

Exchange Network Forum

Partnerships with EPA, States, Tribes & Territories

Thursday, February 13, 2025

Format

- **This Forum is an open meeting.** We want to encourage open dialogue. Please be respectful.
- **You will hear from Tribes, States, and EPA.** Calls are divided into thirds, with time for each group to push updates and request feedback.
- **We will send polls, surveys to gauge interests.** This is a call run by Exchange Network partners for Exchange Network partners.



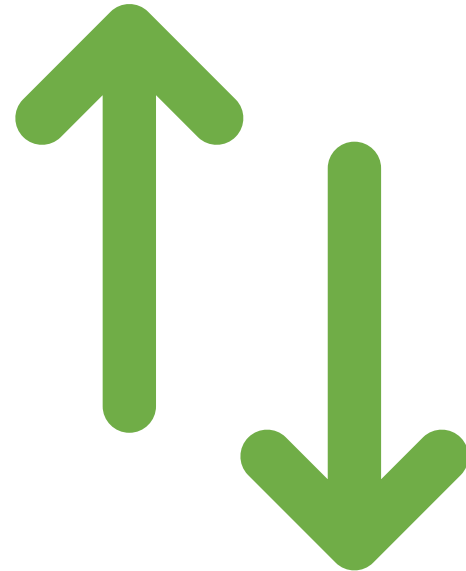
Logistics

- **Introduce yourself!** If or when you speak, please tell us your name the organization you represent.
- **Submit questions in the Microsoft Teams chat.** You are also welcome to message the meeting host directly.



Meeting Guidelines

- **Choose to be present and participate**
- **Engage actively, raise your hand to speak**
- **Maintain a respectful, open space to share and discuss ideas**
- **Assume positive intent**
- **Be curious and open to new ideas**
- **Listen and question with a desire to understand**
- **Stay on topic**
- **Turn on your camera when speaking**
- **Meetings will be recorded**



Agenda

- **Welcome**
- **Meet Your Region 2 RENC**
- **New Jersey Sports & Exposition Authority Demonstration**
- **API 101**
- **Open Forum, Questions**





+ 8 Tribal Nations

EPA Region 2

Regional Exchange Network Coordinator (RENC)

Name: Barry Kaye

Job Title: IT Specialist

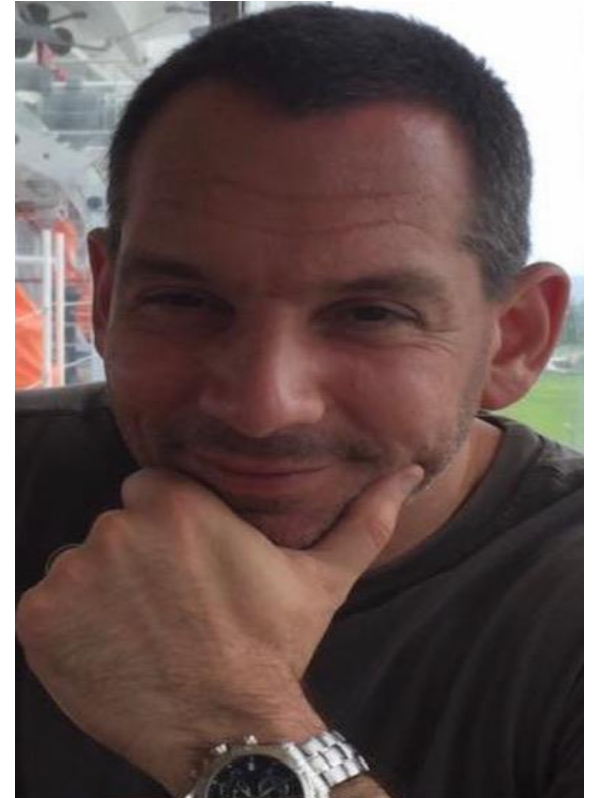
Time at the Agency: 31 Years, 1 Month

Time in the RENC Role: 8 Years, 0 Months

Other Job (non-RENC) Roles: Systems Admin (RCRA), SQL Oracle/SQL Server Admin; Report Writer, DataViz Creator; Liaison for Forms, CUI and Section 508; 508 Trustee Tester; EE Regional Coordinator; various other IT needs.

