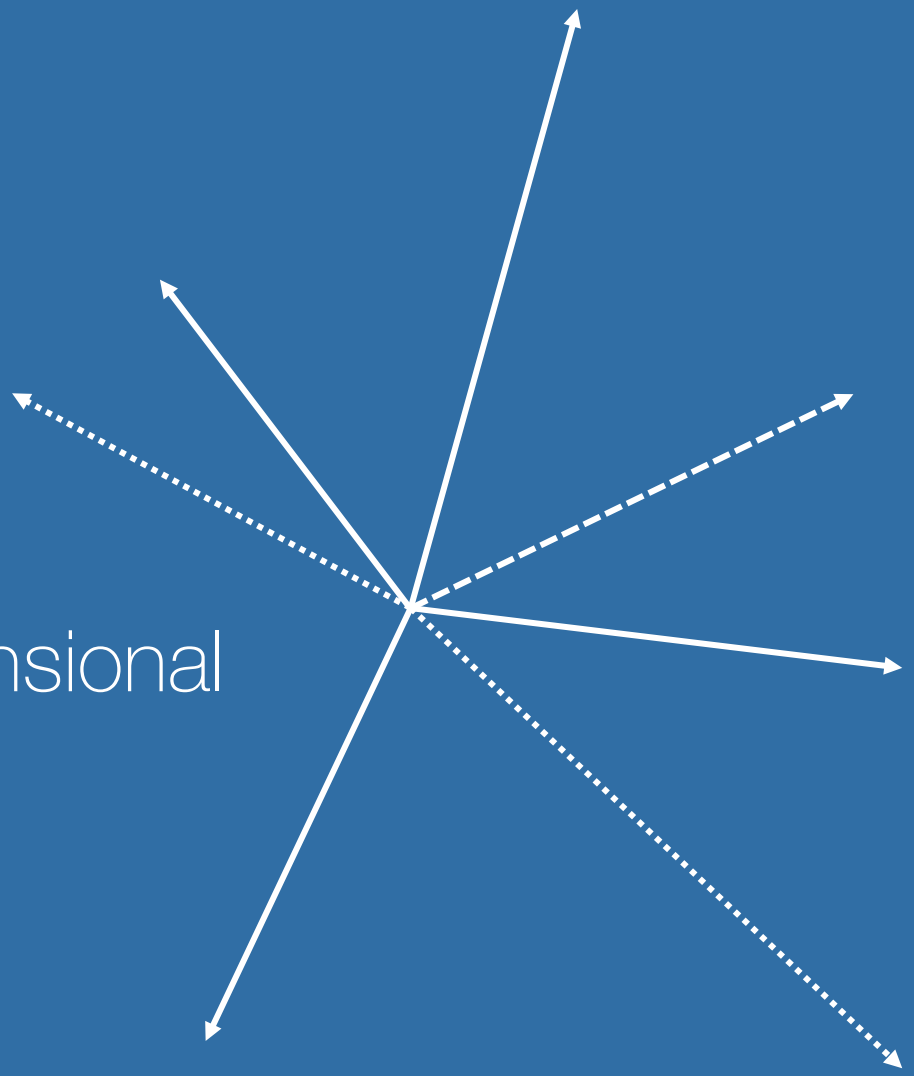
THE PLAN

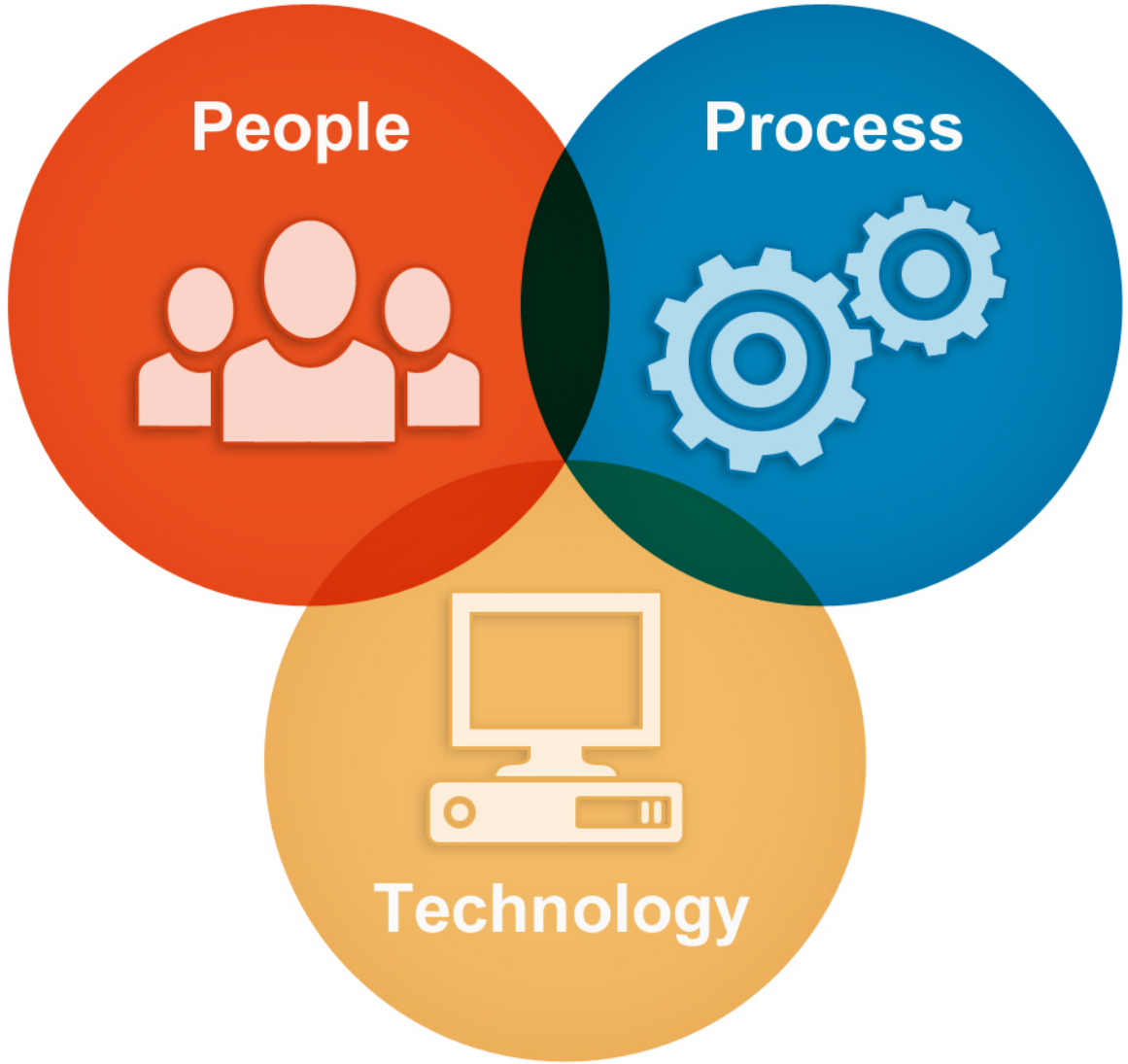
- The Reality
- APIs: Sweat and Toil, CitySDK, MIDAAS
- Lessons

