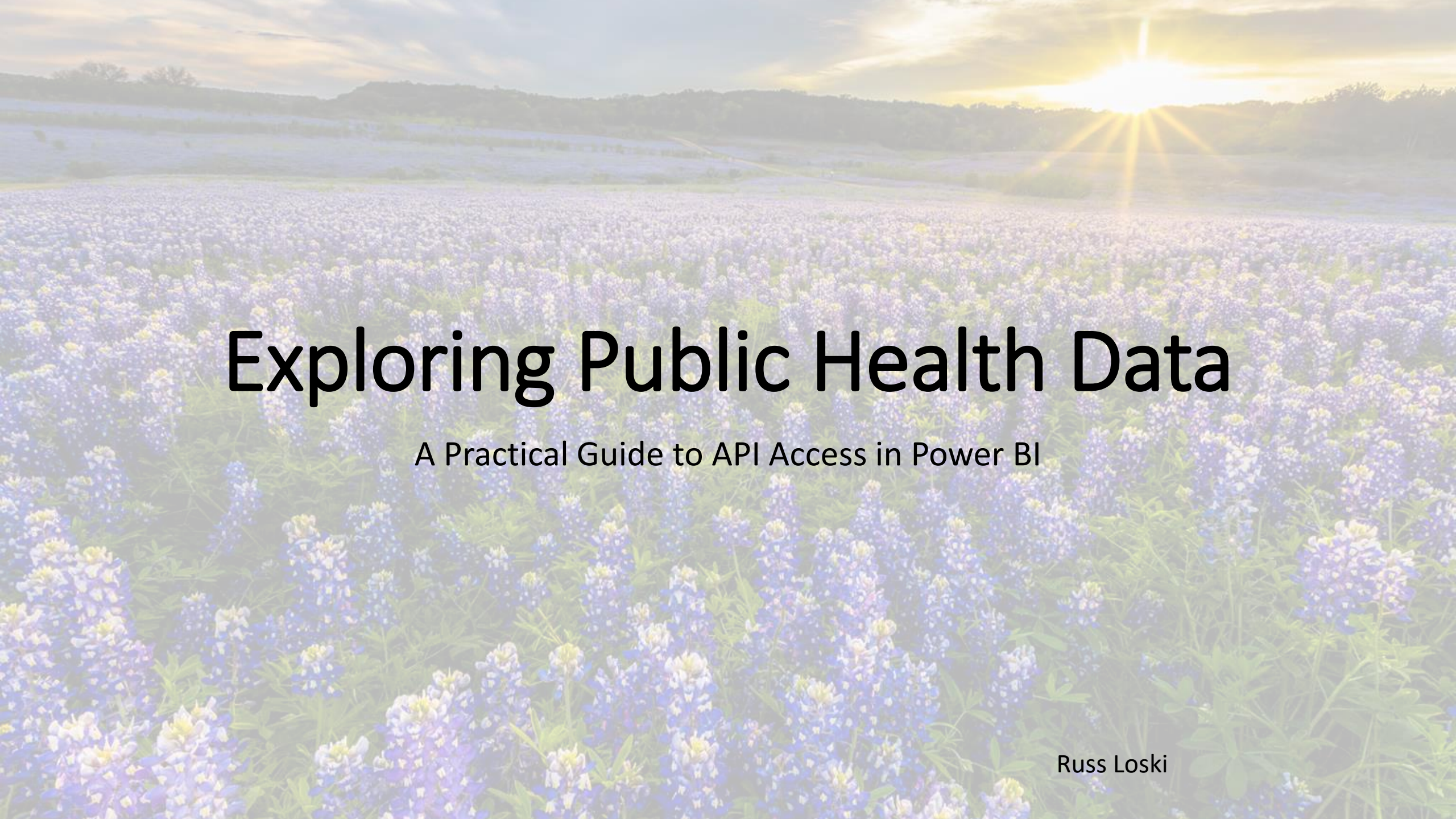

Exploring Public Health Data

A Practical Guide to API Access in Power BI

Russ Loski

Introduction

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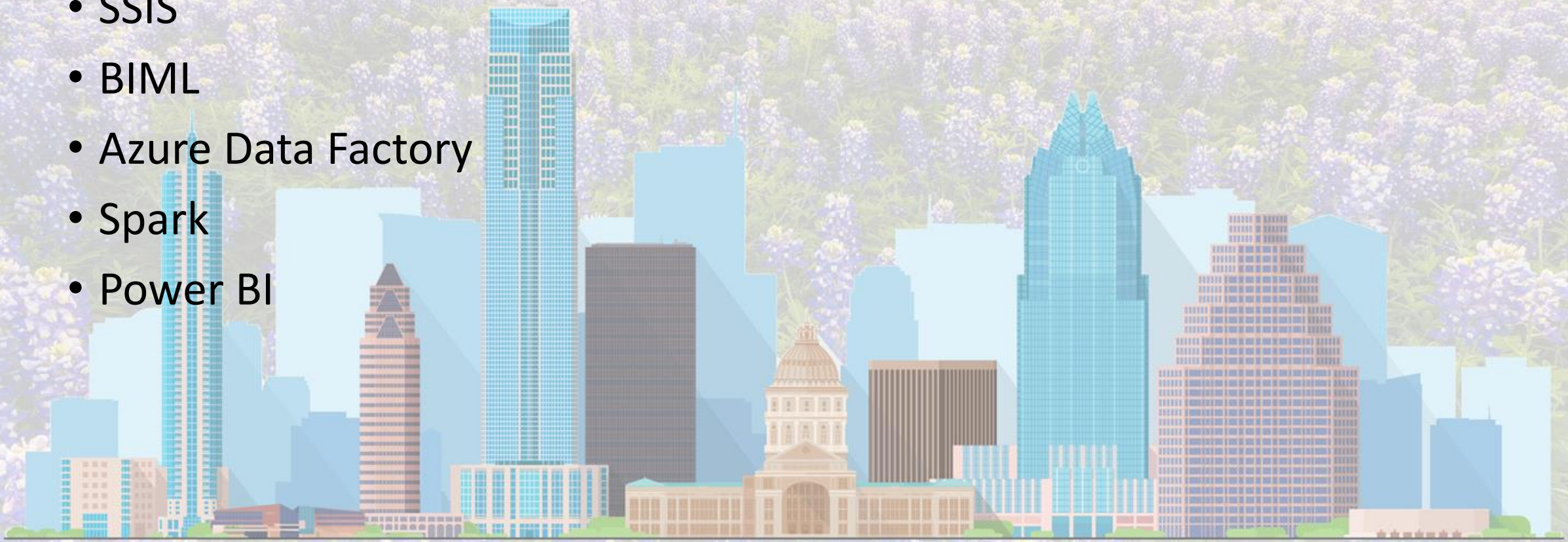
- Slides and Code: https://bit.ly/4a4Il1x

Tons of government data

- Data.gov Home - Data.gov
  - https://data.gov/
- Healthcare
- CMS Developer Tools
  - https://developer.cms.gov/
- Catalogs
  - data.cms.gov/data.json
  - data.healthcare.gov/data.json
