GBIF Global Biodiversity Information Facility

Emmelina monodactyla (Linnaeus, 1758), Hellerup, Denmark, 4 May 2013

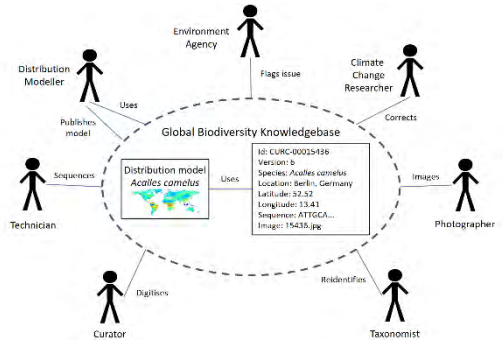
Global Biodiversity Information Facility

Open access to biodiversity data

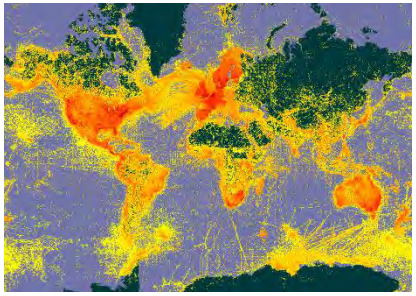
Madrid, 7 November 2017

GBIF'S ROLE

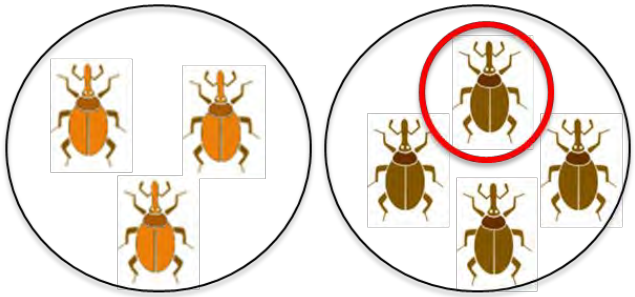
1. Remove obstacles to collaboration in sharing and use of biodiversity data



2. Organise evidence of recorded occurrence of any species in time and space



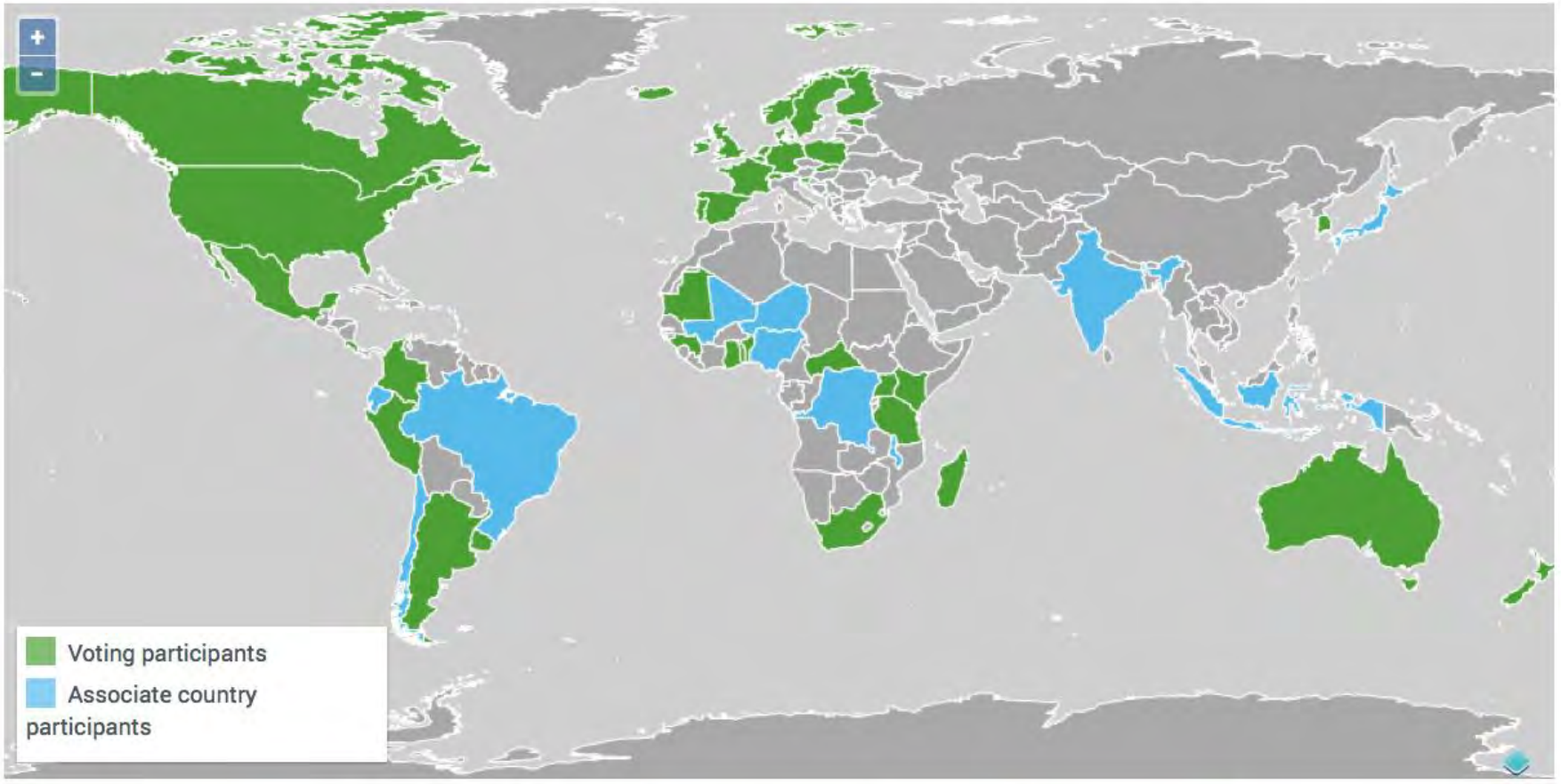
3. Support development of a global virtual natural history collection



