

Tools of the trade: API

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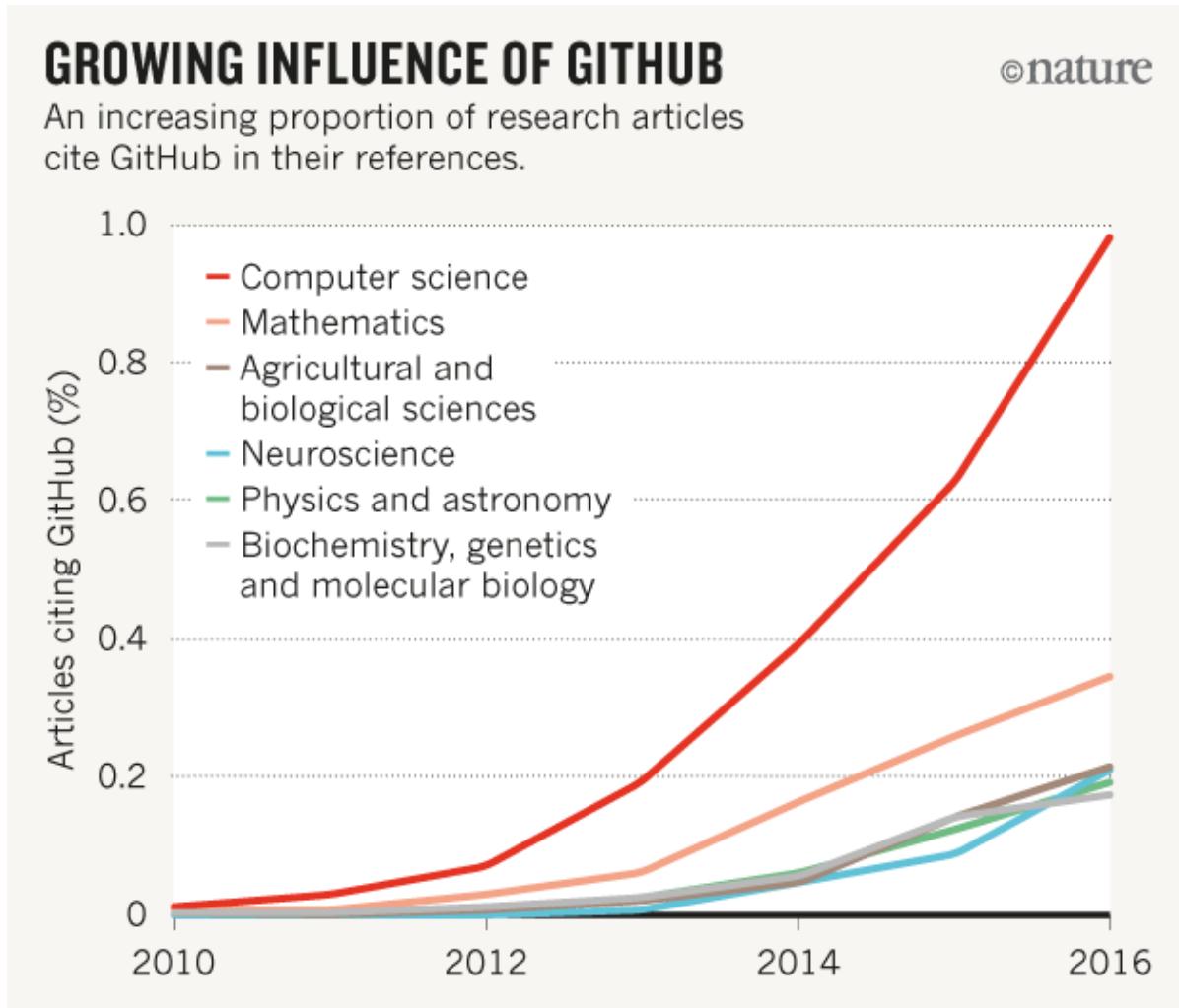
Checklist

(5mins)