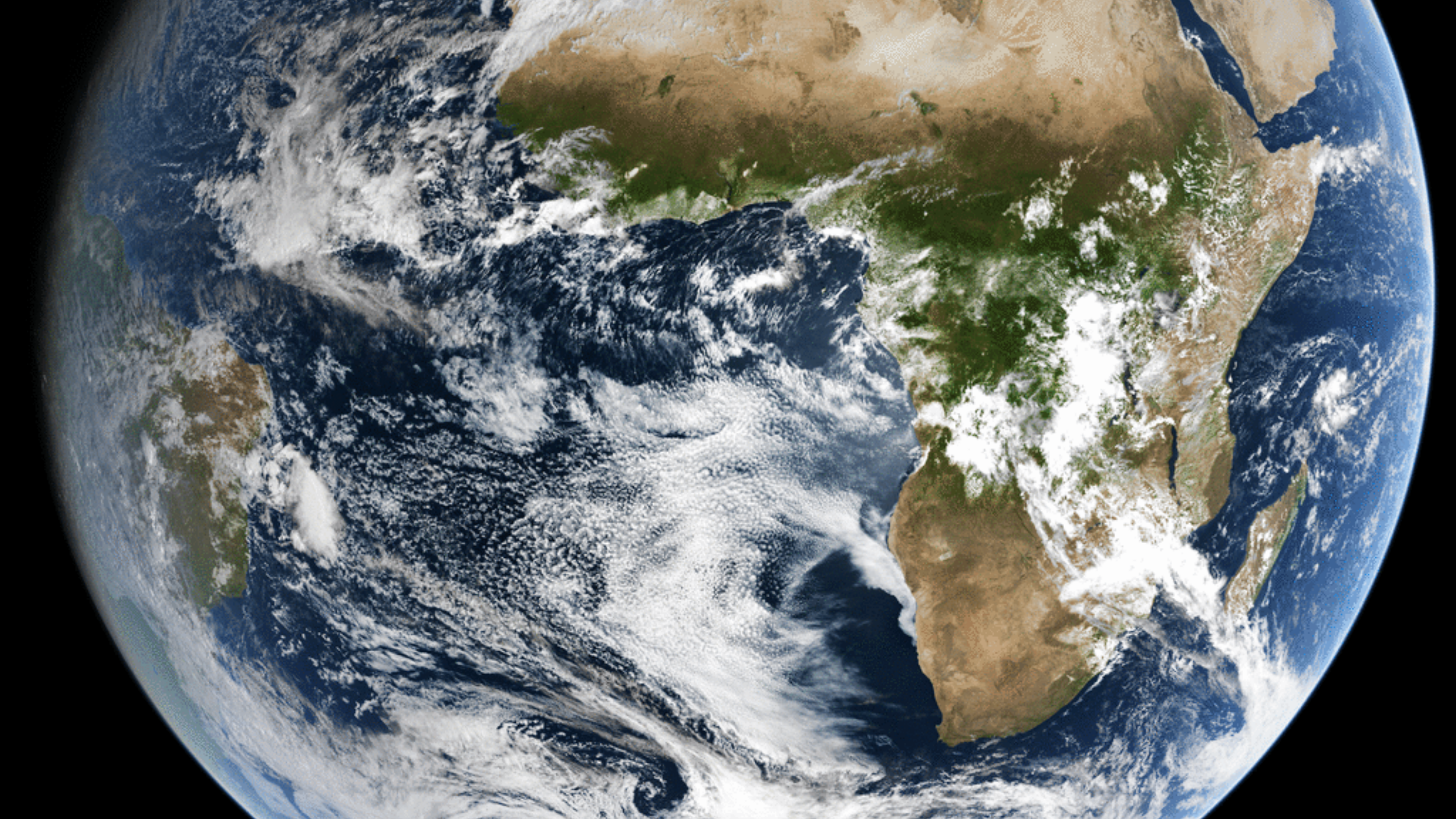
government takes
on the hardest,
inelastic problems

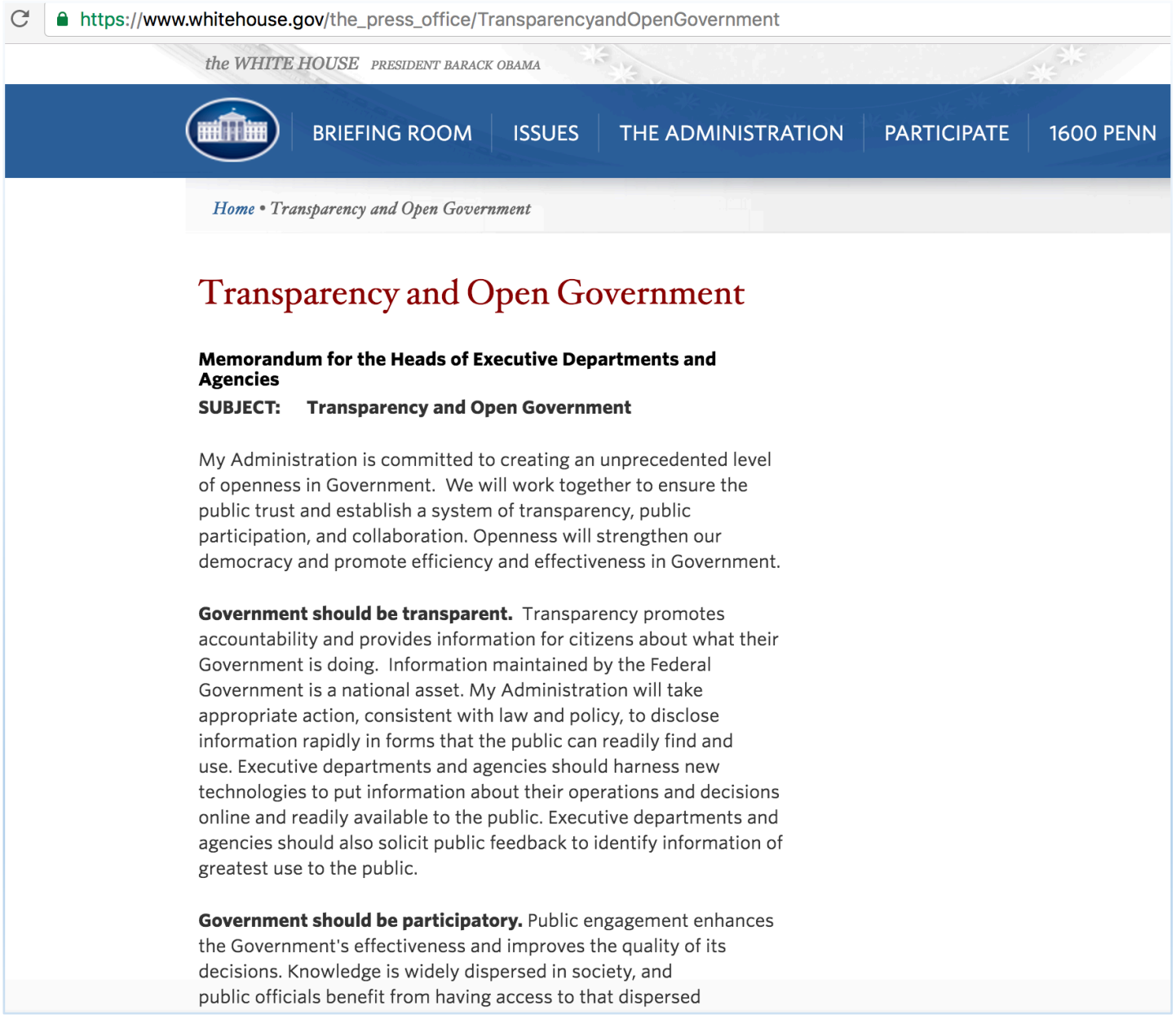

optimum

n-dimensional




People
Process
Technology





Executive Order M-13-13


https://www.data.gov
DATA.GOV
DATA
TOPICS
IMPACT
APPLICATIONS
DEVELOPERS
CONTACT
The home of the U.S. Government's open data
Here you will find data, tools, and resources to conduct research, develop web and mobile applications, design data visualizations, and more.
GET STARTED
SEARCH OVER 186,304 DATASETS
Federal Student Loan Program Data
BROWSE TOPICS
Agriculture
Business
Climate
Consumer
Ecosystems
Education
Energy

https://sourcecode.cio.gov

Federal Source Code Policy

M-16-21
MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

FROM:
Tony Scott
United States Chief Information Officer

Anne E. Rung
United States Chief Acquisition Officer

SUBJECT:
Federal Source Code Policy: Achieving Efficiency, Transparency, and Innovation through Reusable and Open Source Software