GBIF

participation

CURRENT NETWORK



41 VOTING PARTICIPANTS | 13 ASSOCIATE COUNTRY PARTICIPANTS | 40 OTHER ASSOCIATE PARTICIPANTS | 1,222 PUBLISHERS

https://demo.gbif.org/the-gbif-network

BY THE NUMBERS

17 Nov 2017

Species occurrence records

874,480,804

Datasets

36,957

(Occurrence, Checklists, Sampling-event data, metadata)

Country Participants

54

Organizational Participants

40

Publishers

1,426

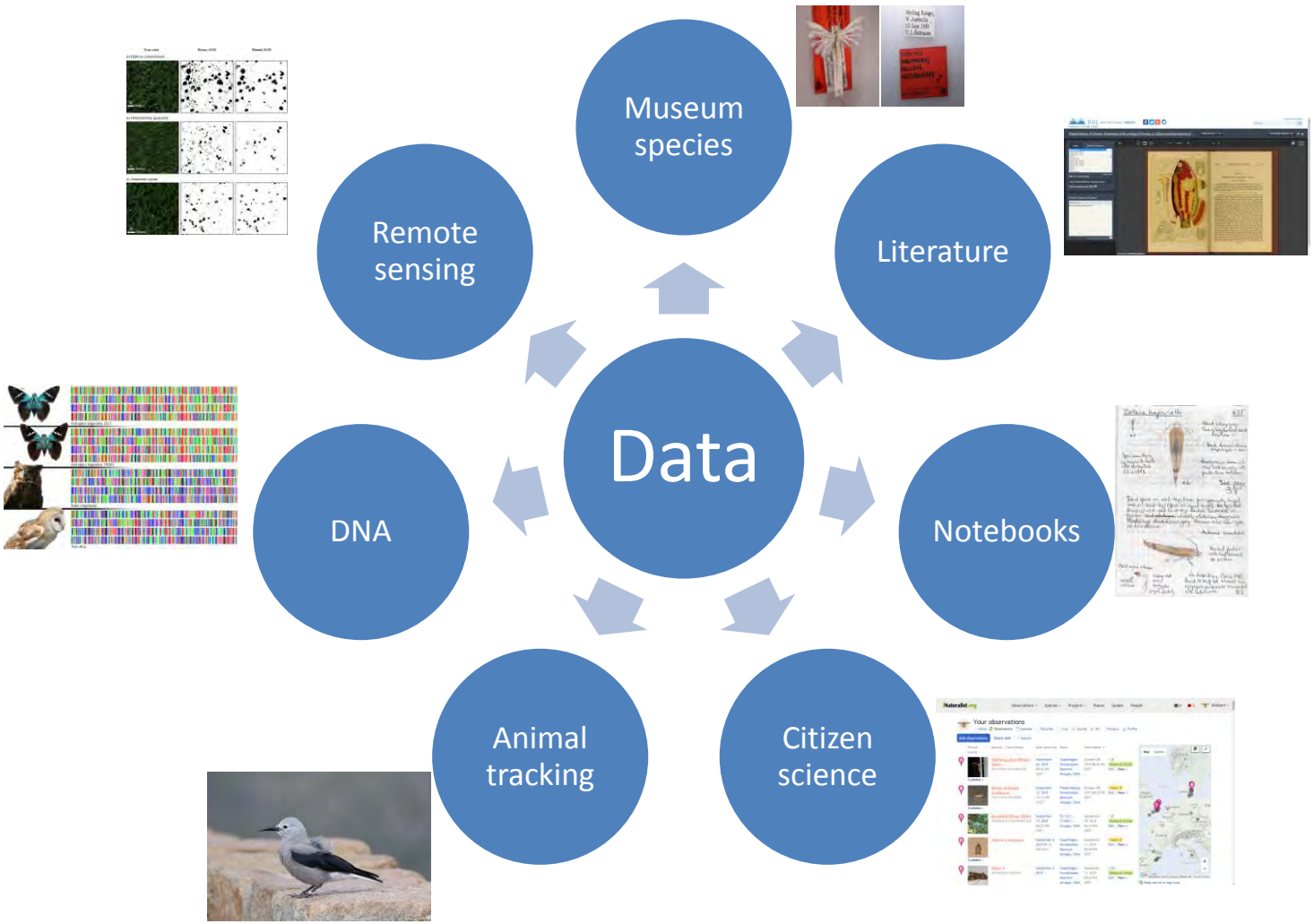
Records downloaded per month (avg Jan-Aug 2017)