1. Download Chrome
2. "Chrome Advanced Rest Client"
3. Java JRE
4. OpenRefine



Github



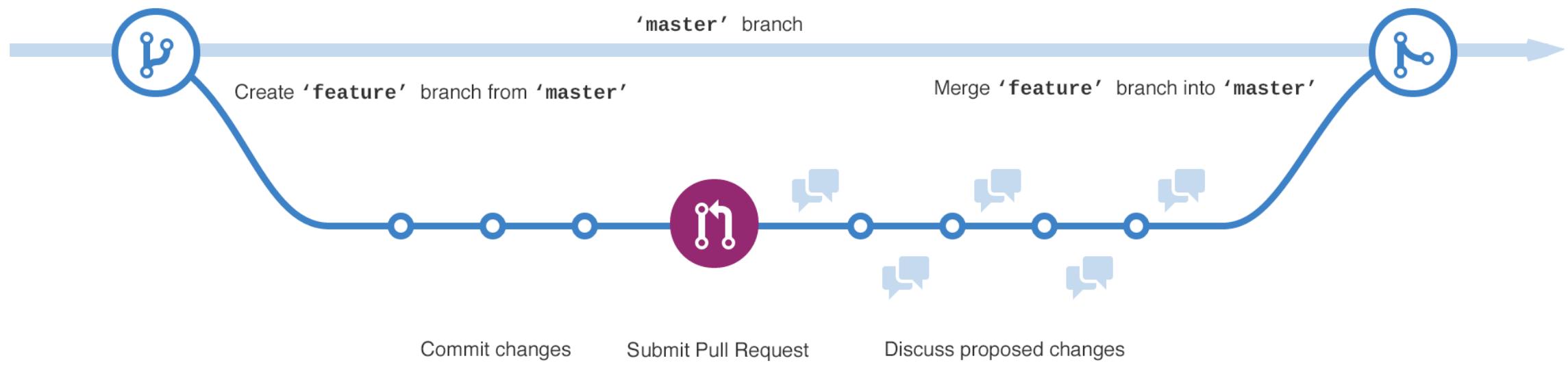
- What is version control?
- Why should you care?
 - Code, Tools
 - Data
- Ebola data by Caitlin Rivers
 - 2014
 - Model outbreak
 - Started as data collection
 - Community contributions to help clean data, analyze it, visualize it, and add to it



Terminology

<https://guides.github.com>

- Repository (repo)
- Branch
- Clone vs. Fork
- Merge
- Pull (Pull Request)



<https://guides.github.com/activities/hello-world/>

Introduction to APIs



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The Data Landscape for Precision Medicine