  - data.medicaid.gov/data.json
- Search
  - Search Data.CMS.gov - Centers for Medicare & Medicaid Services Data
    - https://data.cms.gov/search
  - Dataset – Catalog
    - https://catalog.data.gov/dataset

Uses for learning

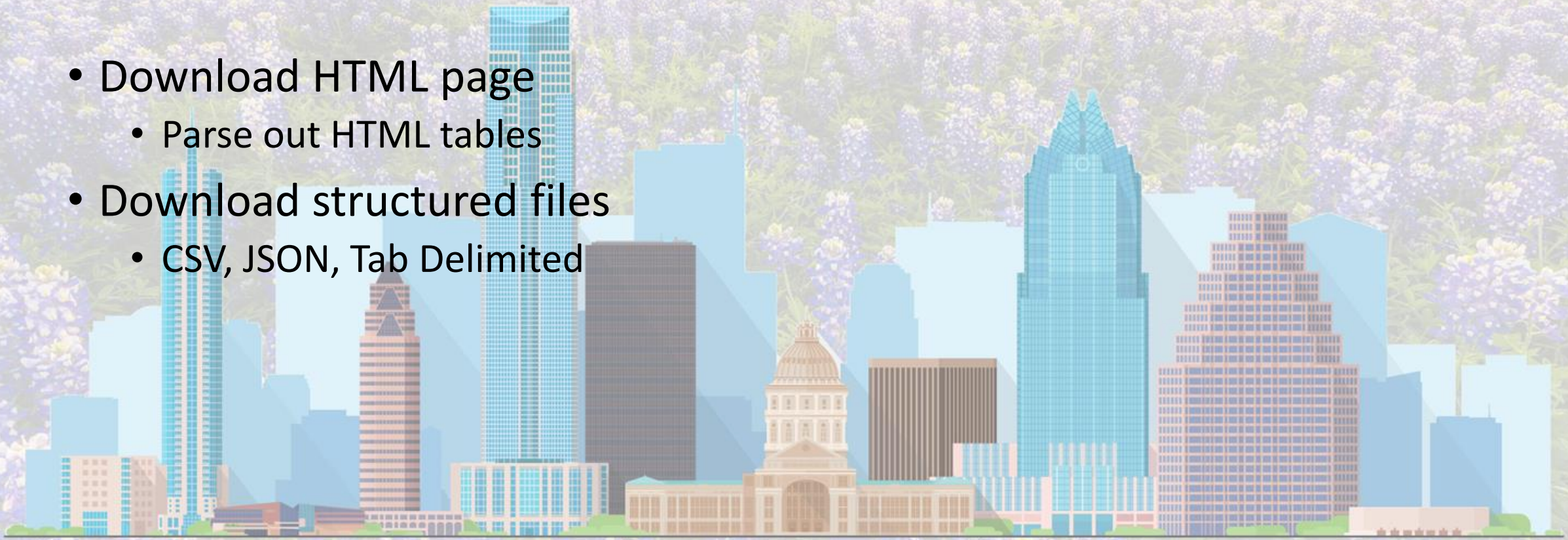
- U-SQL
- SSIS
- BIML
- Azure Data Factory
- Spark
- Power BI



Getting data from Web is easy

- Web.Contents(URL)

- Download HTML page
  - Parse out HTML tables
- Download structured files
  - CSV, JSON, Tab Delimited



Web.Contents can do more!