43.4 billion

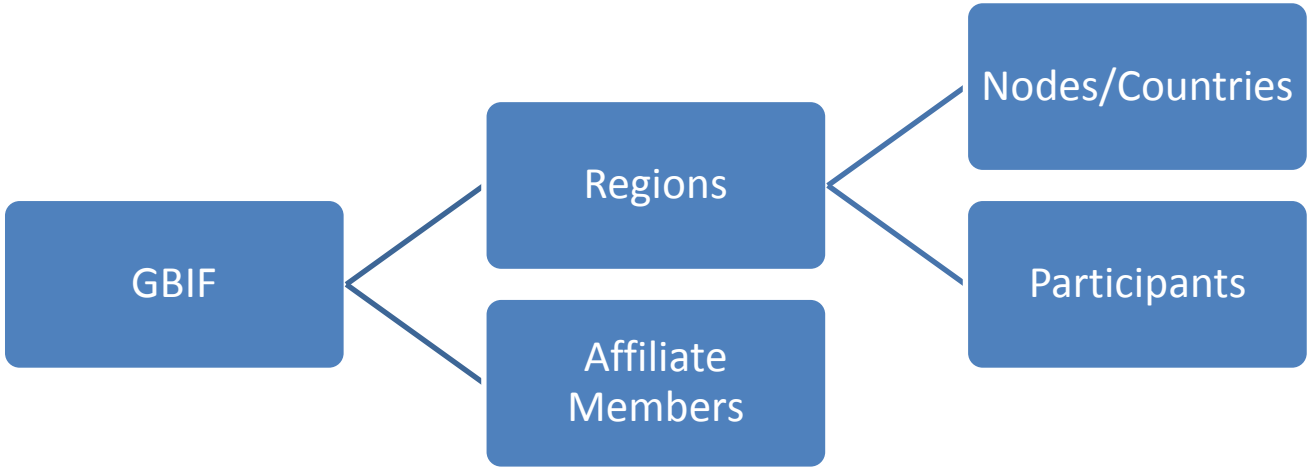
Total page views (Aug)