Contact Information:

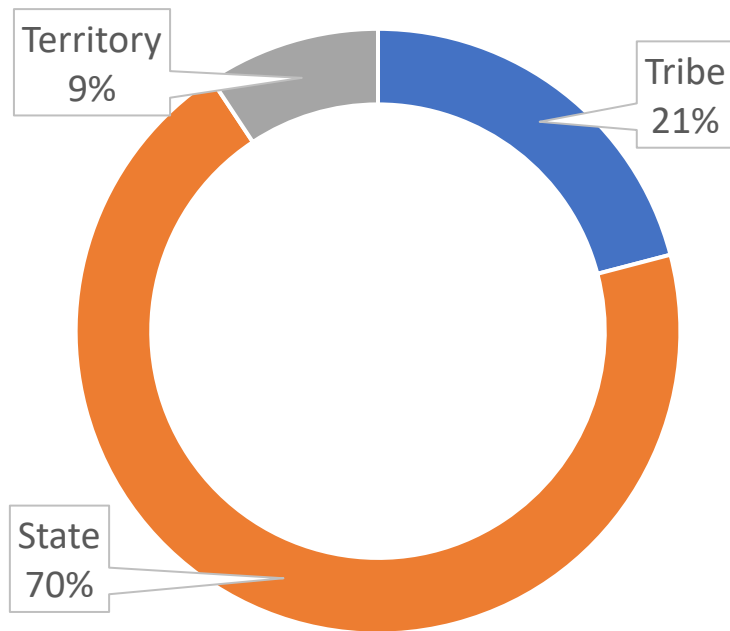
kaye.barry@epa.gov
212-637-3323



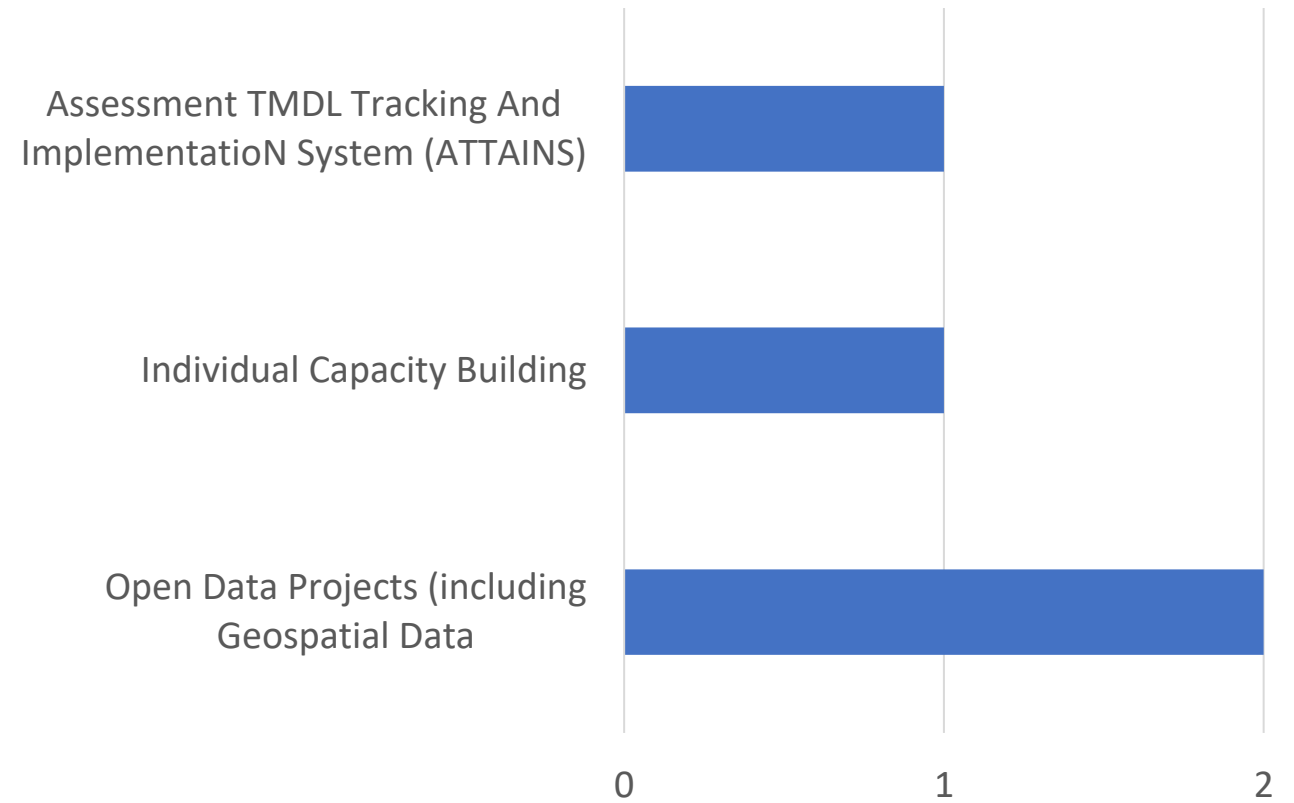
3 Open Grants

43 Total Grants since 2002

R2 Grantees by Applicant Type (2002-2022)



FY21-23 Project Trends R2



Web Services & APIs 101

Exchange Network

Thursday, February 13, 2025

Context

- **APIs will be an important component of Exchange Network Reinvigoration**
- **January's Forum featured APIs for the DW-SFTIES application**