- Web.Contents has a second argument, expanding its Power
  - Web.Contents - PowerQuery M | Microsoft Learn (https://learn.microsoft.com/en-us/powerquery-m/web-contents)
- Record with the following fields
  - Query
  - Content
  - Headers
  - ApiKeyName
  - RelativePath
  - And a couple others

Two APIs

- Medicare Monthly Enrollments
  - CSV Download
  - API
- Marketplace API
  - Get county by zip code
  - Get plans from search

Medicare Monthly Enrollment

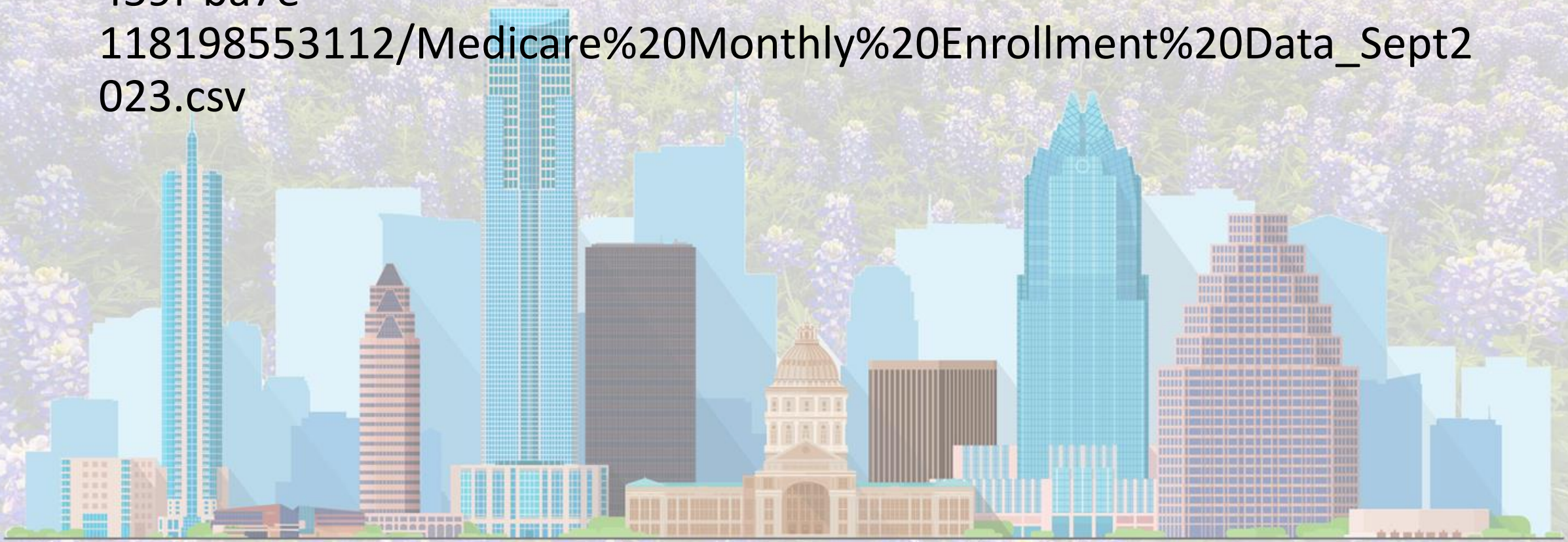
- Medicare Monthly Enrollment - Centers for Medicare & Medicaid Services Data (cms.gov)
- https://data.cms.gov/summary-statistics-on-beneficiary-enrollment/medicare-and-medicaid-reports/medicare-monthly-enrollment
- Two ways to get this
  - Download CSV
  - RestFul query to get JSON

Resources for Medicare Monthly Enrollment

- Medicare Monthly Enrollment Data Dictionary - Centers for Medicare & Medicaid Services Data (cms.gov)
  - https://data.cms.gov/resources/medicare-monthly-enrollment-data-dictionary
- Medicare Monthly Enrollment Methodology - Centers for Medicare & Medicaid Services Data (cms.gov)
  - https://data.cms.gov/resources/medicare-monthly-enrollment-methodology
- Medicare Monthly Enrollment - Centers for Medicare & Medicaid Services Data (cms.gov)
  - https://data.cms.gov/summary-statistics-on-beneficiary-enrollment/medicare-and-medicaid-reports/medicare-monthly-enrollment/api-docs

Medicare Monthly Enrollment – CSV

- https://data.cms.gov/sites/default/files/2023-12/327bc727-6a52-459f-ba7e-118198553112/Medicare%20Monthly%20Enrollment%20Data_Sept2023.csv



