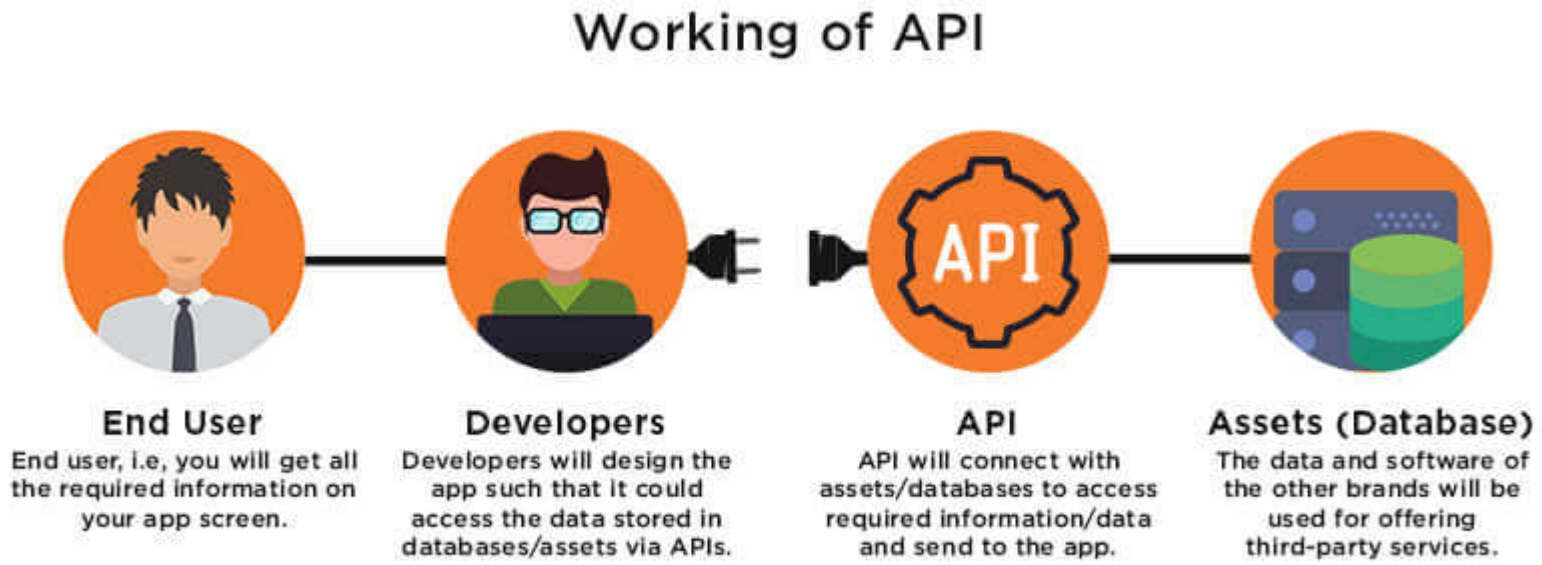
APIs

DATA SCIENCE USAGE AND EXAMPLES

What is an API?