- **Today is about sharing some foundational info on APIs to support future discussions**



Today's Topics

- **Key Foundational Concepts**
- **Some API Terminology**
- **API Principles & Strategies**
- **Examples of APIs in Action**



What is an **A**pplication **P**rogramming **I**nterface?



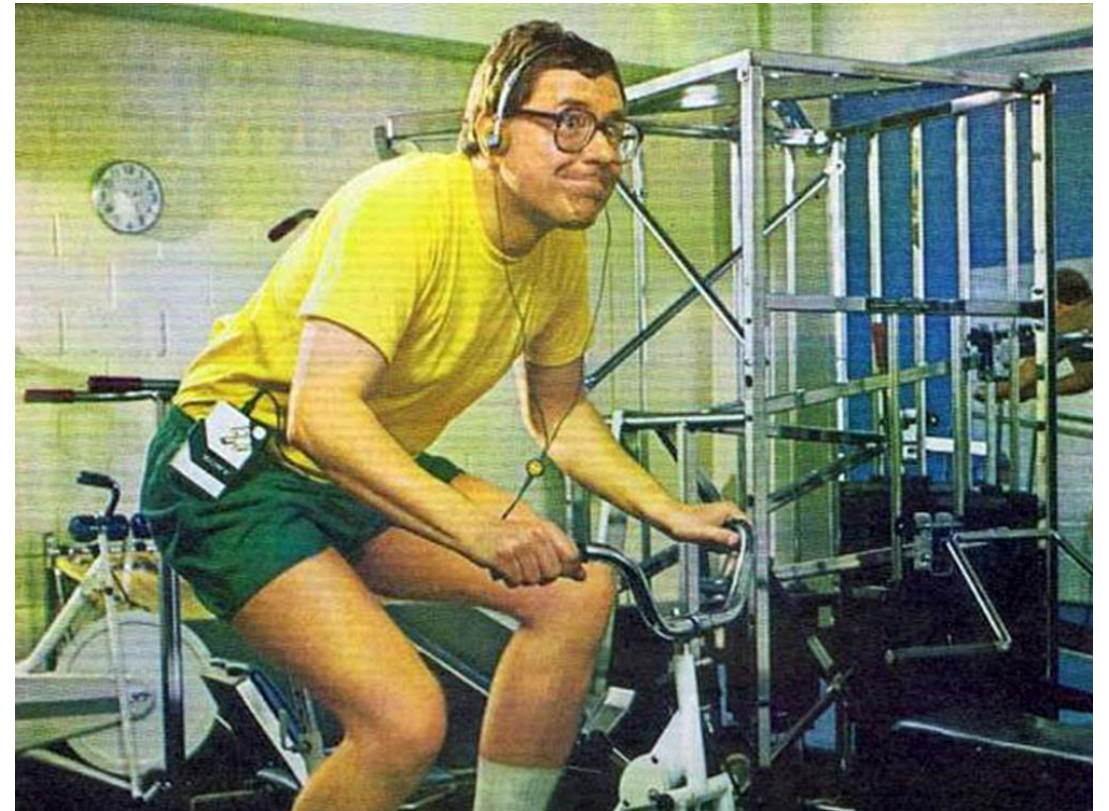
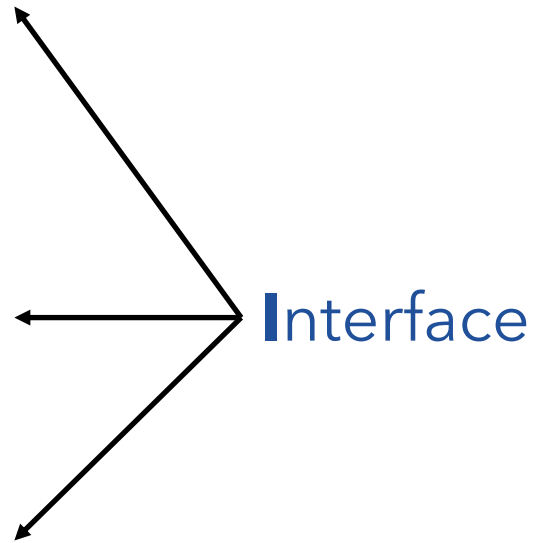
It's an **I**nterface
that **P**rograms use to
interact with **A**pplications.