Compare Web and File

File

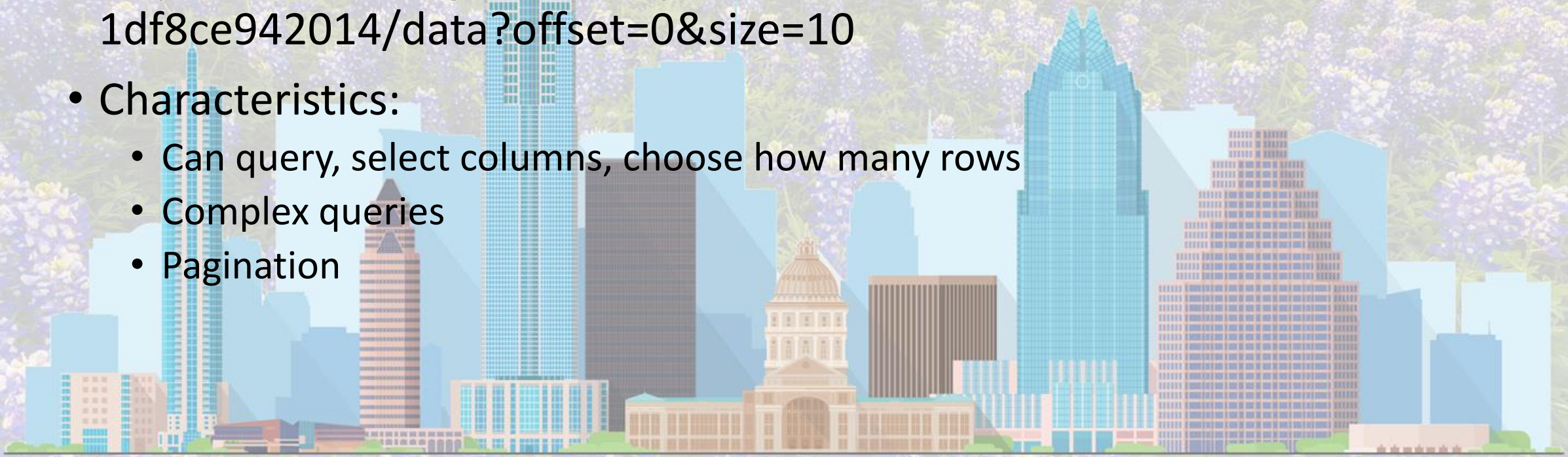
- let
- FilePath = "C:\Reports\Medicare Monthly Enrollment Data_August 2023.csv",
- Contents = File.Contents(FilePath),
- Source = Csv.Document(Contents,[Delimiter=",", Columns=26, Encoding=1252, QuoteStyle=QuoteStyle.None]),
-
- #"Promoted Headers" = Table.PromoteHeaders(Source, [PromoteAllScalars=true]),
- #"Changed Type" = Table.TransformColumnTypes(#"Promoted Headers",{{"YEAR", Int64.Type}, {"MONTH", type text}, {"BENE_GEO_LVL", type text}})
- in
- #"Changed Type"

Web

- let
- URL = "https://data.cms.gov/sites/default/files/2024-01/81d25d0e-34b1-4177-9a6e-584102ab741b/Medicare%20Monthly%20Enrollment%20Data_Oct2023.csv",
- Contents = Web.Contents(URL),
- Source = Csv.Document(Contents,[Delimiter=",", Columns=26, Encoding=1252, QuoteStyle=QuoteStyle.None]),
- #"Promoted Headers" = Table.PromoteHeaders(Source, [PromoteAllScalars=true]),
- #"Changed Type" = Table.TransformColumnTypes(#"Promoted Headers",{{"YEAR", Int64.Type}, {"MONTH", type text}, {"BENE_GEO_LVL", type text}})
- in
- #"Changed Type"

Medicare Monthly Enrollment – API

- Medicare Monthly Enrollment - Centers for Medicare & Medicaid Services Data (cms.gov)
- https://data.cms.gov/data-api/v1/dataset/cf6462a9-9a5e-451b-8ae1-1df8ce942014/data?offset=0&size=10
- Characteristics:
  - Can query, select columns, choose how many rows
  - Complex queries
  - Pagination



Drupal conventions

- Filtering | JSON:API module | Drupal Wiki guide on Drupal.org
  - https://www.drupal.org/docs/core-modules-and-themes/core-modules/jsonapi-module/filtering
- Sorting | JSON:API module | Drupal Wiki guide on Drupal.org
  - https://www.drupal.org/docs/core-modules-and-themes/core-modules/jsonapi-module/sorting

APIs using Drupal approach

- Medicare Part D Opioid Prescribing Rates - by Geography - Centers for Medicare & Medicaid Services Data (cms.gov)
- Accountable Care Organization Participants - Centers for Medicare & Medicaid Services Data (cms.gov)
- Accountable Care Organization Skilled Nursing Facility Affiliates - Centers for Medicare & Medicaid Services Data (cms.gov)
- ACO Realizing Equity, Access and Community Health Aligned Beneficiaries - Centers for Medicare & Medicaid Services Data (cms.gov)