The U.S. Government is committed to improving the way Federal agencies buy, build, and deliver information technology (IT) and software solutions to better support cost efficiency, mission effectiveness, and the consumer experience with Government programs. Each year, the Federal Government spends more than $6 billion on software through more than 42,000 transactions.[1] A significant proportion of software used by the Government is comprised of either preexisting Federal solutions or commercial solutions. These solutions include proprietary, open source, and mixed source[2] code and often do not require additional custom code development.

When Federal agencies are unable to identify an existing Federal or commercial software solution that satisfies

COMMERCE DATA SERVICE

THE PLAN

- The Reality
- APIs: Sweat and Toil, CitySDK, MIDAAS
- Lessons

Sweat and Toil

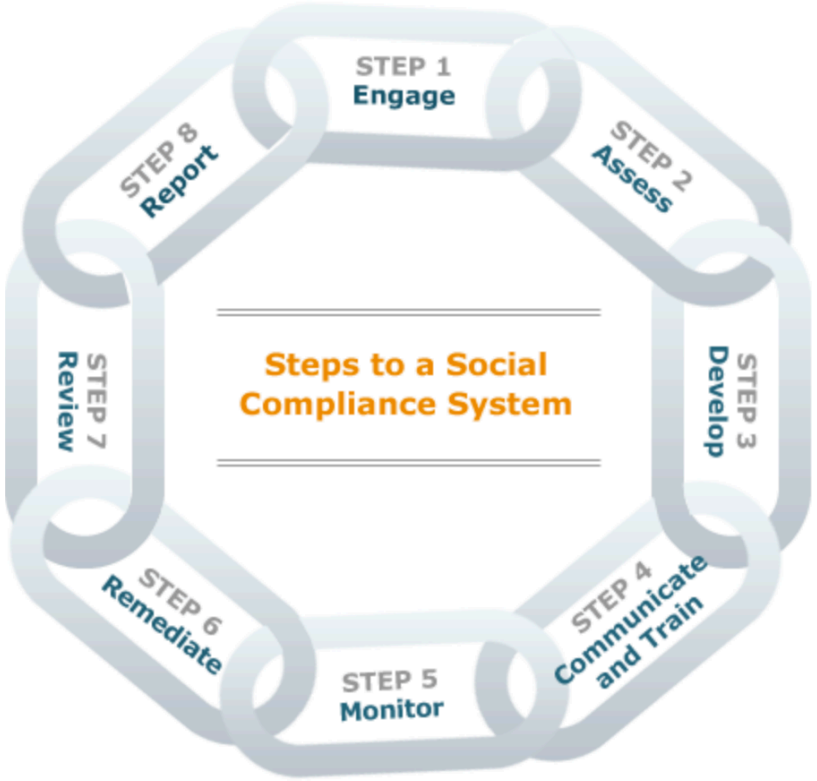
http://developer.dol.gov/others/sweat-and-toil

https://github.com/USDepartmentofLabor/Child-Labor
https://github.com/USDepartmentofLabor/Child-Labor-Android