Some API Analogies



Application



Program
(sort of)

Some API Analogies

An API to the Electrical Grid



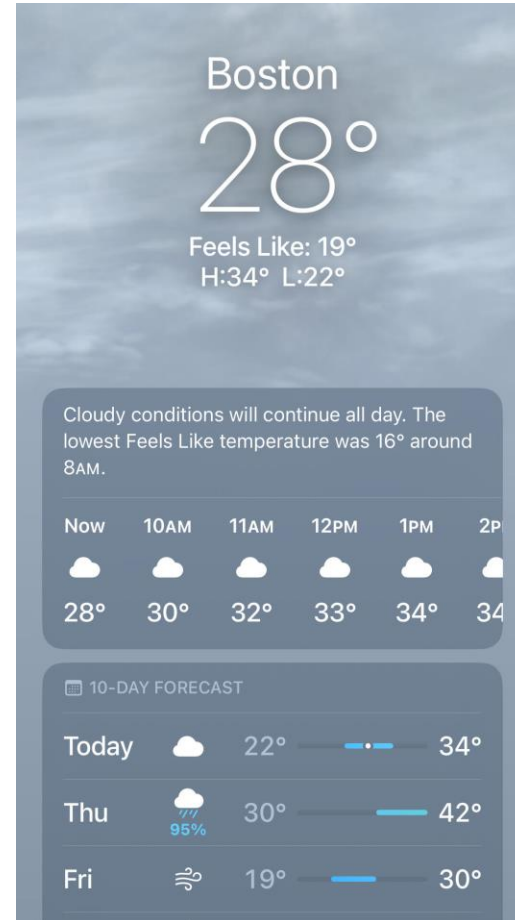
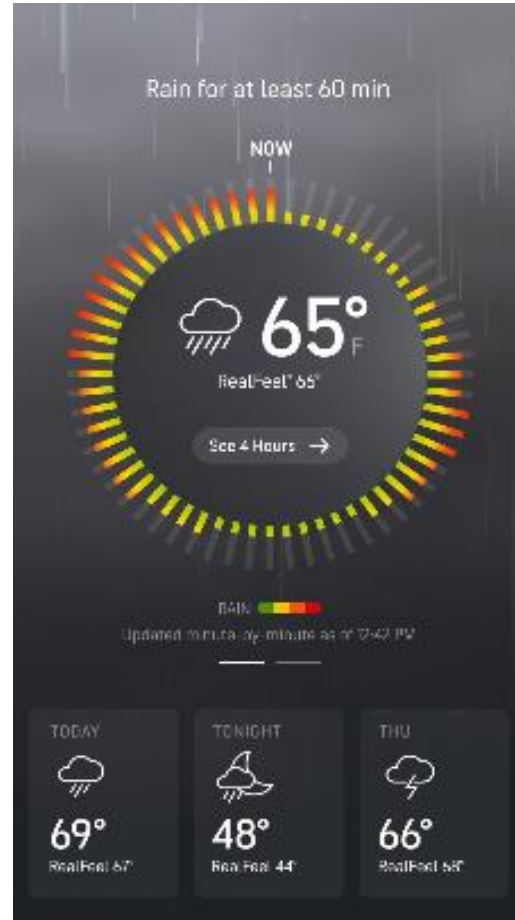
Developers Connect...