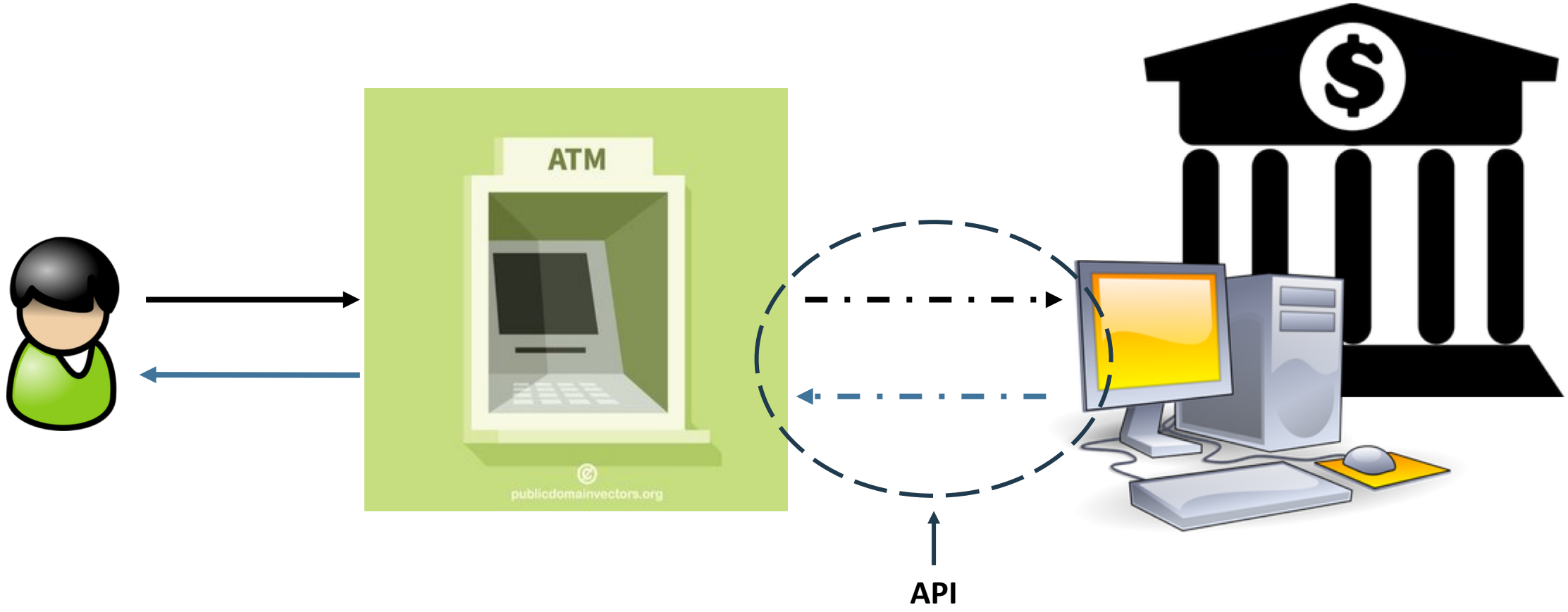
- API stands for Application Programming Interface
- It’s the interface that allows communication between products or services
- It also allows access to data from outside the firewall

Simply put …



Source: https://appinventiv.com/blog/wp-content/uploads/2018/05/What-are-APIs-Learn-How-API-Works.jpg

Example



Some more examples?

External

- Food Delivery
- Shopping
- Social Media
- Games

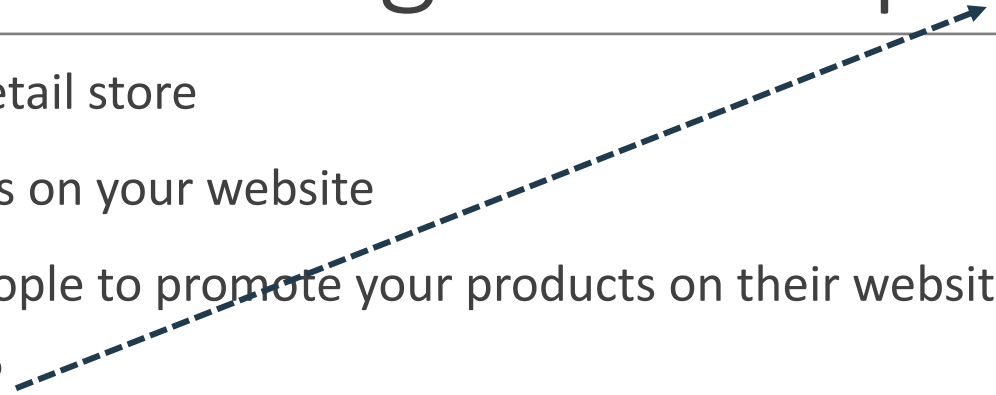
Internal

- Paystubs
- Attendance
- Learning Center

Where do APIs come into play?