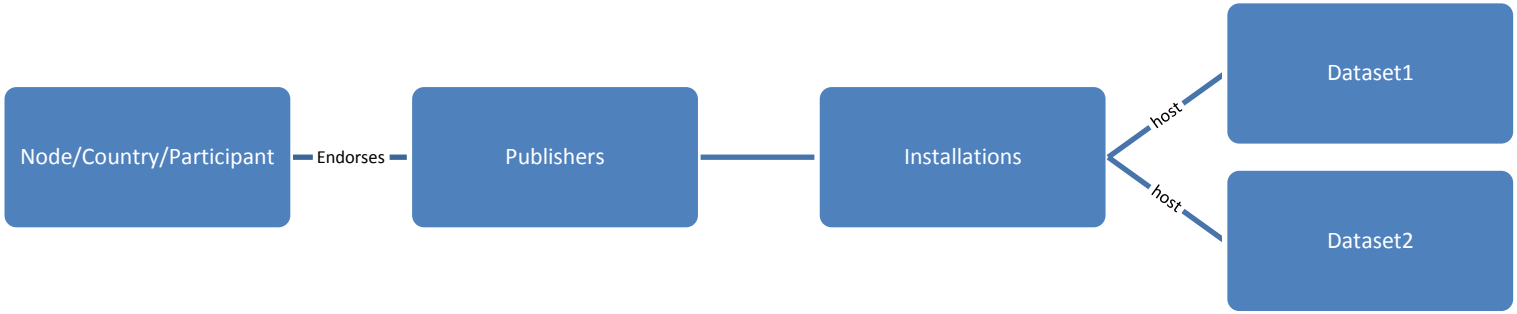
97,053

DATA SOURCES



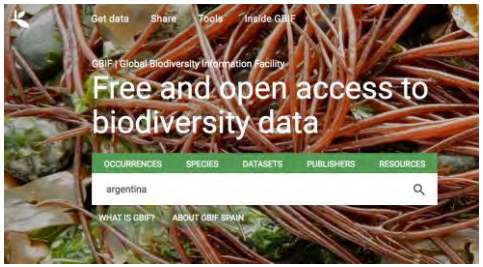
GBIF GOVERNANCE MODEL

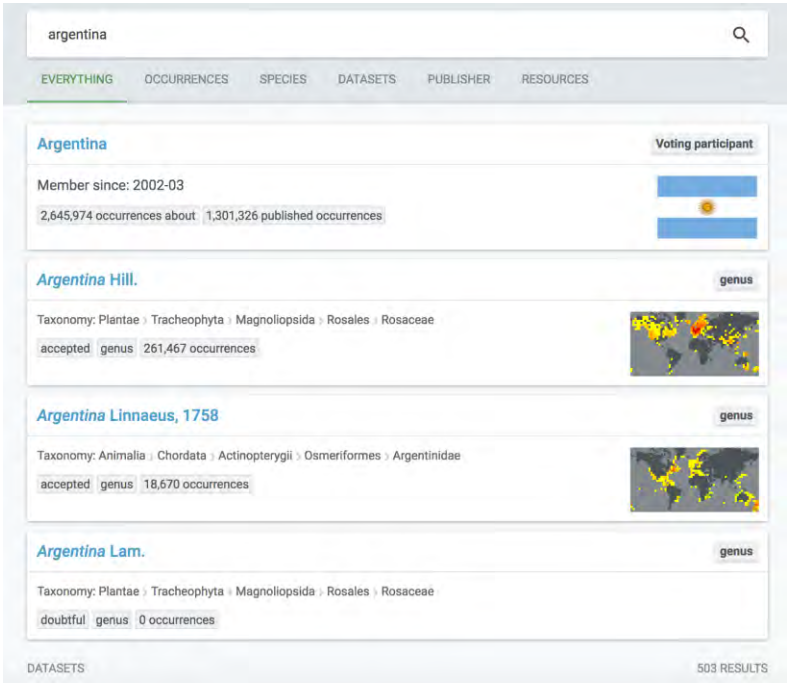




GBIF PORTAL – MAIN FUNCTIONALITIES

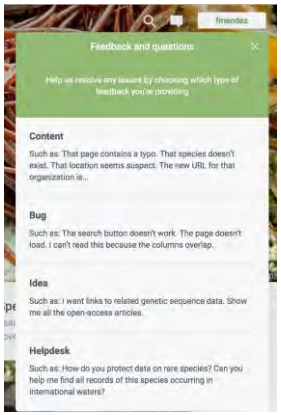
Cross content search





Integrated feedback

- iNaturalist
- Symbiota
- Annosys



Exercise 1!

Extensive collection of Images

- Flabelina
- Herbarium
- Amber
- Road Kills!

GBIF PORTAL – MAIN FUNCTIONALITIES

Species names search

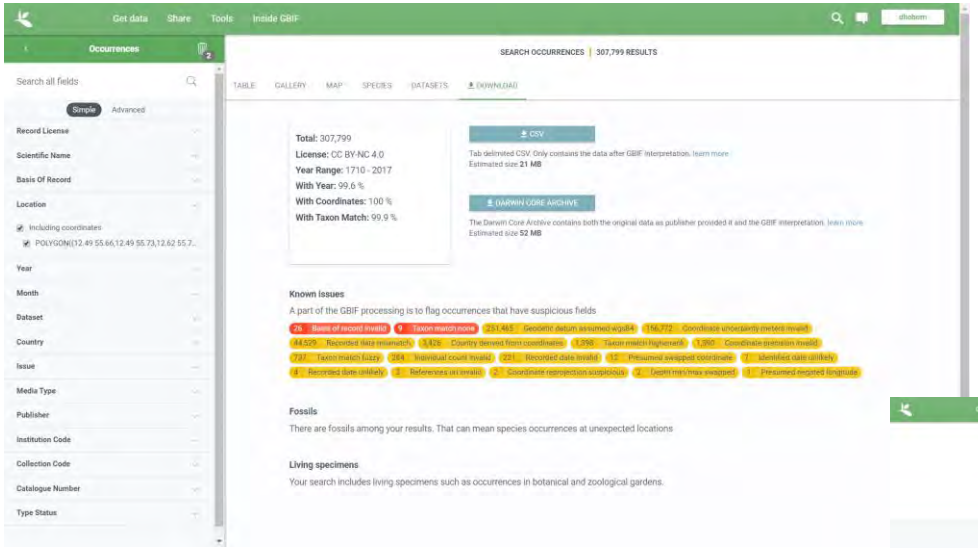
"The GBIF Backbone Taxonomy, often called the Nub taxonomy, is a single synthetic management classification with the goal of covering all names GBIF is dealing with."

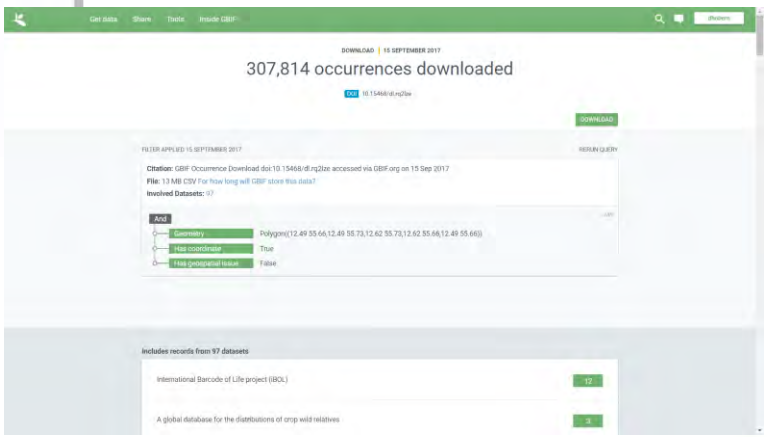
Demo: Panthera

Exercise 2!