Building the API – Step 1

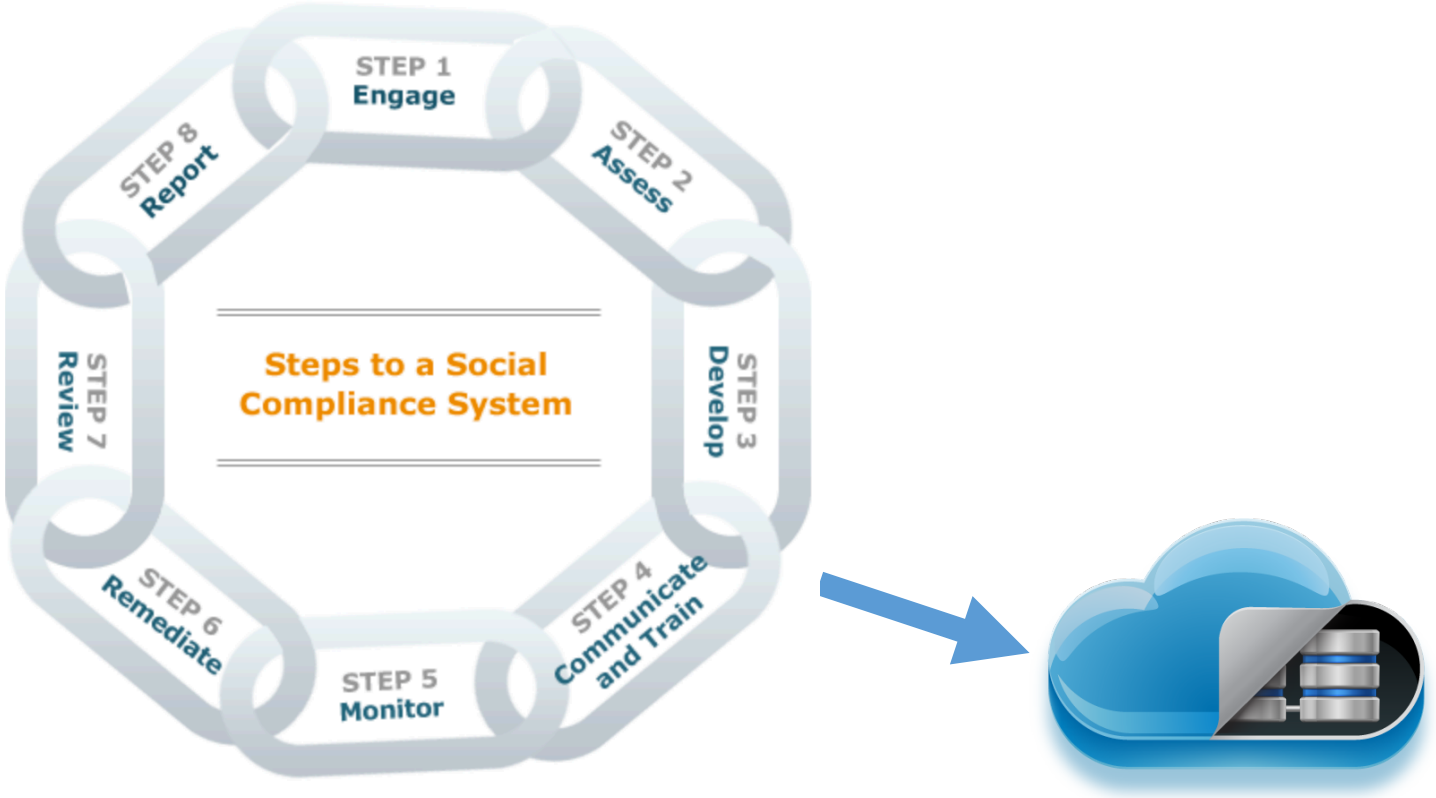
Coalition and Urgency

Building the API – Step 2



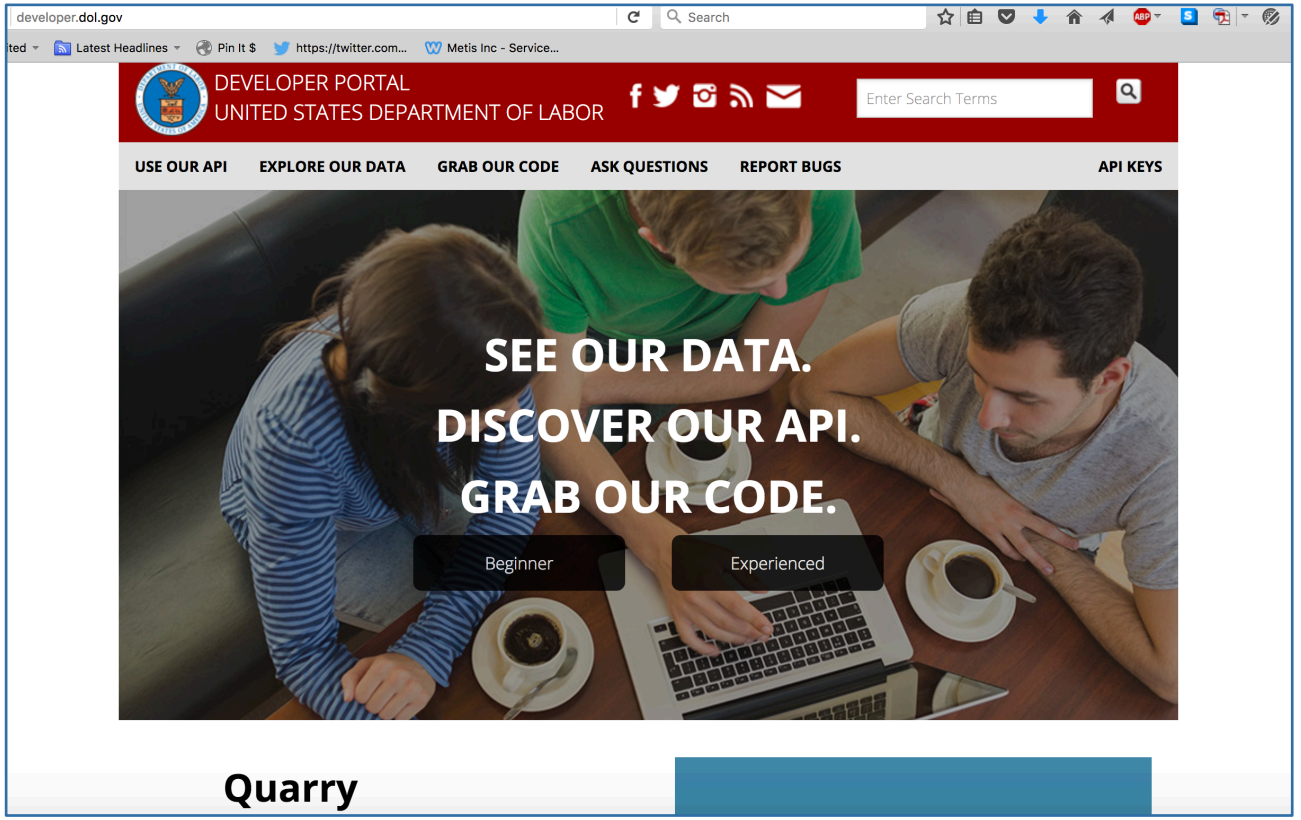
Understand The Data Production Process

Building the API – Step 3



Find Natural Intervention Point

Building the API – Step 4



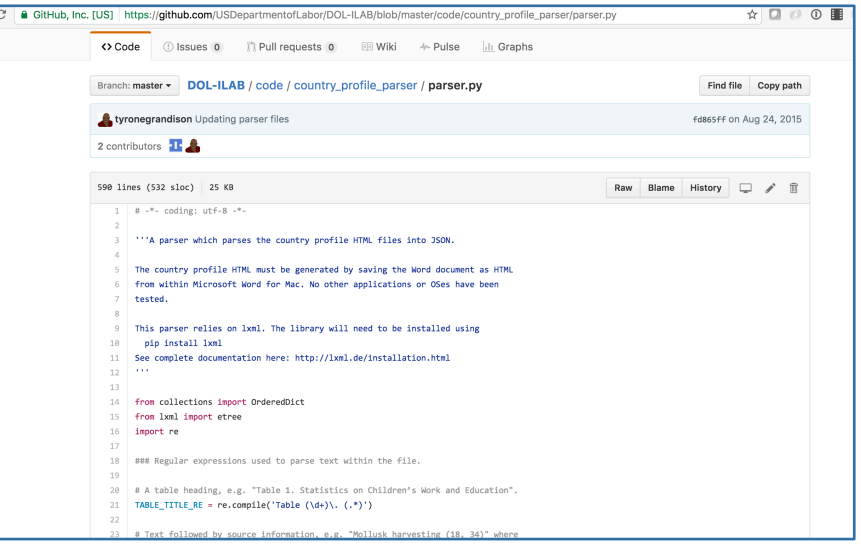
Learn Technology Constraints

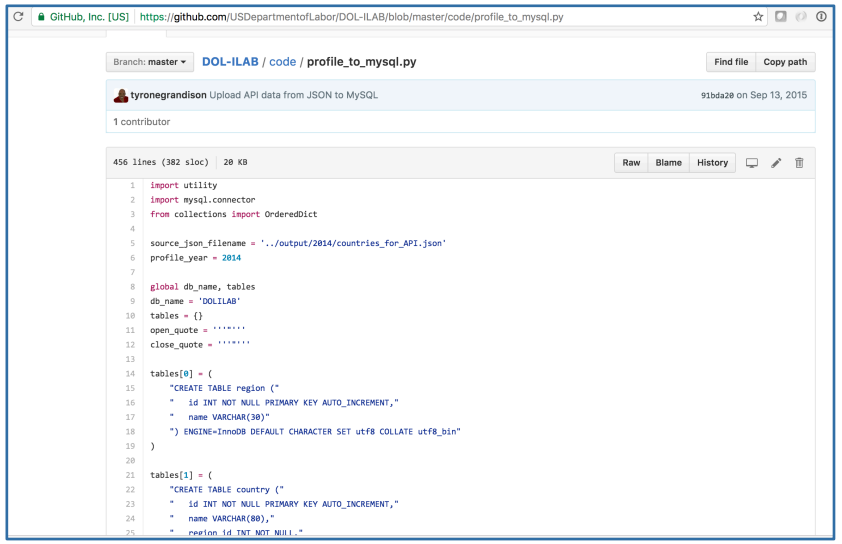
Building the API – Step 5

Understand The API User Groups

Building the API – Step 6

Python → MySQL, MSSQL → Quarry





Country Profile Table

https://data.dol.gov/get/childlabor_pro

childlabor_pro

Column Name	Column Description	Data Type
id	Unique country profile identifier	int
country_id	Unique country identifier	int
profile_year	Year of country profile	int
advancement_id	Unique advancement level identifier	int
description	Country profile summary description	text