I have been hearing about Open API …?

- Say you have a online retail store
- You list all your products on your website
- You also allow other people to promote your products on their website (affiliate)
- How does that happen?



How do we use it as Data Scientists?

- Data Science solutions are nothing but model(s) working together
- Example – Self driving car
- Let's breakdown the steps of one cycle (think of how would you make it)
  - Start vehicle
  - Input destination
  - Capture image using camera
  - Identify image
  - Choose best driving action (steering angle, acceleration, gear, etc.)
  - Do it!
  - Repeat

Where do APIs come into play?

Some more Data Science API examples?

- Can you think of some more?
- Heart Attack Predictions
- Insurance Claim Decisions
- BitBite (https://www.youtube.com/watch?v=qU2w_qiP4Ck)

What data can we get from here?

- https://developer.translink.ca/
- https://developer.github.com/v3/
- https://openweathermap.org/api
- https://www.alphavantage.co/
- https://rapidapi.com/apicloud/api/facerect
- More - https://rapidapi.com/collection/list-of-free-apis

Structure of an API

- https://api.translink.ca/rttiapi/v1/stops/50624?apikey=**Your_API_Key**&lat=49.187706&long=-122.850060
- A key (registration and authentication)
- Parameter keys
- Parameter values
- Output: JSON, XML, or csv, usually JSON

- Key: BwvmKTKZ7XMPDV2y0AqD

JSON

- Java Script Object Notation – open standard file format in key-value pairs.
- { "name":"John",
- "age":30,
- "car":null,
- "transit_history": {"monday": true,
- "tuesday": false,
- "wednesday": true,
- "thursday": true,
- "friday": false,
- "saturday": true,
- "sunday": true}
- }

XML

- Extensible Markup Language is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