...and Build Tools that Consume the API's Output



APIs Power Your Favorite Apps



APIs Help You Make Decisions...



Travel

Explore

Flights

Hotels

Vacation rentals

Round trip 1 Economy

Washington, D.C.

Miami MIA

Sat, Mar 15

Sat, Mar 22

All filters

Stops

Airlines

Bags

Price

Times

Emissions

Connecting airports

Duration

Best

Cheapest from \$105

NEW

Top departing flights

Ranked based on price and convenience Prices include required taxes + fees for 1 adult. Optional charges and [bag fees](#) may apply. [Passenger assistance](#) info.

Sorted by top flights

	7:30 PM – 10:22 PM United	2 hr 52 min IAD-MIA	Nonstop	148 kg CO2e Avg emissions	Additional fees for carry-on bags Additional fees for checked bags To include bags, use the Bags filter
	8:03 PM – 10:57 PM Frontier Avoids as much CO2e as 1,218 trees absorb in a day	2 hr 54 min BWI-MIA	Nonstop	135 kg CO2e -13% emissions	0 0 \$133 round trip
	8:43 PM – 11:37 PM American	2 hr 54 min DCA-MIA	Nonstop	138 kg CO2e -11% emissions	1 0 \$208 round trip



The cheapest time to book is usually now, until Feb 20



Prices are currently typical

[View price history](#)