Sector Table

https://data.dol.gov/get/childlabor_sec

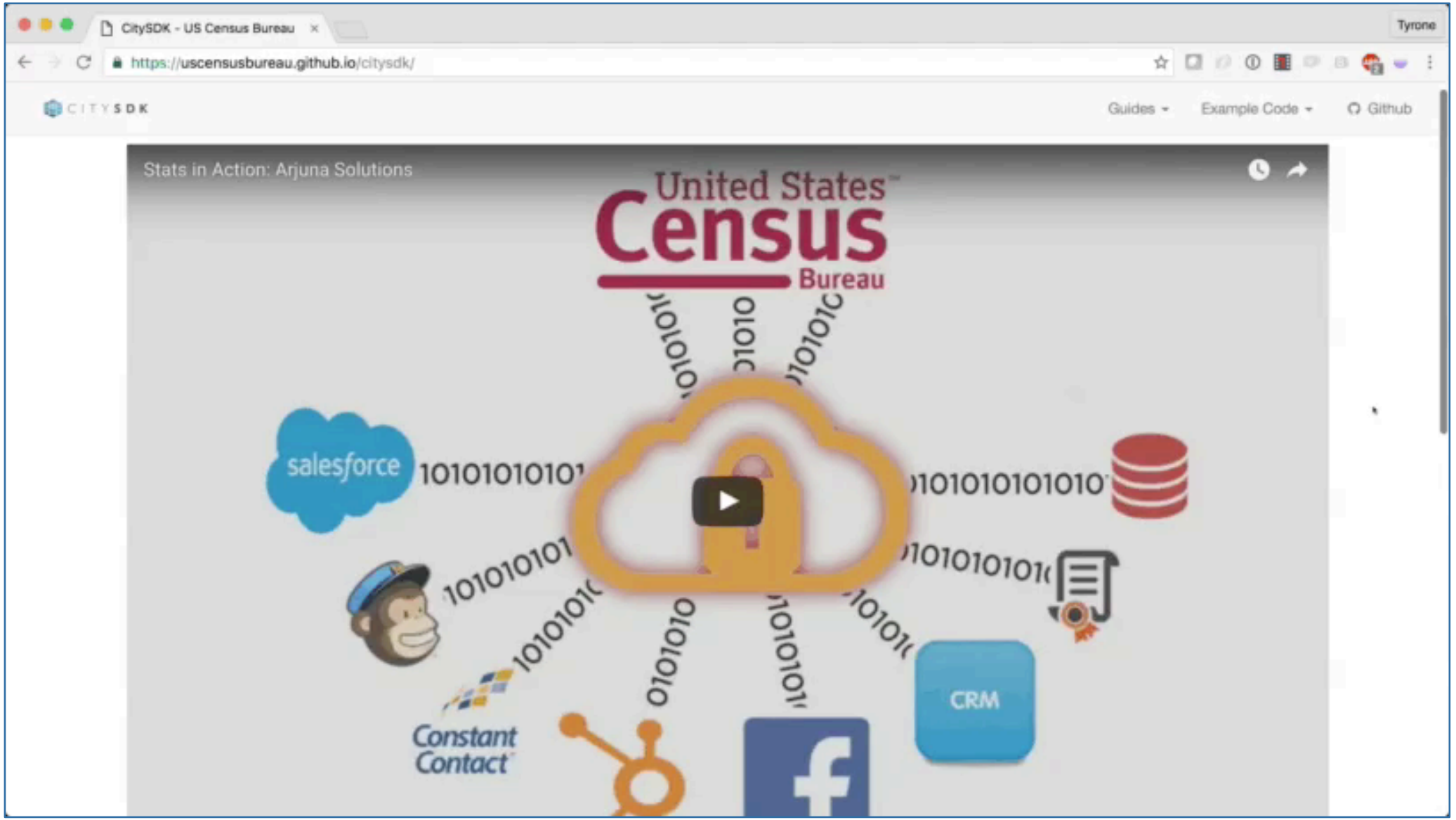
childlabor_sec

Column Name	Column Description	Data Type
id	Unique sector identifier	int

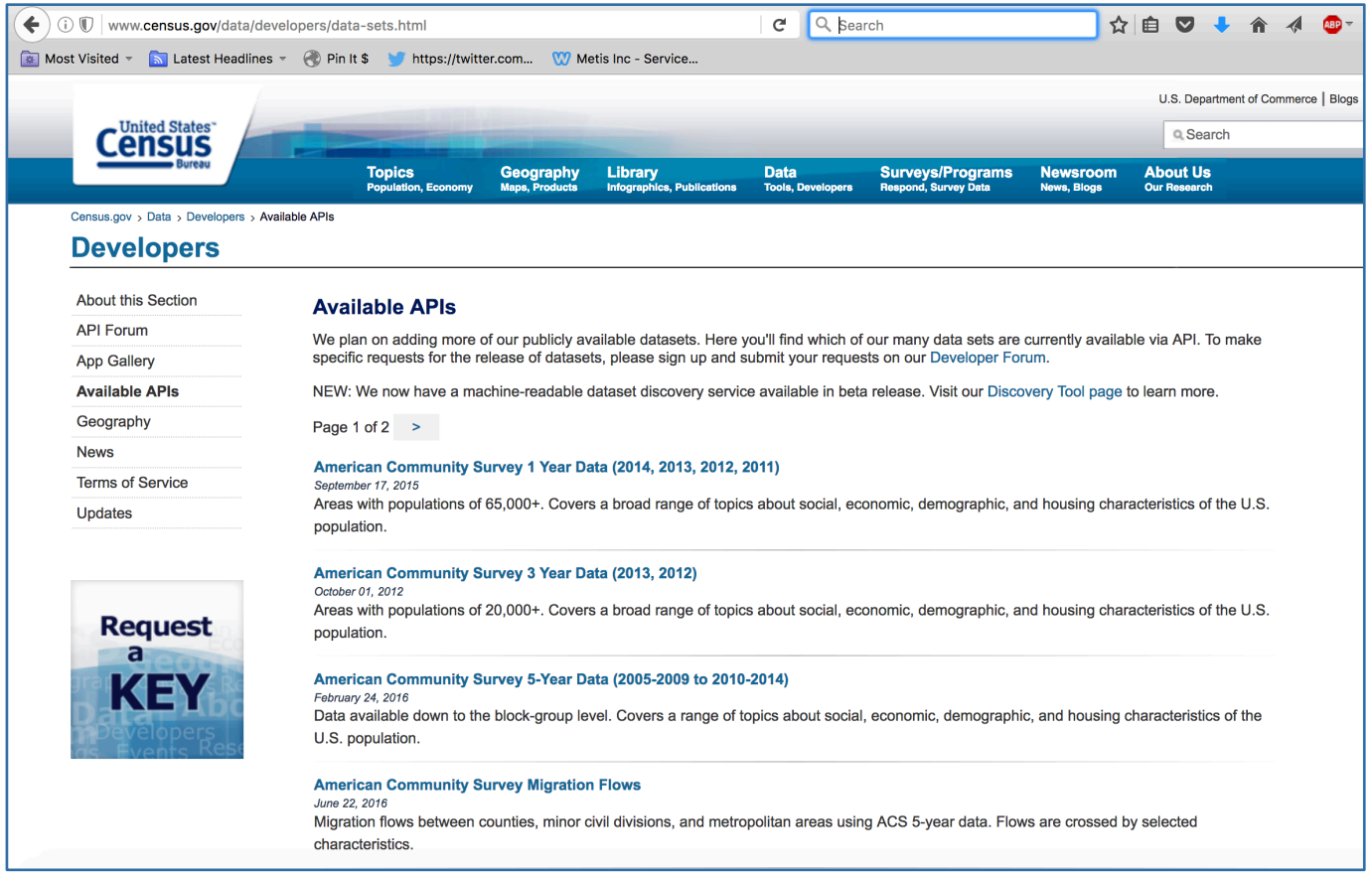
Census CitySDK

https://uscensusbureau.github.io/citysdk/

https://github.com/uscensusbureau/citysdk

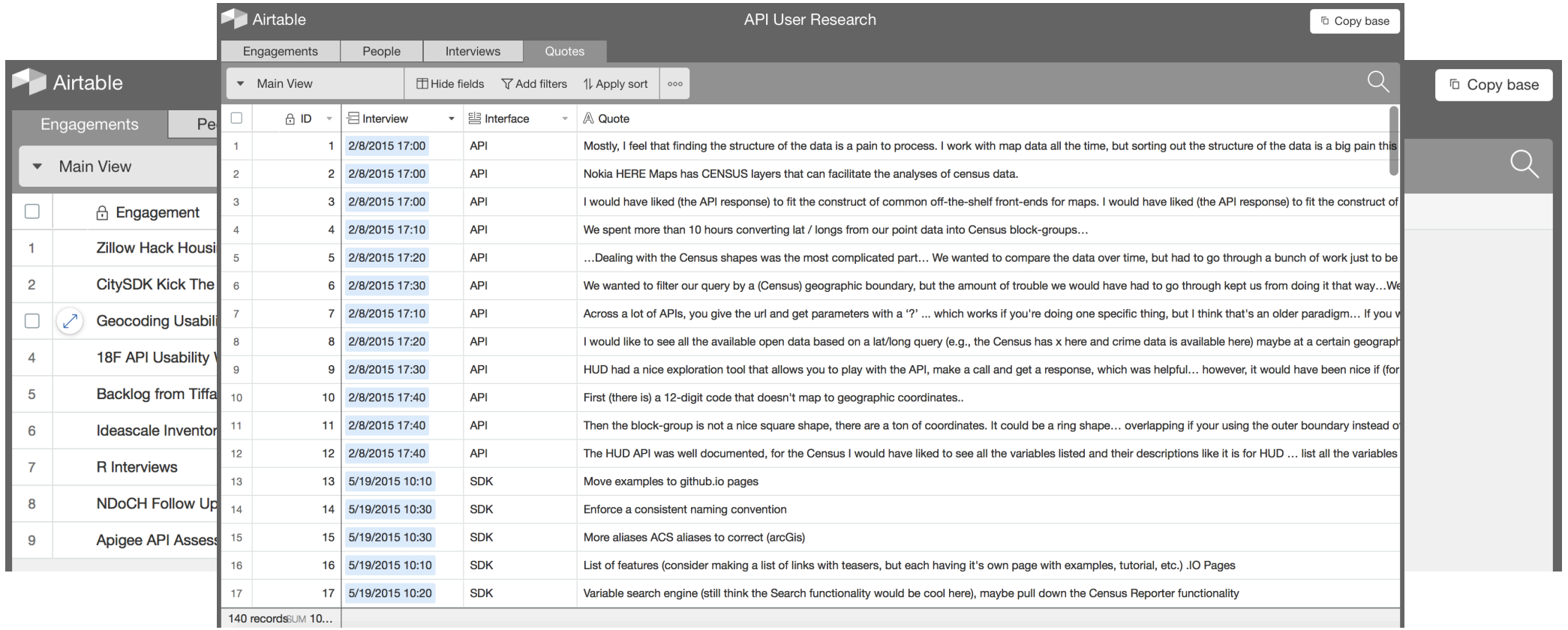

CitySDK - US Census Bureau
Tyrone
https://uscensusbureau.github.io/citysdk/
CITYSDK
Guides
Example Code
Github
Stats in Action: Arjuna Solutions
United States
Census
Bureau
salesforce
Constant Contact
CRM

Building the API – Step 1



Validate The Demand

Building the API – Step 2



Understand The User

Building the API – Step 3

Geography

Geography is at the heart of all Census Bureau data. All of our data sets pertain to very specific geographies that embody very specific geographic concepts. Although we try to make using our API as intuitive as possible, the greater your understanding of these concepts, the more powerful you become as a developer using these data.

Every query must include a geography, and this API supports both FIPS and GNIS geography codes.

To query the API your request URL query string must include a for argument which defines the geography level and FIPS code(s).

For example:

http://api.census.gov/data/2010/sf1?key=...&get=P0010001&for=state:06

will find the total population for the state of California.

The "for" argument may include additional FIPS codes, separated by a comma.

For example:

http://api.census.gov/data/2010/sf1?key=...&get=P0010001&for=state:06,24

will find the total population for the states of California and Maryland.

In some cases you must also include an in argument to fully qualify the geography.

Understand Technology Constraints

Building The API – Step 4

2. Client-side Javascript library