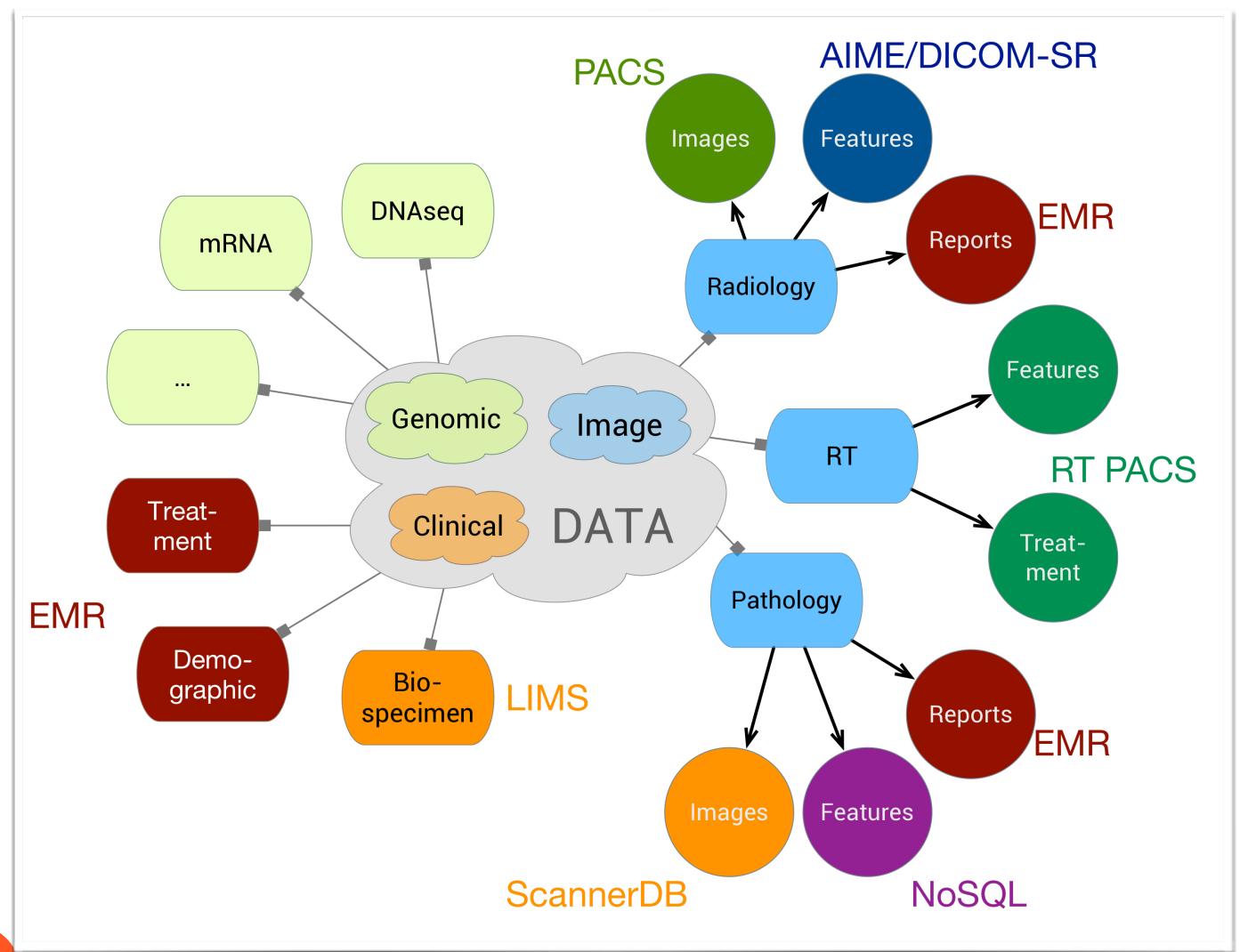
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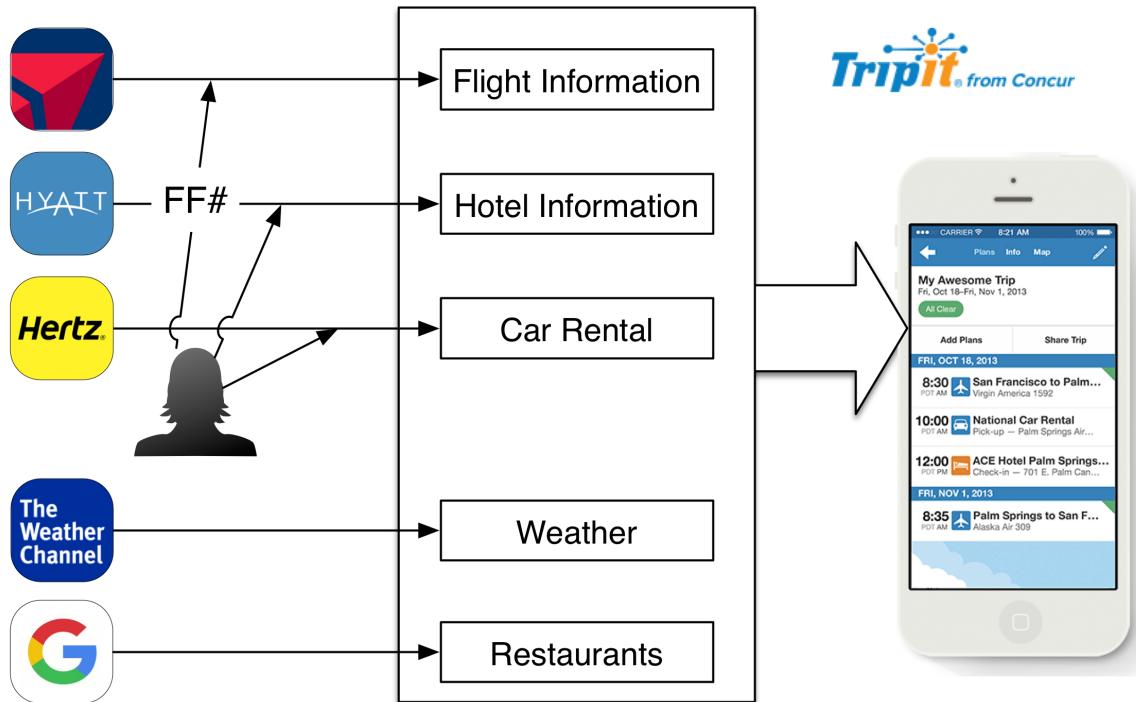
Data Characteristics

- Large number of small datasets
- Structured...Semi-structured
...Unstructured...Ill formed
- Noisy and Fuzzy/Uncertain
- Spatial, Temporal relationships

Data Management

- Variety in storage & messaging protocols
- No shared interface





Data Integration



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API → Building Blocks

API = Programmatic Interface

APIs to access data, integrate multiple data sources/types, build novel applications...