GBIF PORTAL – MAIN FUNCTIONALITIES

Occurrence records search, filtering and download

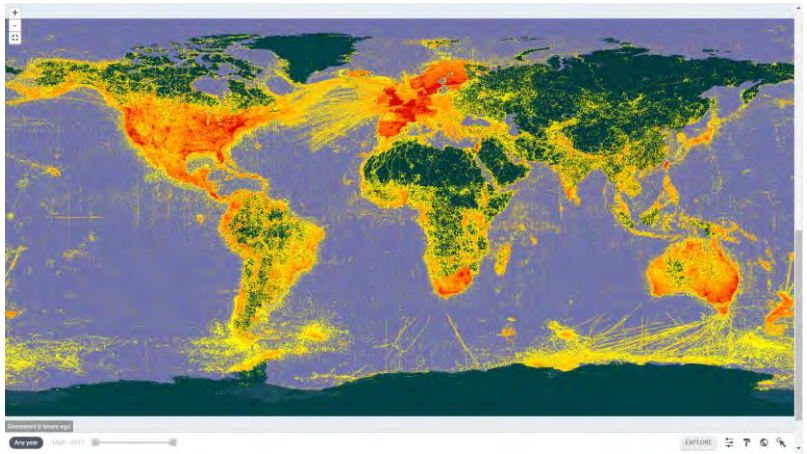




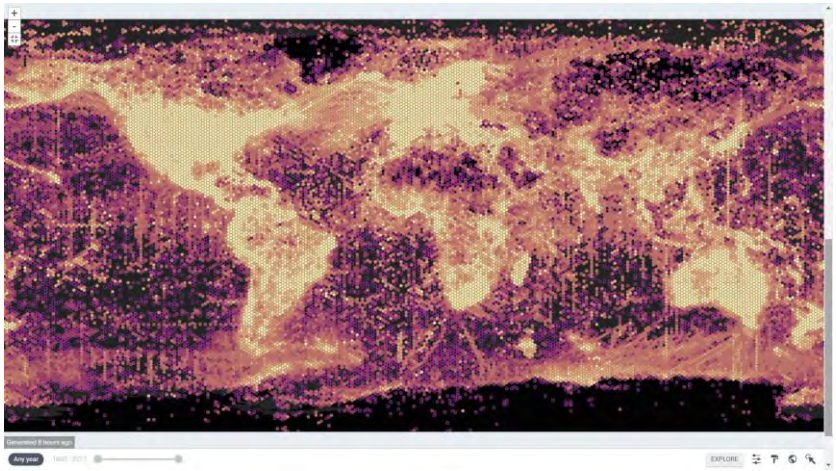
Demo occurrence search, detail and diagnostics!

GBIF PORTAL – FLEXIBLE GEOSPATIAL TOOLS

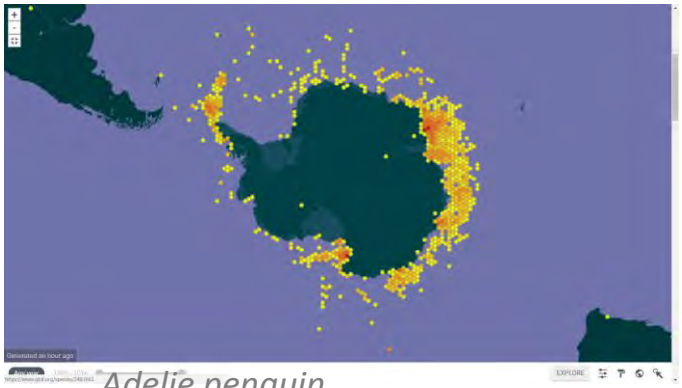
Projections: Plate Carrée, Mercator, Artic, Antartica