For client-side only apps, a Javascript library is provided that is expanded by modules which call on various APIs. Each module essentially adds a new data source for scripting to consume. The core library (citysdk.js) includes some basic utility functions that return coordinates for state capitals, etc.

2.1 Add the Library

Add the script libraries to the page. You will need the CitySDK core and then any modules you wish to use. This example will use the Census Module.

```
<script src="https://cdn.rawgit.com/uscensusbureau/citysdk/Release1.1/js/citysdk.js"></script>
<script src="https://cdn.rawgit.com/uscensusbureau/citysdk/Release1.1/js/citysdk.census.js"></script>
```

Note: jQuery is also a required.

2.2 Enable the Library(s)

Make sure you have a Census API key, you may request one here.

```
<script>
        var sdk = new CitySDK(); //Create the CitySDK Instance
        census = sdk.modules.census; //Create an instance of the module
        census.enable("API-KEY"); //Enable the module with the api key
</script>
```

2.3 Create the Request

Define Location

The location can be defined by coordinates (latitude/longiture), state, zipcode, or address. Generally coordinate points are optimal and

MVP → JS

1. Node API

Once you have acquired an API key, it needs to be included in the basic auth header of every request.

```
Authorization: Basic <your_api_key>
```

1.1 Example with cURL

```
curl --user yourApiKey: http://citysdk.commerce.gov
```

Note: leave the `password` field empty.

1.2 Endpoints

Base URL: http://citysdk.commerce.gov

Path	Method	Request Data	Description
`/`	`POST`	`JSON` Request object	Evaluates request and returns either GeoJSON data or GeoJSON with Census data
`/alias-to-variable`	`GET`	Comma separated aliases. Example: `?aliases=income,population`	Returns a map of alias -> variable for the given parameter values
`/variable-to-alias`	`GET`	Comma separated variables. Example: `?variables=P0010001,P0110022`	Returns a map of variable -> alias for the given parameter values

1.3 The Request Object

The request object you send using the POST method is just JSON.