Query String

- https://data.cms.gov/data-api/v1/dataset/93bd5bd2-4160-4890-ac4c-7357a1dbef8d/data?offset=0&size=1000&column=YEAR,BENE_STATE_ABRVTN,BENE_COUNTY_DESC,TOT_BENES,PRSCRPTN_DRUG_TOT_BENES&filter[YearFilter][condition][path]=YEAR&filter[YearFilter][condition][operator]=>%3D&filter[YearFilter][condition][value]=2019&filter[MONTH]=Year&filter[BENE_GEO_LVL]=County&filter[BENE_STATE_ABRVTN]=GA&filter[BENE_COUNTY_DESC]=Fulton

Query field in Web.Contents

```
= [
        offset="0",
        size="1000",
        column="YEAR,BENE_STATE_ABRVTN,BENE_COUNTY_DESC,TOT_BENES,PRSCRPTN_DRUG_TOT_BENES",
        #"filter[YearFilter][condition][path]"="YEAR",
        #"filter[YearFilter][condition][operator]"=">=",
        #"filter[YearFilter][condition][value]"="2019",
        #"filter[MONTH]"="Year",
        #"filter[BENE_GEO_LVL]"="County",
        #"filter[BENE_STATE_ABRVTN]"="GA",
        #"filter[BENE_COUNTY_DESC]"="Fulton"
    ]
```

Anatomy of an HTTP request

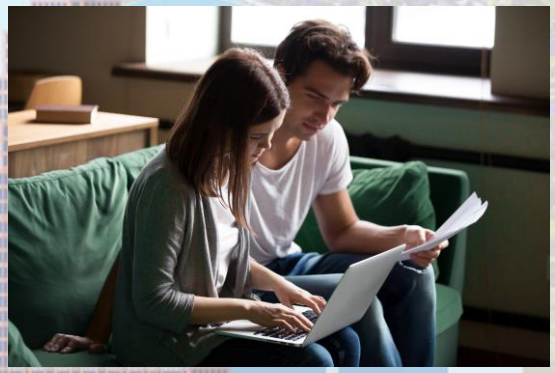
- Request Line
  - HTTP Method (GET, POST, etc)
  - URL (http://www.google.com)
  - HTTP Version
- Headers

  Content-Type: text/html
- Message Body

HTTP Requests Defined: What They Are & How They Work – Sematext
https://sematext.com/glossary/http-requests/

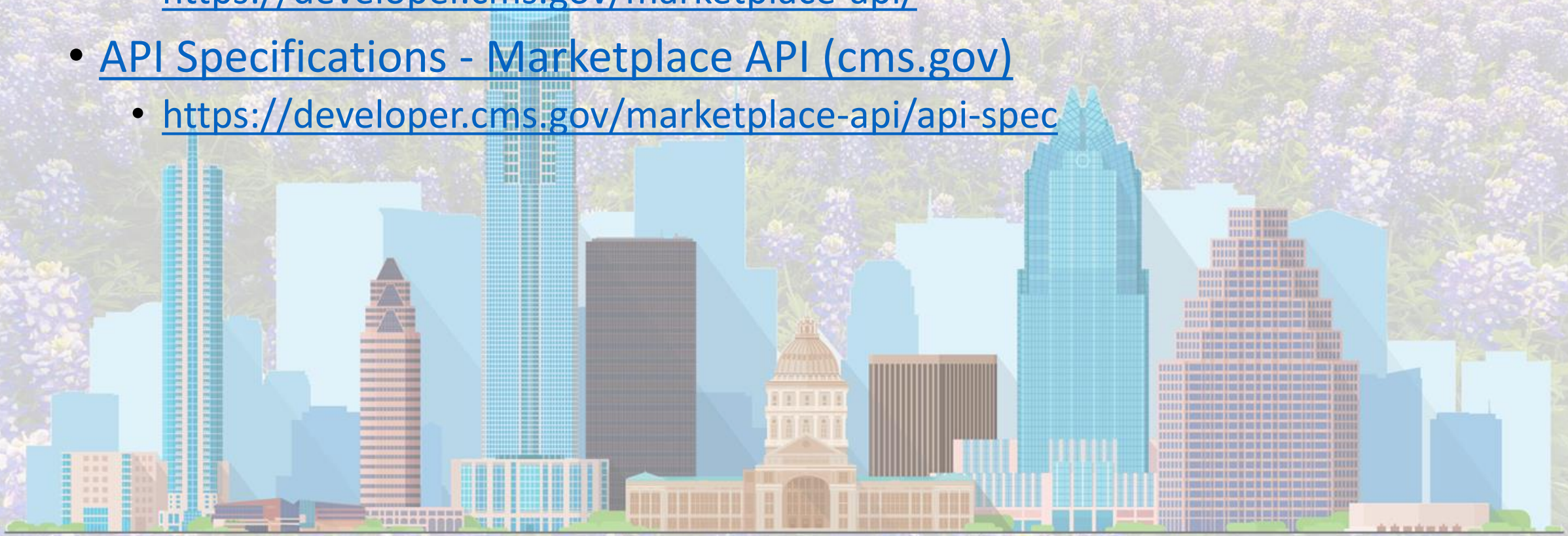
Health Insurance Marketplace

- Government run interface for finding health insurance
- Targets are people who have difficulty (lack of income, etc) finding insurance