Google Genomics + GA4GH
Allen Brain Atlas
NLM Toxicology Data Network
AETNA

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iTriage

The company's market-leading platform and mobile/Mobile application offer a "Program Symptom-to-Provider™" pathway that improves consumers to make better health care decisions.

iTriage helps people answer the two most common medical questions: "What could be wrong?" and "Where should I go for treatment?"

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- API KEYS
- SUPPORT
- FORUMS
- GET STARTED

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TOXNET Web Service API - Search TOXNET Chemical Databases

TOXNET chemical databases include HSDB, CCRIS, GENETOX, IRIS, ITER, and LactMed. The TOXNET Web Service API allows users to search for keywords in one of these databases.

Search using HTTP GET requests

Base URL: http://toxgate.nlm.nih.gov/cgi-bin/sis/search/x?db+<db>+<keyword>

Required Parameters for Initial Search Requests

Parameter Name	Description
db	Database to search. Valid database names are hsdb, ccris, genetox, iris, iter, and lact. Please note that the database name must be in lowercase.
keyword	The keyword submitted to the service. Spaces should be replaced by "+" signs. Special characters should be replaced with a "%6" followed by their ASCII code in hexadecim. For very long queries (more than several hundred characters long), consider using the HTTP POST method.

Example: Search for benzene leukemia in the HSDB database. URL for initial search: http://toxgate.nlm.nih.gov/cgi-bin/sis/search/x?db+hsdb+benzene+leukemia

Search Result: Click here. (Please allow your browser to show blocked content by right clicking on the information bar.)

Search using HTTP POST requests

Searches can only be called by using the POST method. Please refer to programming language-specific documents on how to issue HTTP POST requests.

Base URL: http://toxgate.nlm.nih.gov/cgi-bin/sis/search

Required Parameters

Parameter Name	Description
queryxx	Keyword.
chemsyn	Must be 1 to turn on query expansion with chemical synonyms and CAS Registry Number.
db	Database search. Valid database names are hsdb, ccris, genetox, iris, iter, and lact. Please note that the database name must be in lowercase.
expansion	Must be 1 to turn on expansion.