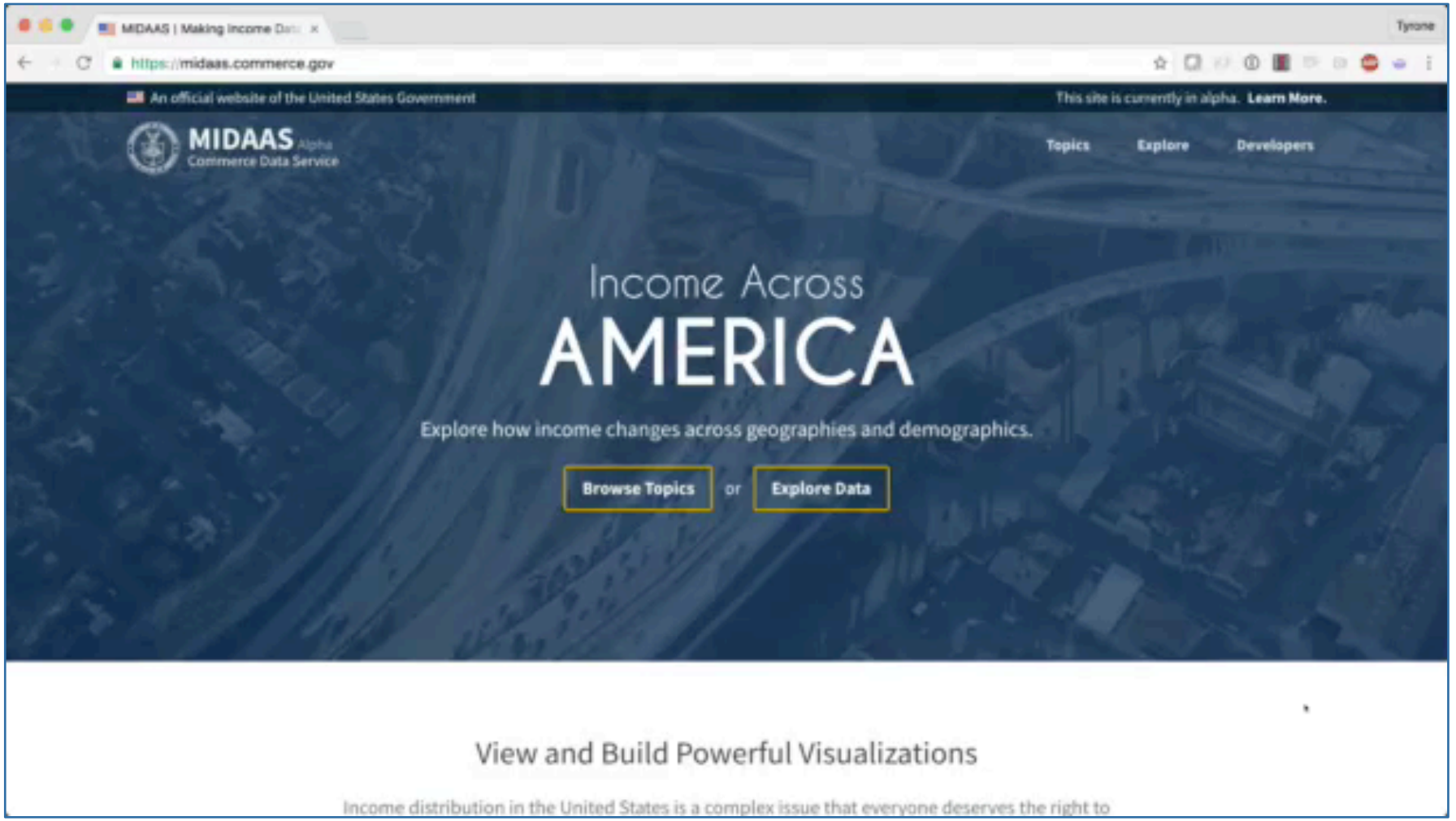
Property	Type	Supported Values	Description

beta → node.js

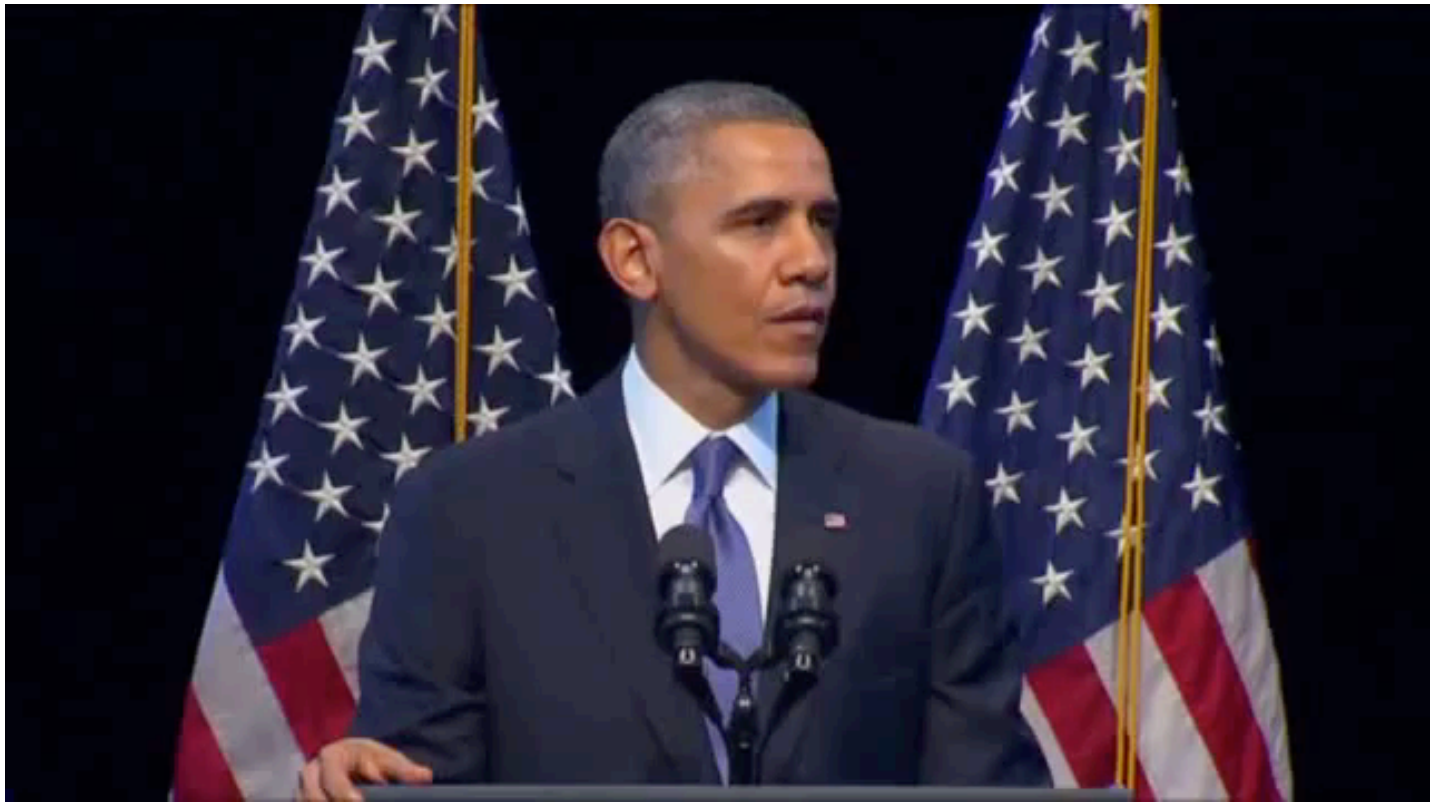
MIDAAS

https://midaas.commerce.gov

https://github.com/CommerceDataService/midaas-api


MIDAAS | Making Income Data
Tyrone
https://midaas.commerce.gov
An official website of the United States Government
This site is currently in alpha. Learn More.
MIDAAS Alpha
Commerce Data Service
Topics
Explore
Developers
Income Across
AMERICA
Explore how income changes across geographies and demographics.
Browse Topics
or
Explore Data
View and Build Powerful Visualizations
Income distribution in the United States is a complex issue that everyone deserves the right to