Track prices Mar 15 – 22

Any dates

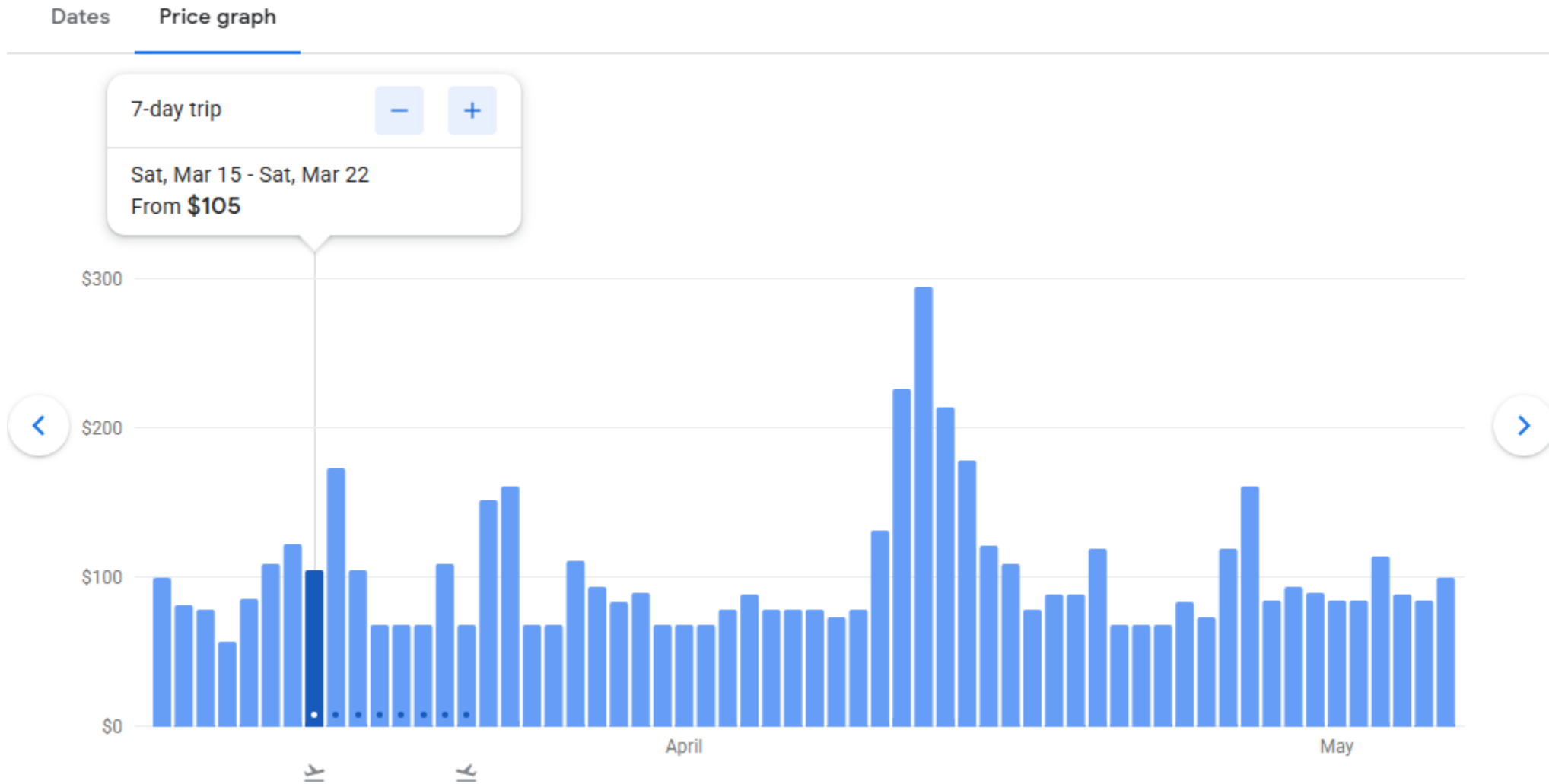
Date grid

Price graph

Other departing flights

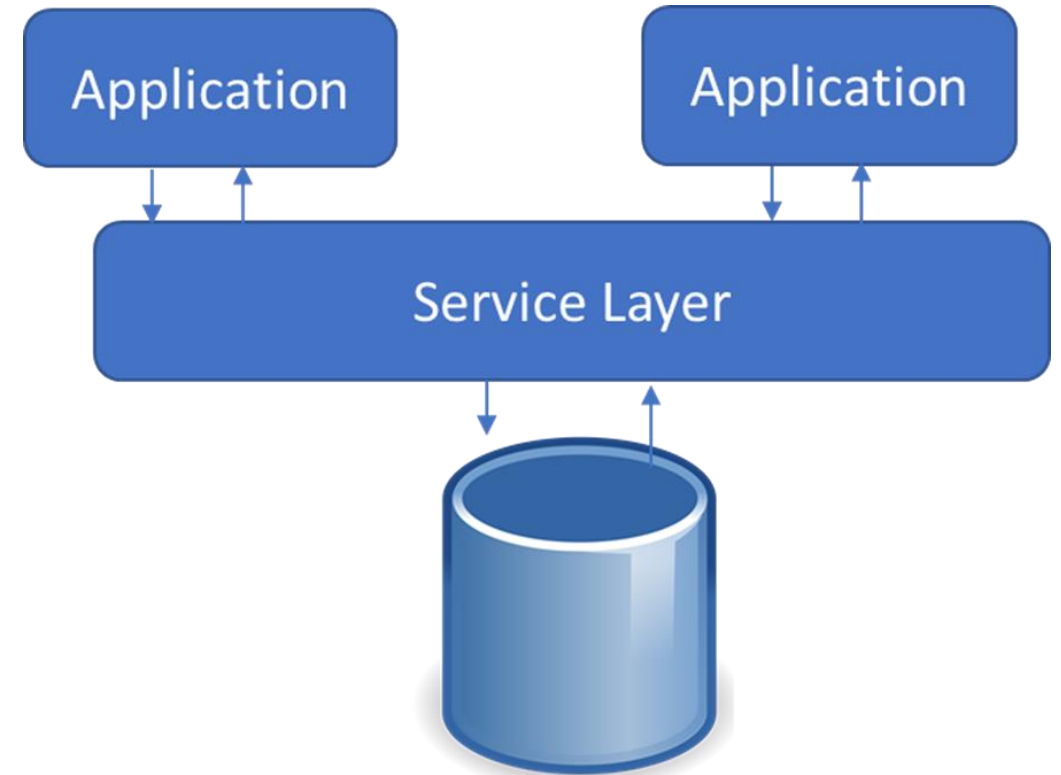
	6:00 AM – 1:28 PM Spirit	7 hr 28 min BWI-MIA	1 stop 2 hr 22 min BOS	237 kg CO2e +53% emissions	0 0 \$186 round trip
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...And Help You Visualize Data