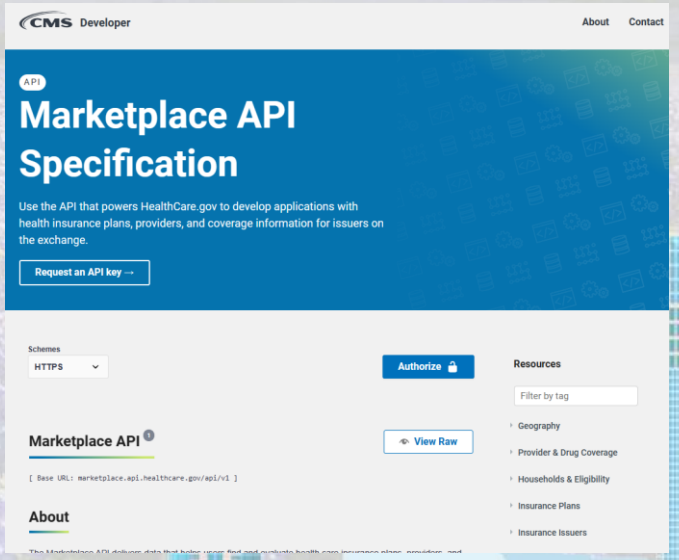


Marketplace API

- Marketplace API (cms.gov)
  - https://developer.cms.gov/marketplace-api/
- API Specifications - Marketplace API (cms.gov)
  - https://developer.cms.gov/marketplace-api/api-spec



API Specifications - Marketplace API (cms.gov)



drug coverage for a specific plan. Other endpoints, like looking up doctors and providers, or getting recent state medicaid information, are covered in the docs.

Search for health insurance plans

We begin by searching for the health insurance plans for a 27 year-old woman living in North Carolina by posting a single person household to the plan search endpoint

```
apikey="d687412e7b53146b2631dc01974ad0a4" # rate limited test key
curl --request POST \\
  --url "https://marketplace.api.healthcare.gov/api/v1/plans/search?apikey=${apikey}" \\
  --header 'content-type: application/json' \\
  --data '{
    "household": {
      "income": 52000,
      "people": [
        {
          "age": 27,
          "aptc_eligible": true,
          "gender": "Female",
          "uses_tobacco": false
        }
      ]
    },
    "market": "Individual",
    "place": {
      "countyfips": "37057",
      "state": "NC",
      "zipcode": "27360"
    },
    "year": 2019
}'
```

This **POST** request returns health insurance information and pricing estimates for the plans for which she can sign up. More discussion about building the household JSON object can be found later on this page. Don't know the county FIPS code? To look it up for this person's zip code, we use the counties by zip endpoint.

```
apikey="d687412e7b53146b2631dc01974ad0a4"
zipcode="27360"
curl "https://marketplace.api.healthcare.gov/api/v1/counties/by/zip/${zipcode}?apikey=${apik
```

This helps gather the necessary information to build the household object to submit to the API.