Building the API – Step 1

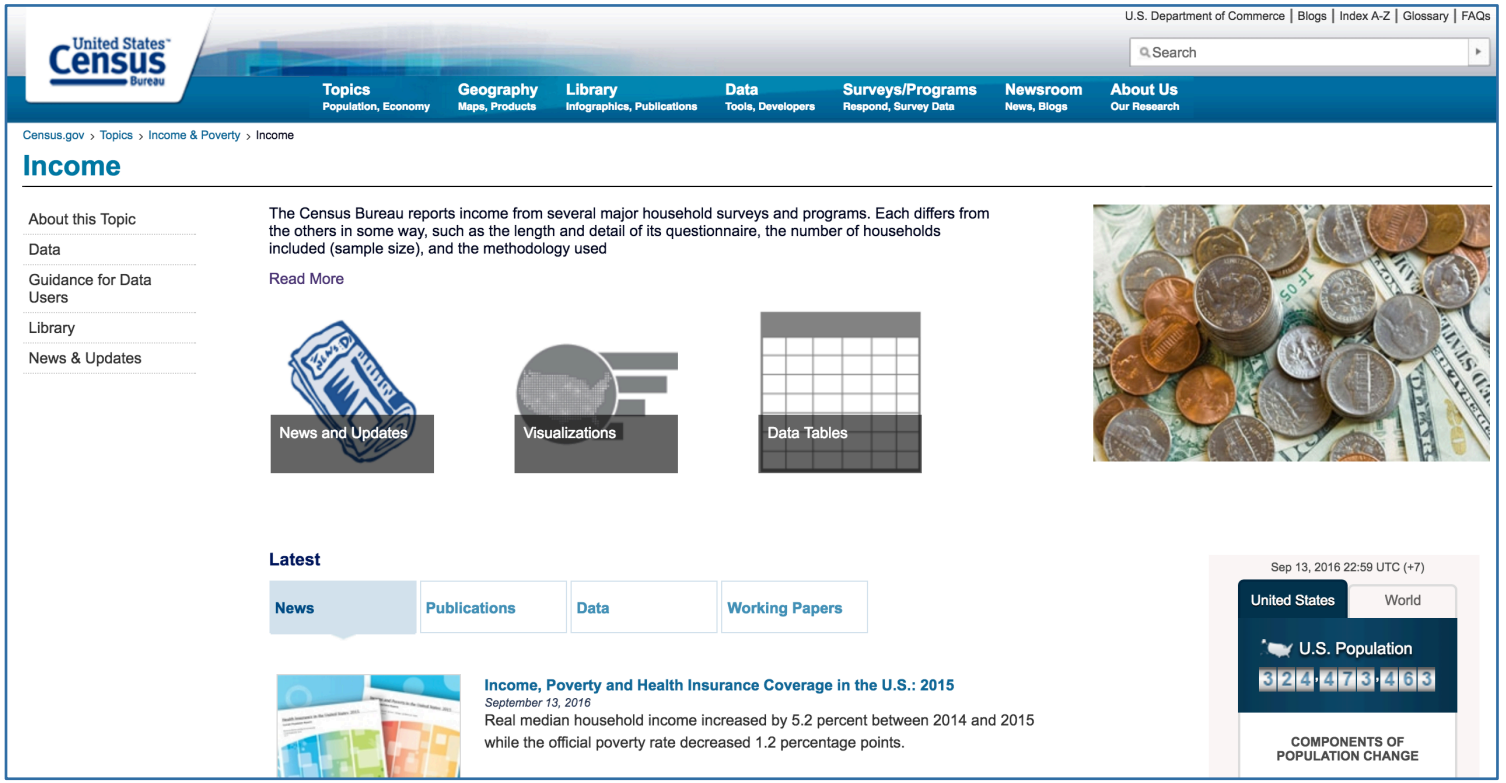


Validate The Need

Building the API – Step 2

Understand Initial User Stories

Building the API – Step 3



Validate with Domain Experts

Building the API – Step 4

AWS Granted Authority to Operate for Department of Commerce and NOAA

June 14, 2016 | Chad Woolf | Compliance | ATOs | Authority to operate | Department of Commerce | Federal Cloud Computing Strategy | NOAA

AWS already has a number of federal agencies onboarded to the cloud, including the Department of Energy, The Department of the Interior, and NASA. Today we are pleased to announce the addition of two more ATOs (authority to operate) for the Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA). Specifically, the DOC will be utilizing AWS for their Commerce Data Service, and NOAA will be leveraging the cloud for their "Big Data Project." According to NOAA, the goal of the Big Data Project is to "create a sustainable, market-driven ecosystem that lowers the cost barrier to data publication. This project will create a new economic space for growth and job creation while providing the public far greater access to the data created with its tax dollars."

Understand Technical Constraints

Building the API – Step 5

[GET] /quantiles?[year=?][state=?][race=?][sex=?][ageg

returns the income amounts for each quantile

```
curl 'https://api.commerce.gov/midaas/quantiles?state=CA
{
  overall: {
    5%: 400,
    10%: 4000,
    20%: 10000,
    30%: 16000,
    40%: 23000,
    50%: 30000,
    60%: 40000,
    70%: 52000,
    80%: 71000,
    90%: 100000,
    95%: 143200,
    99%: 455000
  }
}
```

[GET] /income/distribution?[year=?][state=?][race=?][sex=?][agegroup=?][compare=?]

returns the income amounts for each quantile

```
curl 'https://api.commerce.gov/midaas/distribution?state=CA&race=white&agegroup=25-34&sex=male&api_key=
{your_api_key}'
{
  $20.00k-$30.00k: 0.1261146303655346,
  $120.00k-$130.00k: 0.018000879457209275,
  $450.00k-$460.00k: 0.005737466859976182,
  $160.00k-$170.00k: 0.004153510772184425,
  $180.00k-$190.00k: 0.002701356626896694,
  $110.00k-$120.00k: 0.013195357305735017,
  $220.00k-$230.00k: 0.0006076886021645845,
  $130.00k-$140.00k: 0.011160008724588761,
  $370.00k-$380.00k: 0.0001702927752706897,
  $240.00k-$250.00k: 0.0004910497149928792,
  $380.00k-$390.00k: 0.00006298499907272085,
  $300.00k-$310.00k: 0.00014229944234948042,
  $500.00k-$510.00k: 0.0003919066608969297,
  $540.00k-$550.00k: 0.00009564388748079833,
  $30.00k-$40.00k: 0.12264112430556122,
  $10.00k-$20.00k: 0.11912912741282118,
  $0.00-$10.00k: 0.1194382204638262,
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  $80.00k-$90.00k: 0.041483786611488695,
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  $50.00k-$60.00k: 0.0887400317491051,
  $90.00k-$100.00k: 0.03705034251009218,
  $320.00k-$330.00k: 0.0015373005329230756,
```

MVP ⇒ Redshift, Lambda, API Gateway

beta ⇒ Postgres, S3, EC2

THE PLAN

- The Reality
- APIs: Sweat and Toil, CitySDK, MIDAAS
- Lessons

Summary

People
Scope
Constraints
Validate
Show The Thing

So Far

Sweat and Toil

- Monthly Data Users > Web Traffic
- Three tools built using this data.

CENSUS CitySDK

- Over 10 civic solutions built using CitySDK
- Positive User Feedback

So Far

Sweat and Toil

- 2016 Department of Labor‘s Innovation Award.

CENSUS CitySDK

- 2016 Department of Commerce Gold medal
- 2016 Best Data API Award, API:World
- 2015 Fedscoop Innovation Of The Year

Thank you

tyronewagrandison@gmail.com