Philosophies and Strategies Driving Behavior

- **API First Strategy** means that all interactions between the application and the database is done via an open API.
- **System owners do not have special access** to run queries and feed their application that is not otherwise available via an API.
- **Identify points of integration** between systems to enable easy discovery and entry points across systems.
- **Data indexes (catalogs)** allow quick discovery of data. Data indexes can also facilitate common search functionality across systems.
- **Extra thought:** there may also be value in being database agnostic.



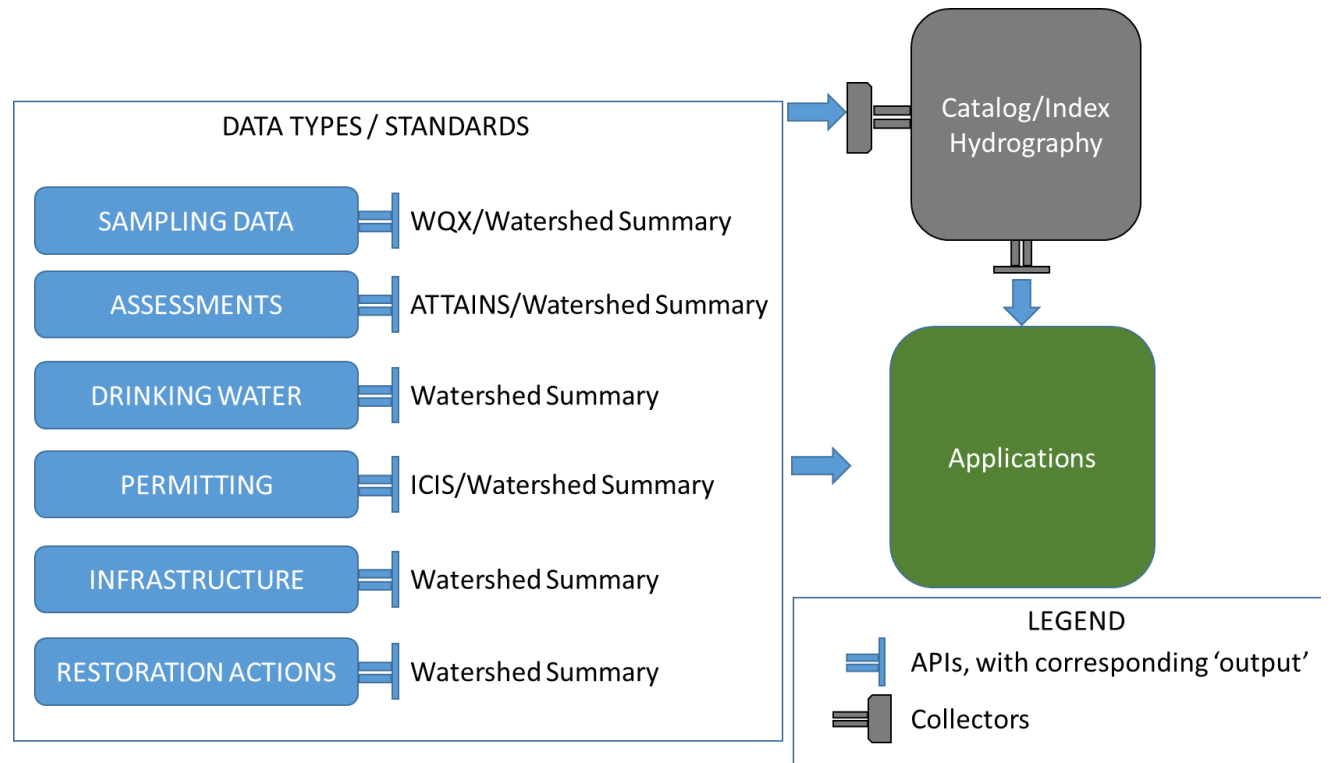
Integration Principles (example)

- **Points of Integration (thinking about how data connects):**
 - Assessed Water ↔ Monitoring Locations
 - Assessed Water ↔ Permitted Facility
 - Assessed Water ↔ Restoration Actions
 - Pollution Budgets ↔ Permitted Facilities
- **Referenced to Common Hydrography**
(geospatial geometry) underpins all data