Clustered hexagons



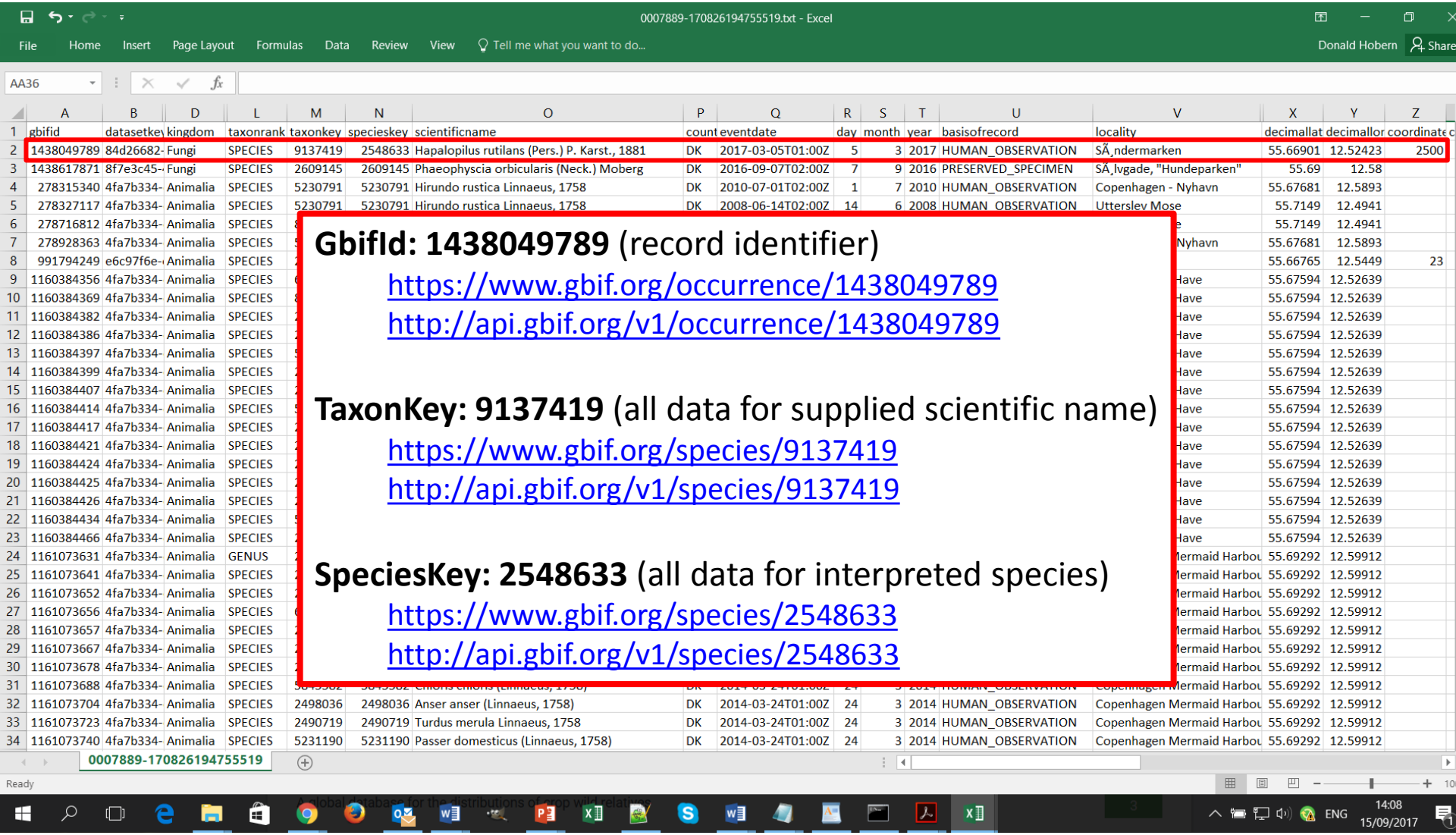
Artic Projection



Adelie penguin

Exercise 3!

GBIF PORTAL– DOWNLOAD RESULTS



	A	B	D	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Z
1	gbifid	datasetkey	kingdom	taxonrank	taxonkey	specieskey	scientificname	countr	eventdate	day	month	year	basisofrecord	locality	decimallat	decimallor	coordinate
2	1438049789	84d26682-	Fungi	SPECIES	9137419	2548633	Hapalopilus rutilans (Pers.) P. Karst., 1881	DK	2017-03-05T01:00Z	5	3	2017	HUMAN_OBSERVATION	SÃ,ndermarken	55.66901	12.52423	2500
3	1438617871	8f7e3c45-	Fungi	SPECIES	2609145	2609145	Phaeophyscia orbicularis (Neck.) Moberg	DK	2016-09-07T02:00Z	7	9	2016	PRESERVED_SPECIMEN	SÃ,lvgade, "Hundeparken"	55.69	12.58	
4	278315340	4fa7b334-	Animalia	SPECIES	5230791	5230791	Hirundo rustica Linnaeus, 1758	DK	2010-07-01T02:00Z	1	7	2010	HUMAN_OBSERVATION	Copenhagen - Nyhavn	55.67681	12.5893	
5	278327117	4fa7b334-	Animalia	SPECIES	5230791	5230791	Hirundo rustica Linnaeus, 1758	DK	2008-06-14T02:00Z	14	6	2008	HUMAN_OBSERVATION	Utterslev Mose	55.7149	12.4941	
6	278716812	4fa7b334-	Animalia	SPECIES										e	55.7149	12.4941	
7	278928363	4fa7b334-	Animalia	SPECIES										Nyhavn	55.67681	12.5893	
8	991794249	e6c97f6e-	Animalia	SPECIES											55.66765	12.5449	23
9	1160384356	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
10	1160384369	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
11	1160384382	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
12	1160384386	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
13	1160384397	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
14	1160384399	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
15	1160384407	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
16	1160384414	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
17	1160384417	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
18	1160384421	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
19	1160384424	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
20	1160384425	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
21	1160384426	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
22	1160384434	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
23	1160384466	4fa7b334-	Animalia	SPECIES										Have	55.67594	12.52639	
24	1161073631	4fa7b334-	Animalia	GENUS										Mermaid Harbou	55.69292	12.59912	
25	1161073641	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
26	1161073652	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
27	1161073656	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
28	1161073657	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
29	1161073667	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
30	1161073678	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
31	1161073688	4fa7b334-	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
32	1161073704	4fa7b334-	Animalia	SPECIES	2498036	2498036	Anser anser (Linnaeus, 1758)	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	
33	1161073723	4fa7b334-	Animalia	SPECIES	2490719	2490719	Turdus merula Linnaeus, 1758	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	
34	1161073740	4fa7b334-	Animalia	SPECIES	5231190	5231190	Passer domesticus (Linnaeus, 1758)	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	

GbifId: 1438049789 (record identifier)

https://www.gbif.org/occurrence/1438049789

http://api.gbif.org/v1/occurrence/1438049789

TaxonKey: 9137419 (all data for supplied scientific name)

https://www.gbif.org/species/9137419

http://api.gbif.org/v1/species/9137419

SpeciesKey: 2548633 (all data for interpreted species)

https://www.gbif.org/species/2548633

http://api.gbif.org/v1/species/2548633

Exercise 4!

GBIF

GBIF PORTAL

- Country pages: show summary information about data published from and about a country
- Global Analytics: shows a summary of data trends in the GBIF network, it can be used as high level data quality exploration tool

Demo Global Trends and Country Pages!

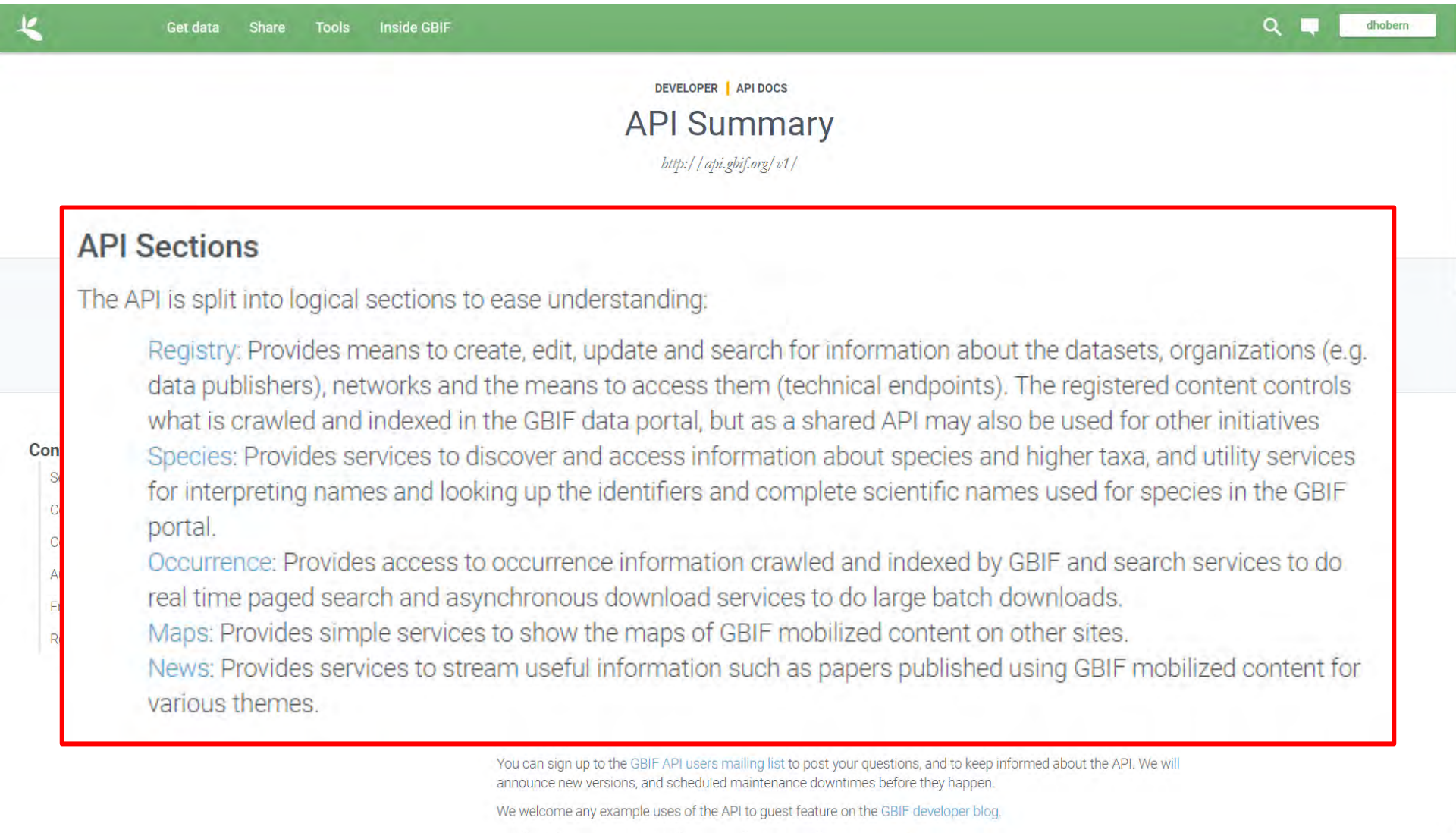
Exercise 5!

GBIF PORTAL – MAIN FUNCTIONALITIES

- Additional tools:
  - Species matching
  - Data Validator

  Exercise 6!

HTTPS://WWW.GBIF.ORG/DEVELOPER/SUMMARY



GBIF APIS

GBIF website built on top of the GBIF API

Supports:

- Dataset / Organisation registration, search
- Occurrence record search and download
- Species search
- Services in support of name matching

GBIF APIS

Typical RESTful JSON based API

- Occurrences, species, datasets, organisations etc.

Asynchronous download API

- CSV and Darwin Core Archives

Mapping API

- Mapbox Vector Tile format
- PNGs

OAI-PMH for integrations with generic catalogues

OCCURRENCE SEARCH API EXAMPLE

http://api.gbif.org/v1/occurrence/search?decimalLatitude=55.67,55.68&decimalLongitude=12.56,12.57


```
offset:                 0
limit:                  20
issues:
  0:                    "COORDINATE_ROUNDED"
  1:                    "GEODETIC_DATUM_ASSUMED_WGS84"
modified:               "2017-05-30T20:31:56.000+0000"
lastInterpreted:        "2017-06-08T07:54:40.796+0000"
references:             "https://www.inaturalist.org/observations/6433745"
license:                "http://creativecommons.org/licenses/by-nc/4.0/legalcode"
identifiers:
media:
  0:
    type:               "StillImage"
    format:             "image/jpeg"
    identifier:         "https://static.inaturalist.org/photos/8125353/original.jpeg?1496172207"
    references:         "https://www.inaturalist.org/photos/8125353"
    created:            "2017-05-30T19:21:37.000+0000"
    creator:            "Ross"
    publisher:          "iNaturalist"
    license:            "http://creativecommons.org/licenses/by-nc/4.0/"
    rightsHolder:       "Ross"
    familyKey:          2986
    genusKey:           2498016
    speciesKey:         2498036
```