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CUSTOMERS

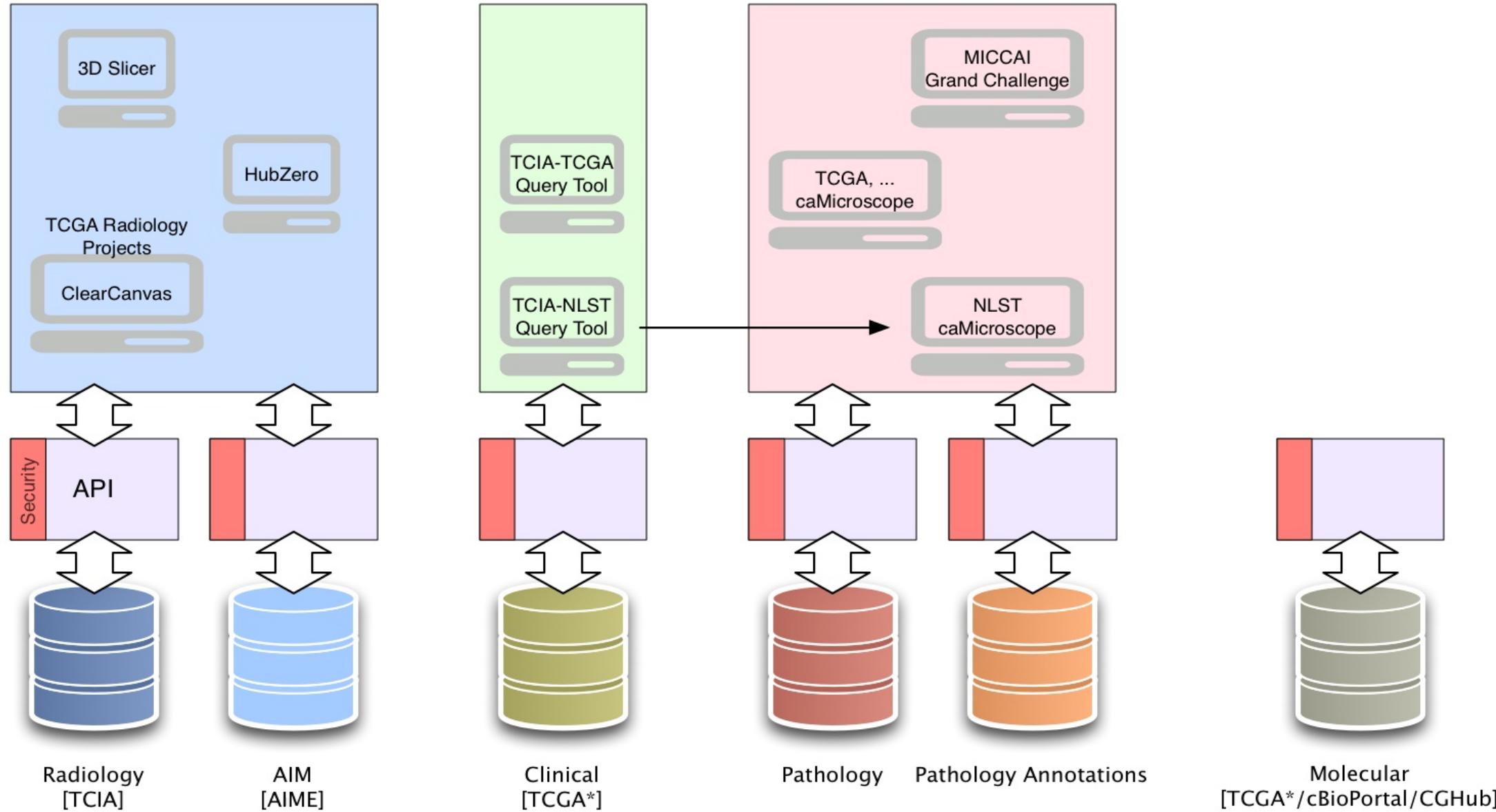
GET STARTED

DOCUMENTATION

COMMUNITY

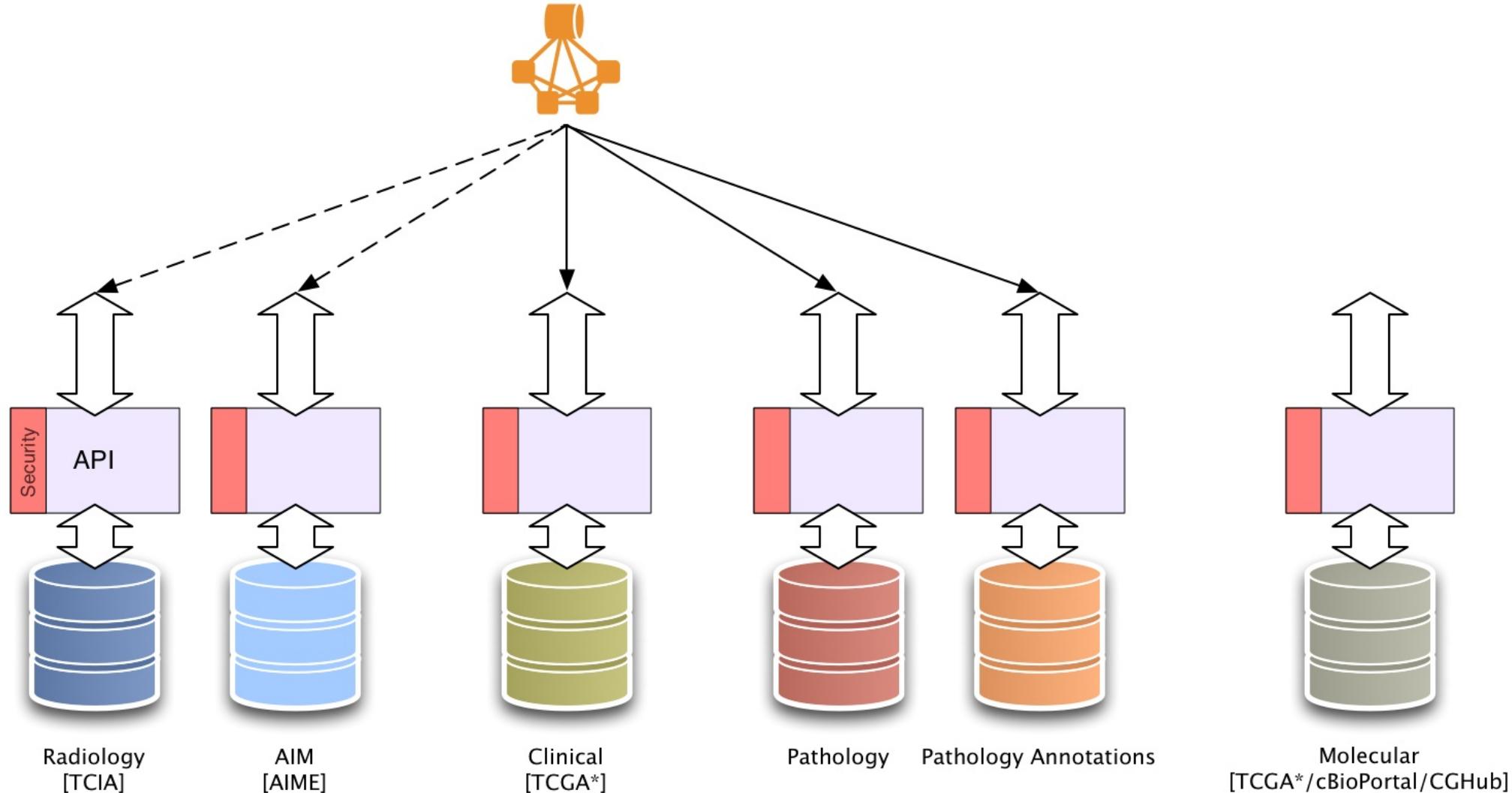
How Google Genomics can help you

Google Genomics helps the life science community organize the world's genomic information and make it accessible and useful. Through our extensions to Google Cloud Platform, you can apply the same technologies that power Google Search and Maps to securely store, process, explore, and share large, complex datasets.





Federated Exploration [Prototype for TCGA-BRCA]



Hands on with APIs



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/getByCountry

http://174.129.112.58:9099/services/MSCR/Population/query/

?Country=India & Year=1960...

The screenshot shows the ARC interface with the following details:

- Request URL:** http://174.129.112.58:9099/services/MSCR/Population/query/getByCountry?Country=India&Year=1960
- Method:** GET
- Headers:** api_key: f811456a-fecd-49e1-8c92-6f6824078d1f
- Response Status:** 200 OK (50.97 ms)
- Response Body:** [Array[1] -0: { 1977: " 650 485", "Country": "India" }]

Github links

Try:

/getAll

/getByCountry

/getByCountryYear



APIs get you more than Data

Twilio



ARC Request

HTTP request

Method: POST Request URL: https://api.twilio.com/2010-04-01/Accounts/ACde3fe1a754593fa160851f0e838a9ce1/Messages

SEND ::

Parameters ^

Headers	Body	Variables
<input type="button" value="X"/> <input type="button" value="<>"/>		<input type="checkbox"/> Headers sets