Architecting to Integration (water example)

- **Each Data Type supports an API with a defined output.** Where common outputs can be defined, those outputs are used.
- **Points of integration are also defined between Data Types.** All data are indexed for quick discovery as well as referenced to a common hydrography to enable advanced searches/discovery



Standardization is Critical to Interoperability

Standard 'Interfaces' can be important here as well, especially if data are distributed and shared by many different entities

Documentation of APIs is also important. A hidden API will likely not be used or be trusted.

The 'Language' of a Web Service



Data are typically returned in 'machine readable' language



'Machine Readable' means that the data are structured, but likely not that easy for humans to read



Formats include JSON, XML, GeoJson, and sometimes even .csv

Rest Services are Basically URLs

Base URL for Actions service

State code indicator

Indicates that a number
should be returned
instead of a list of
TMDLs

<https://attains.epa.gov/attains-public/api/actions?actionTypeCode=tmdl&stateCode=NM&tmdlDateLaterThan=2023-10-1&returnCountOnly=Y>

Action type code indicator

Indicates TMDL was approved in FY 2021

Output

```
{  
  "items": [],  
  "count": 2  
}
```

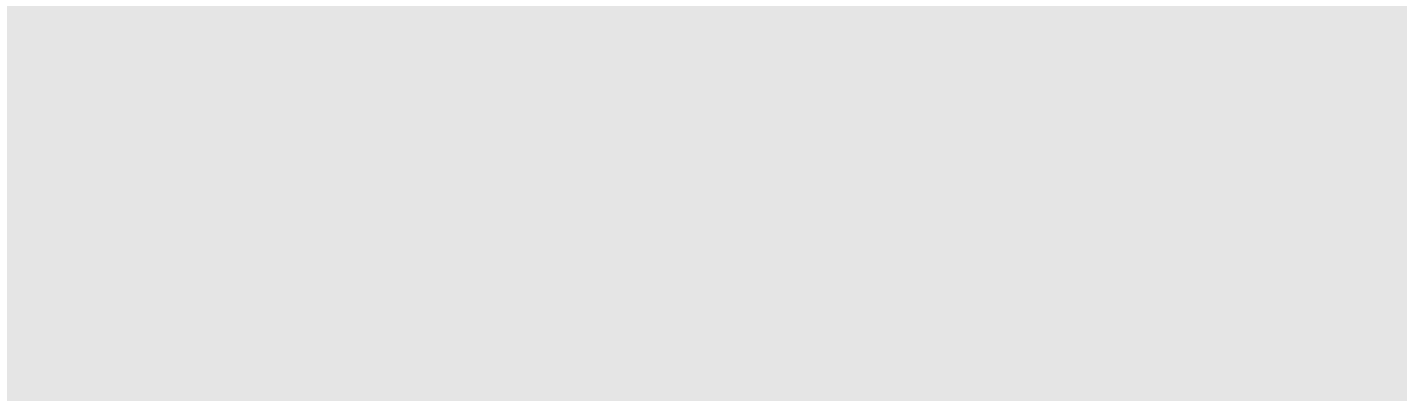
Rest-based APIs are typically defined by a **base URL** and then a series of **input parameters** that tell the API what you want to do.

DEMO: Interacting with Rest Services

Interesting, but
so what?

- I see now that I can get a bunch of glop in my browser that looks like code, but how does that help me?
- Many tools can 'ingest' that data
- Once you learn how to do that, you can then start adding 'code' to your requests to programmatically change what you're asking for
- Next thing you know, you've created your own 'application'

DEMO: Making an 'Application' that Uses Services



Summary

- **APIs can enable:**
 - Automated machine-to-machine communication
 - Access to real-time data
 - Enhanced data integration, analysis, and visualization
 - Reuse and redistribution of information and services
 - Flexibility and agility
- **Potentially leading to:**
 - Better management and policy decisions
 - A more informed public
 - New partnerships and innovation opportunities
 - More efficient and responsive business operations

Contacts

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- Alex O'Neill (OMS): Oneill.Alexander@epa.gov



Thank you!

Questions?

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