

### Building Services for Consumption

Without knowing it, you have been writing Application Programming Interfaces -- commonly known as APIs -- to build services for others to consume your data:

- In MP4:
  - **/extract**, allows the extraction of a hidden “uiuc” GIF from a PNG image.
- In MP5:
  - **/:subject/:course**, returns the GPA and course credit information from the courses-microservice
  - **/scheduleGPA**, returns the GPA of a provided schedule

There are a lot of details in how to write a good API for others to use!

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### Generic APIs

An API can take on any number of forms:

- 1.
- 2.
- 3.
- 4.
- 5.

### HTTP-Based APIs

We will primarily focus on web-based APIs, as they are what are the most commonly used form of APIs in the cloud.

### RESTful APIs:

- [REST]:

Four Key Architectural Features:

- [Stateless]:
- [Client-Server]:
- [Explicit Caching]:
- [Layered System]:

Examples of widely-used APIs:

**Non-RESTful APIs:**

Many other APIs exist outside of the RESTful API space -- particularly any if the request requires **state**.

**Example Service:** MapReduce

**Example Input:**

|                                                                                         |                                                                                         |                                                                                            |                                                                                               |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| admin2: Champaign<br>region: Illinois<br>country: US<br>cases: 6390<br>date: 2020-10-29 | admin2: Champaign<br>region: Illinois<br>country: US<br>cases: 6285<br>date: 2020-10-28 | admin2: Champaign<br>region: Sicilia<br>country: Italy<br>cases: 18325<br>date: 2020-10-28 | admin2: Champaign<br>region: Lombardia<br>country: Italy<br>cases: 162968<br>date: 2020-10-28 |
| [0]                                                                                     | [1]                                                                                     | [2]                                                                                        | [3]                                                                                           |

**Source:**

[https://github.com/CSSEGISandData/COVID-19/tree/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_daily\\_reports](https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_daily_reports)

**Example Input:**

|            |              |              |            |              |             |            |             |            |
|------------|--------------|--------------|------------|--------------|-------------|------------|-------------|------------|
| <i>The</i> | <i>quick</i> | <i>brown</i> | <i>fox</i> | <i>jumps</i> | <i>over</i> | <i>the</i> | <i>lazy</i> | <i>dog</i> |
| [0]        | [1]          | [2]          | [3]        | [4]          | [5]         | [6]        | [7]         | [8]        |

Map Function:

Reduce Function: