ISA 401: Business Intelligence & Data Visualization

08: Connecting to APIs in R

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Automated Scheduler for Office Hours

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Quick Refresher from Last Week

- ✅ Understand when can we scrape data (i.e., `robots.txt`)
- ✅ Scrape a webpage Using R
- ✅ Utilize loops to scrape data from multiple webpages

Kahoot Competition # 2

To assess your understanding and retention of the topics covered last week, you will **compete in a Kahoot competition (consisting of 9 questions)**:

- Go to https://kahoot.it/
- Enter the game pin, which will be shown during class
- Provide your first (preferred) and last name
- Answer each question within the allocated 20-second window (**fast and correct answers provide more points**)

Winning the competition involves having as many correct answers as possible AND taking the shortest duration to answer these questions. The winner 🏆 of the competition from each section will receive: 0.25 on their Web Scraping II Assignment. Good luck!!!

Learning Objectives for Today's Class

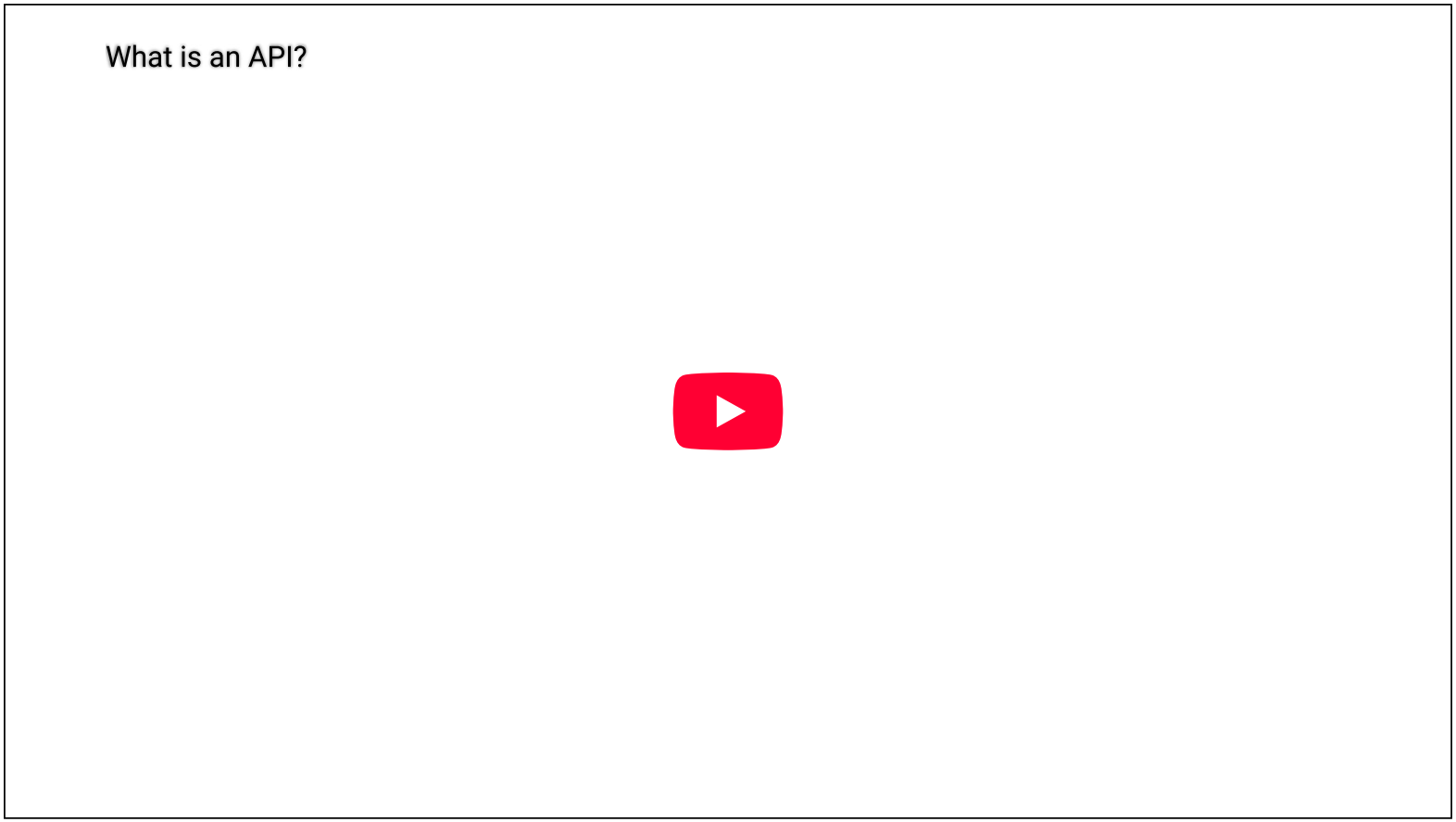
- Describe what we mean by an API
- Explain how APIs will be a huge part of your career as a business analyst and/or data scientist
- Use APIs for extracting web data

What is an API?
(A Web Server Based Perspective)

What is an API? [1]

- An **API** is an acronym for application programming interface.
- It is a **popular** approach to interact with an application/service or data since it:
  - Defines a set of functionalities independent of implementation (i.e., it only exposes information that a programmer might find useful and keep those parts consistent even if the implementation changes later)
  - Provides some level of privacy/control over one's internal data and the rate at which it can be accessed.

What is an API? [2]



What is an API? [3]

Scenario: Alone, you went into a warehouse and are trying to retrieve 3 screwdrivers, a toolbox, and 15 Phillips screws. But you do not know, where those things are in the warehouse.

The API is the set of instructions provided by the warehouse manager on where/how to retrieve this information without touching/accessing other things in there.