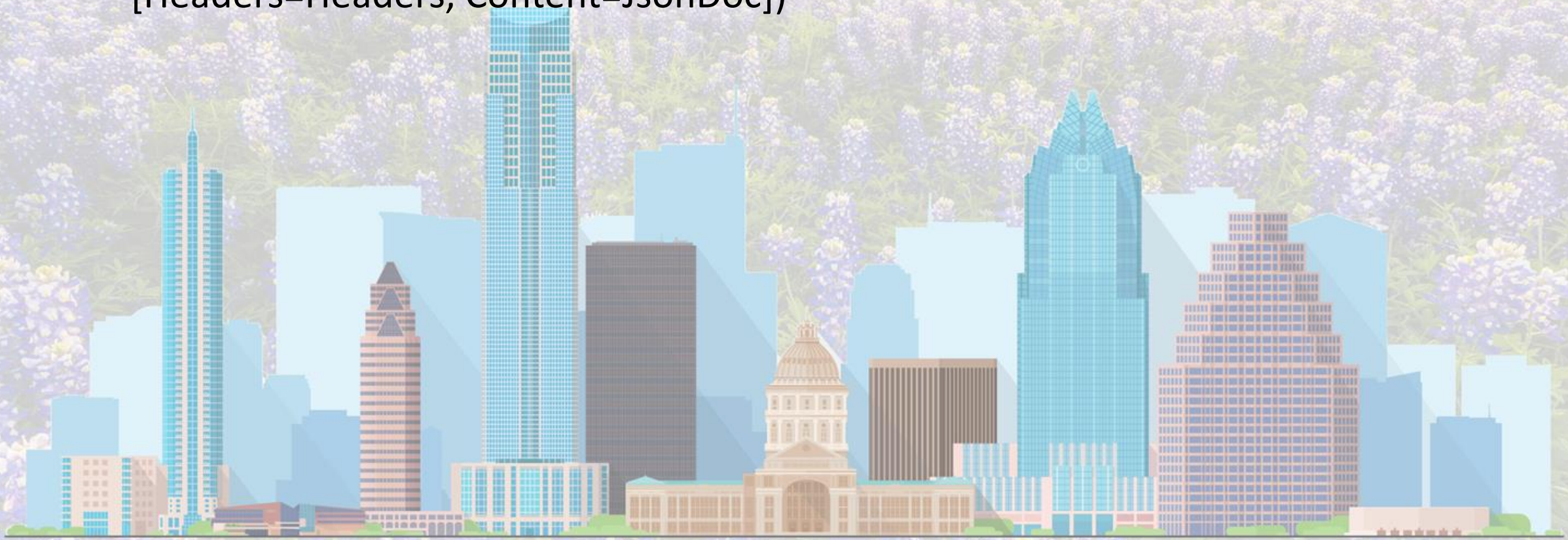
Resources

Filter by tag

- Geography
- Provider & Drug Coverage
- Households & Eligibility
- Insurance Plans
- Insurance Issuers
- Enrollments
- API Reference
- Bulk Data
- default

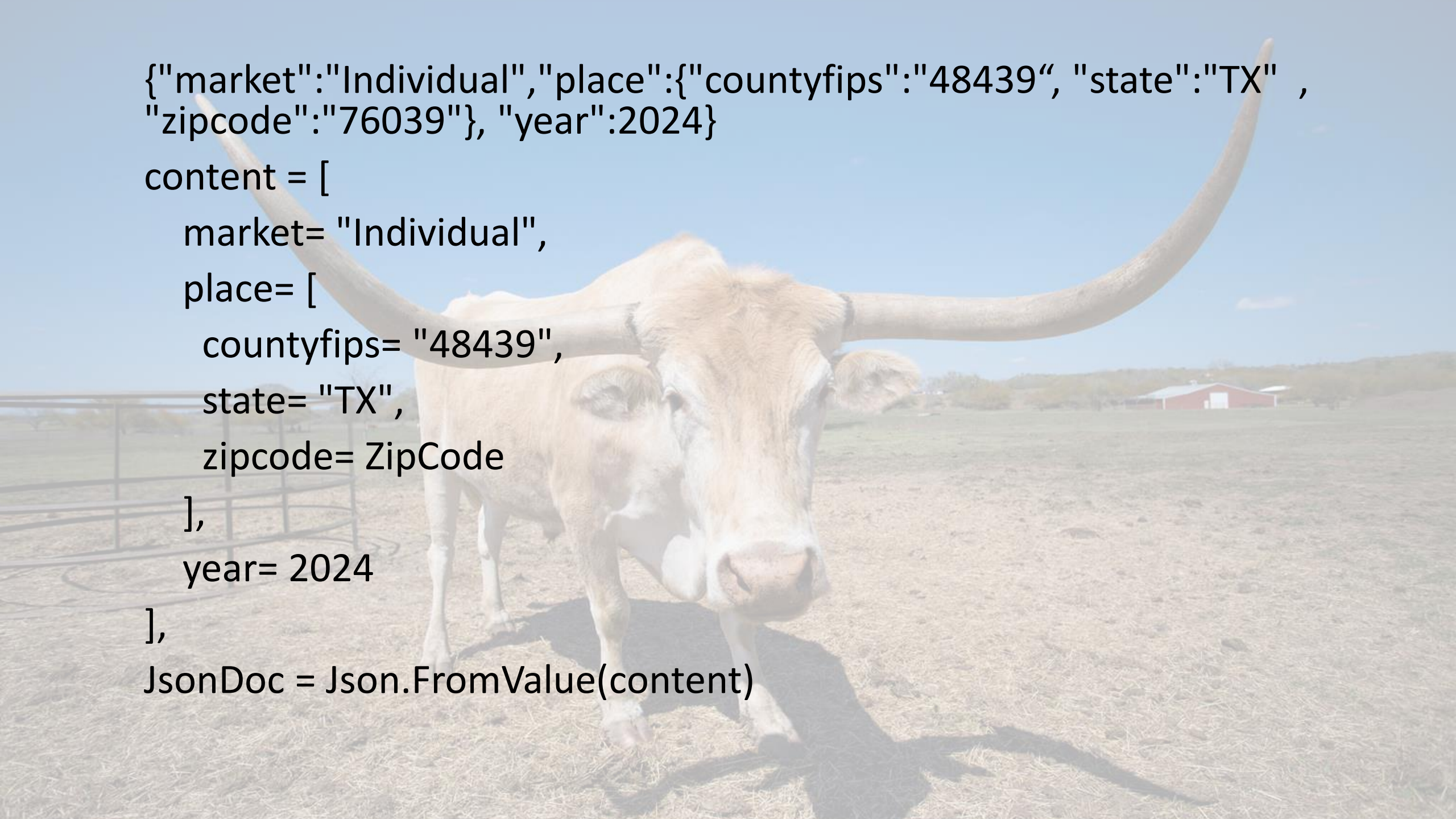
Getting web content in Power Query

```
WebContent = Web.Contents(URL,
    [Headers=Headers, Content=JsonDoc])
```