<note>

<to>Tove</to>

<from>Jani</from>

<heading>Reminder</heading>

<body>Don't forget me this weekend!</body>

</note>

Push and Pull APIs

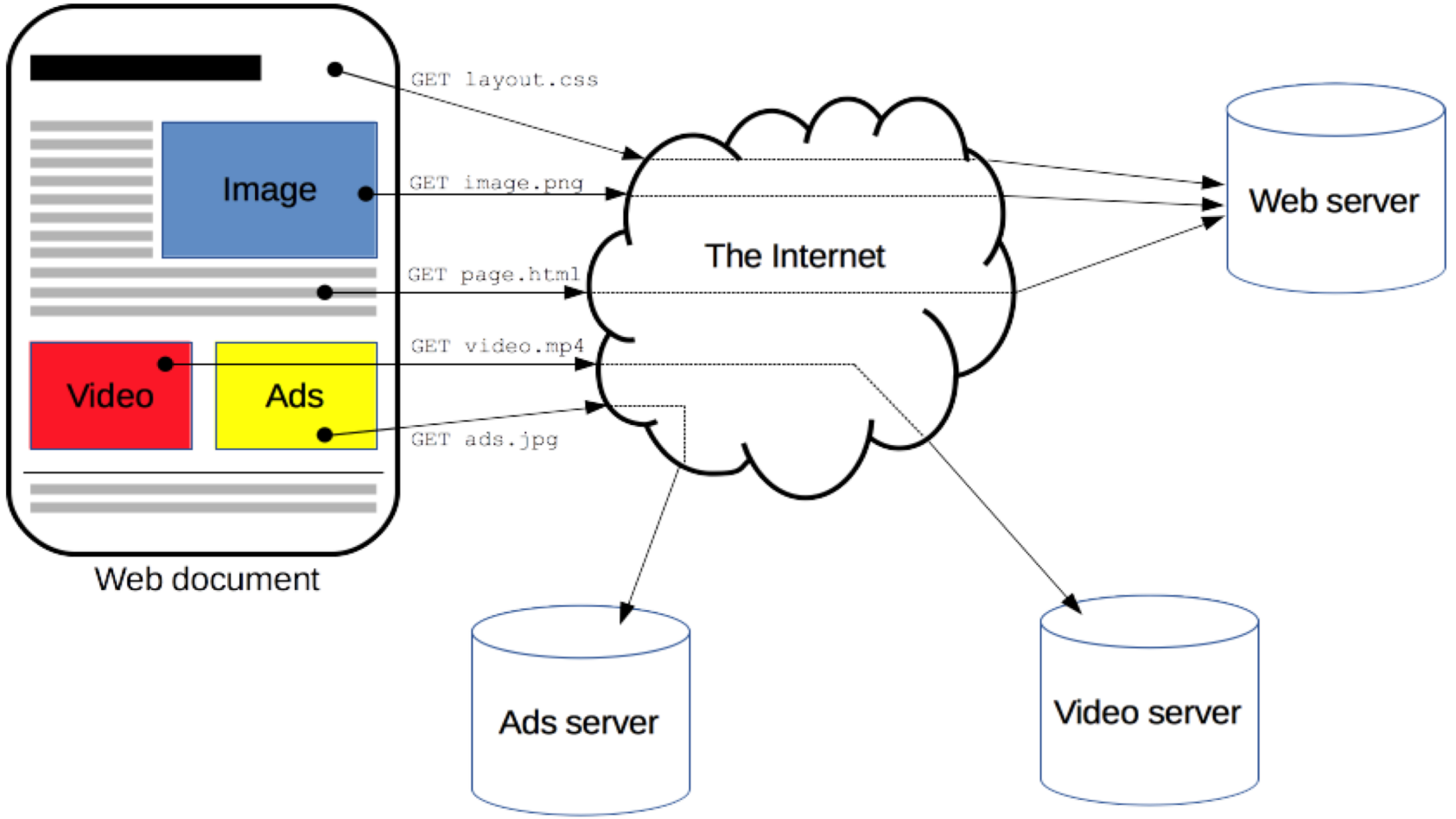
- When information is pushed, it means you're putting it into another system. You're pushing information into the mailbox. A great example is notifications.

- When information is pulled, that means you're retrieving information. A great example is http requests on internet.

HTTP (Hypertext Transfer Protocol) Requests

- **HTTP** is a protocol which allows the fetching of resources, such as HTML documents.
- It is the foundation of any data exchange on the Web and it is a client-server protocol, which means requests are initiated by the recipient, usually the Web browser.
- A complete document is **reconstructed** from the different sub-documents fetched, for instance text, layout description, images, videos, scripts, and more.
- Clients and servers communicate by exchanging individual messages (as opposed to a stream of data). The messages sent by the client, usually a **Web browser**, are called *requests* and the messages sent by the server as an answer are called *responses*.
- More Info - https://developer.mozilla.org/en-US/docs/Web/HTTP/Overview
- https://www.codecademy.com/articles/http-requests

HTTP


GET layout.css
Image
GET image.png
GET page.html
Video
Ads
GET video.mp4
GET ads.jpg
Web document
The Internet
Web server
Ads server
Video server

HTTP Status Codes

- Common HTTP status codes:
  - 200 OK
  - 400 Bad Request
  - 401 Unauthorized
  - 404 Not Found

Demo - Terminal

- curl https://api.translink.ca/rttiapi/v1/stops/50624?apikey=BwvmKTKZ7XMPDV2y0AqD
  - More on curl (https://linuxacademy.com/guide/13852-understanding-curl-and-http-headers/)

- Key is like a password, so obscure it via – (Linux Commands)
- export Bus_API=Your_API_Key
- echo $Bus_API
- curl https://api.translink.ca/rttiapi/v1/stops/50624?apikey=$Bus_API

- For Windows (current instance only)
- SET Bus_API=Your_API_Key
- echo %Bus_API%
- curl https://api.translink.ca/rttiapi/v1/stops/50624?apikey=$Bus_API

Python

- Refer Jupyter Notebook

Questions?

Thank you!