Header name: Authorization Header value: Basic QUNkZTNmZTFhNzU0NTkzMExNjA4NTFmMGU4MzhhOWNIMTpMmMmUzMzhjYWFjZWE5M2QzMmUzMDB		<input type="button" value="X"/> <input type="button" value="Pencil"/> <input type="button" value="?"/>
Header name: Content-Type Header value: multipart/form-data		<input type="button" value="X"/> <input type="button" value="Pencil"/> <input type="button" value="?"/>

[ADD HEADER](#)

A 147 bytes

201 CREATED 311.06 ms

Chrome apps termination: save your data

Selected environment: Default

Github: Ex. 2.2

1. Set Header



ARC

Request

HTTP request

Method Request URL
POST https://api.twilio.com/2010-04-01/Accounts/ACde3fe1a754593fa160851f0e838a9ce1/Messages

SEND

Socket

History

Saved

Projects

Parameters ^

Headers Body Variables

Body content type multipart/form-data

Content type (Optional)

From 6783315156 X

To 4044576346 X

Content type (Optional)

Body Hello X

ADD FILE PART ADD TEXT PART

201 CREATED 311.06 ms DETAILS ▾

Selected environment: Default

Chrome apps termination: save your data

Github: Ex. 2.2

2. Set the Body (Do not change From and To)



APIs for

- Data
 - Genomic Data Commons
 - Google Genomics
- Cloud Services
- FHIR
- Messaging
- Security



OpenRefine

From SIIM Data Lab Exercises

Authors:

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Luciano Prevedello, MD, Ohio State Health System
Ashish Sharma, PhD, Emory University

1. Download from Github
2. Create Project
3. Load Data
4. Edit on field (change value)
5. Follow exercises