Structure of POST Data

- Data is in JSON format
  - {"market":"Individual","place":{"countyfips":"48439","state":"TX","zipcode":"76039"},"year":2024}
- Data for a POST can be in other formats: XML, Name value, etc.
- In Power Query, with JSON, easiest to start with Record structure
- Convert the Record structure to text

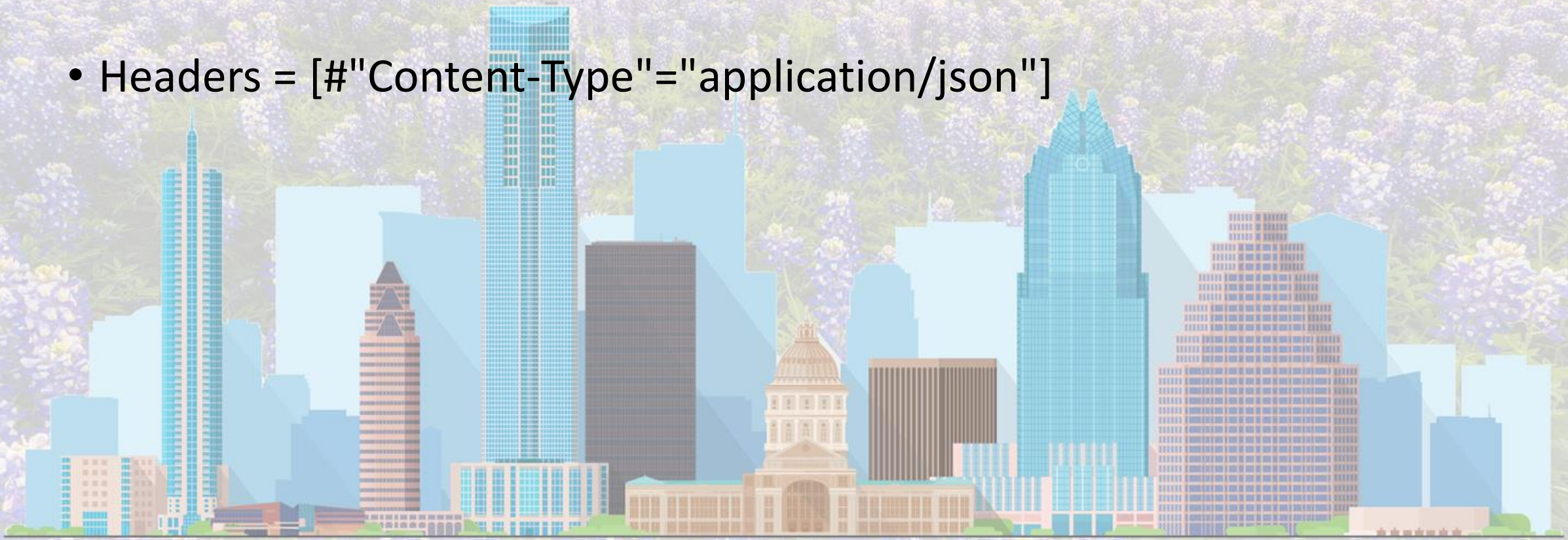


```
{"market":"Individual","place":{"countyfips":"48439“, "state":"TX"  ,
"zipcode":"76039"}, "year":2024}
content = [
    market= "Individual",
    place= [
      countyfips= "48439",
      state= "TX",
      zipcode= ZipCode
    ],
    year= 2024
],
JsonDoc = Json.FromValue(content)
```

Header in Power Query

- Pass in a record

- Headers = [#"Content-Type"="application/json"]



Additional resources

- Power Query Web connector - Power Query | Microsoft Learn
  - https://learn.microsoft.com/en-us/power-query/connectors/web/web
- Create a POST request with Power BI – PBI Guy (pbi-guy.com)
  - https://pbi-guy.com/2023/05/21/create-a-post-request-with-power-bi/
- (3) POST Requests in Power Query | LinkedIn
  - https://www.linkedin.com/pulse/post-requests-power-query-alex-reed/
- Making a POST Request Using Power Query (youtube.com)
  - https://www.youtube.com/watch?v=hbt45XCD5RU
- Easy POST requests with Power BI and Power Query using Json.FromValue – (thebiccountant.com)
  - https://www.thebiccountant.com/2018/06/05/easy-post-requests-with-power-bi-and-power-query-using-json-fromvalue/

Introduction

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- https://www.linkedin.com/in/russloski
- Slides and Code: https://bit.ly/4a4Il1x