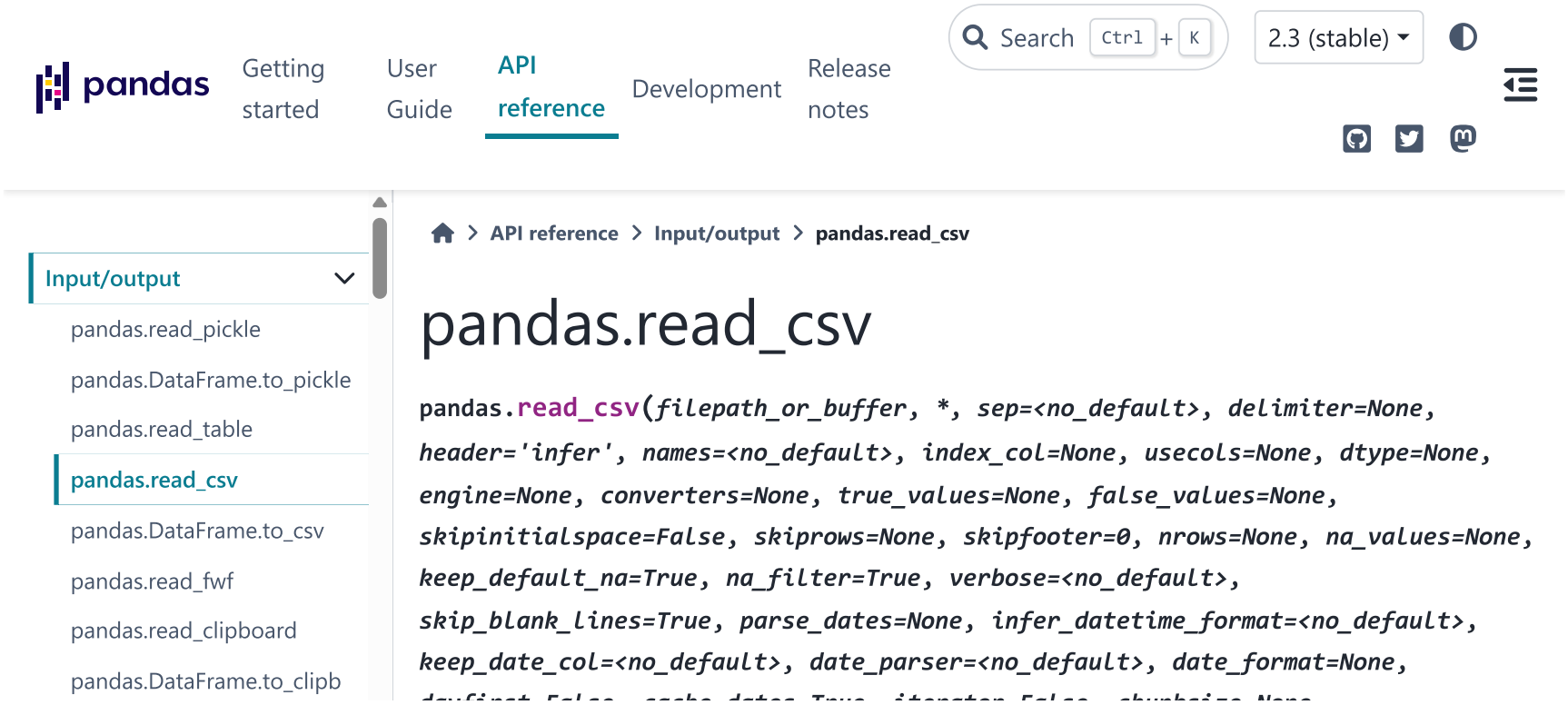
Source: Matt Z. (2018). What is an API? (explanation with cartoon picture so a 5 year old could understand it)

API Useages for Business Analysts and Data Scientists

Application #1: Request Data from Web Server

This is the **classical** example, which was explained in the previous slides and we will be coding several in-class demos to illustrate how to perform such operations in R.

Application #2: Access Python Libraries



Application #3: Use a Pretrained ML Model

Please click on the "Watch on Vimeo" to see OpenAI's explanation of their DALL·E 2 model.

Accessing APIs in 

The 3 Step Process

Before you dive into the API documentation, you **should first check if there is a R (or Python if you are familiar)** package/library that serves as a wrapper for that API.

- **Find** the **API's documentation** and find information about the following:
  A. Does the API require an **authentication key**?
  B. What are the API's **base URL** and **query parameters**?
  C. How does the request URL look like?
- Craft your **request**. My recommendations are to:
  A. First, start with a simple request.
  B. Test that request in your browser and see what results you get.
- Construct that request in R by **either**:
  A. If the generated content seems to be a `JSON` file/webpage, you can capitalize on the reading the content from `jsonlite::fromJSON()`; **OR**
  B. By passing the `base url` inside the `httr::GET()` and parsing the results with `httr::content()`.

Demo: The CryptoCompare API

Demo Description | Code and Results

- Create a Personal (Free) account at CryptoCompare.com
- Click on create your free key to create your API key and copy the key.
- Go to the documentation, and test their sample call by executing the call after you have pasted your API key in the call.
    - The executed call returns the price of BTC (Bitcoin) in USD, JPY and EUR.
- Now click on the Historical Data Tab on the left
    - Click on Daily Pair OHLCV and Execute the Sample Call for BTC
    - This returns 10 days worth of OHLCV for BTC in USD.
- **Let us obtain the price for $BTC over the past 100 days.**

Recap

Summary of Main Points

By now, you should be able to do the following:

- Describe what we mean by an API
- Explain how APIs will be a huge part of your career as a business analyst and/or data scientist
- Use APIs for extracting web data

Things to Do to Prepare for Next Class

- Getting Started with httr
- Getting Started with httr2
- Managing secrets