SPECIES SEARCH API EXAMPLE

http://api.gbif.org/v1/species/match/?name=Felis+concolor


```
usageKey:          2435104
scientificName:    "Felis concolor Linnaeus, 1771"
canonicalName:     "Felis concolor"
rank:              "SPECIES"
status:            "SYNONYM"
confidence:        98
matchType:         "EXACT"
kingdom:           "Animalia"
phylum:            "Chordata"
order:             "Carnivora"
family:            "Felidae"
genus:             "Puma"
species:           "Puma concolor"
kingdomKey:        1
phylumKey:         44
classKey:          359
orderKey:          732
familyKey:         9703
genusKey:          2435098
speciesKey:        2435099
synonym:           true
class:             "Mammalia"
```


http://api.gbif.org/v1/species/2435099


```
key:               2435099
nubKey:            2435099
nameKey:           9541887
taxonID:           "gbif:2435099"
sourceTaxonKey:    120316239
kingdom:           "Animalia"
phylum:            "Chordata"
order:             "Carnivora"
family:            "Felidae"
genus:             "Puma"
species:           "Puma concolor"
kingdomKey:        1
phylumKey:         44
classKey:          359
orderKey:          732
familyKey:         9703
genusKey:          2435098
speciesKey:        2435099
datasetKey:        "d7dddbf4-2cf0-4f39-9b2a-bb099caae36c"
constituentKey:    "7ddf754f-d193-4cc9-b351-99906754a03b"
parentKey:         2435098
parent:            "Puma"
basionymKey:       2435104
basionym:          "Felis concolor Linnaeus, 1771"
```

OCCURRENCE SEARCH FOR PUMA

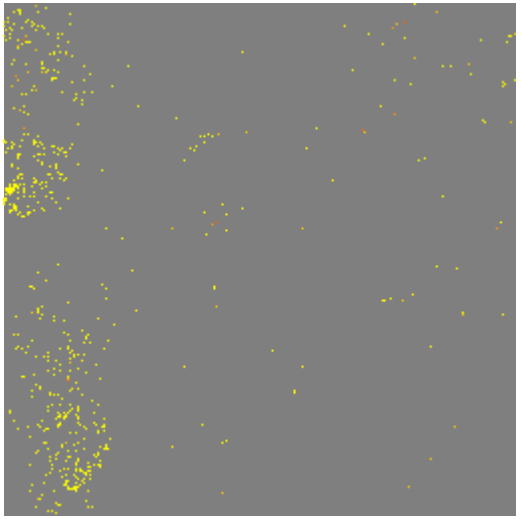
http://api.gbif.org/v1/occurrence/search/?speciesKey=2435099

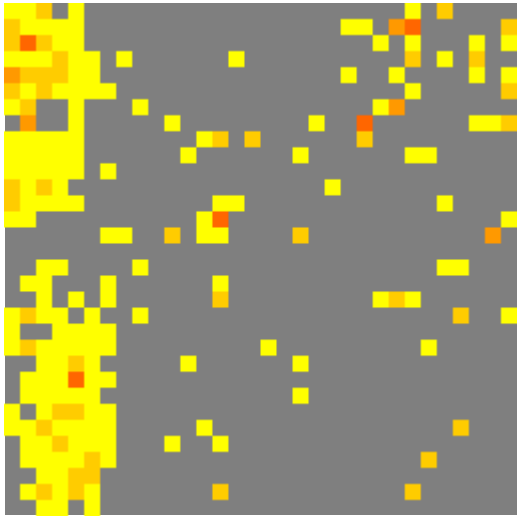

```
offset: 0
limit: 20
endOfRecords: false
count: 8582
results:
  0:
    key: 1453377710
    datasetKey: "50c9509d-22c7-4a22-a47d-8c48425ef4a7"
    publishingOrgKey: "28eb1a3f-1c15-4a95-931a-4af90ecb574d"
    publishingCountry: "US"
    protocol: "DWC_ARCHIVE"
    lastCrawled: "2017-09-08T08:17:04.867+0000"
    lastParsed: "2017-04-21T14:55:11.802+0000"
    crawlId: 82
    extensions:
    basisOfRecord: "HUMAN_OBSERVATION"
    taxonKey: 2435099
    kingdomKey: 1
    phylumKey: 44
    classKey: 359
    orderKey: 732
    familyKey: 9703
    genusKey: 2435098
    speciesKey: 2435099
    scientificName: "Puma concolor (Linnaeus, 1771)"
    kingdom: "Animalia"
    phylum: "Chordata"
    order: "Carnivora"
    family: "Felidae"
    genus: "Puma"
    species: "Puma concolor"
    genericName: "Puma"
    specificEpithet: "concolor"
    taxonRank: "SPECIES"
    dateIdentified: "2017-01-24T23:07:53.000+0000"
```

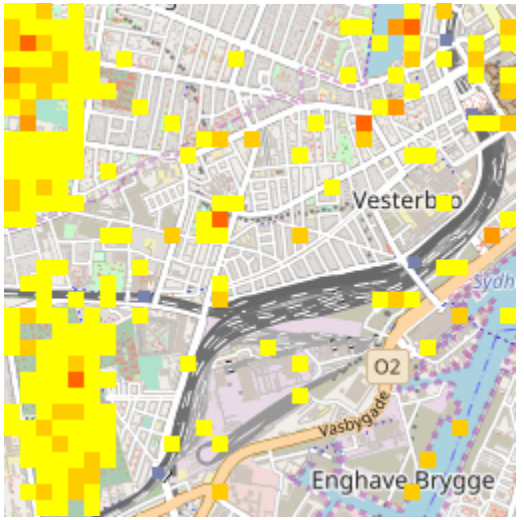
MAP API EXAMPLE

http://api.gbif.org/v1/map/density/tile?x=4381&y=2564&z=13

http://tile.openstreetmap.org/7/63/42.png





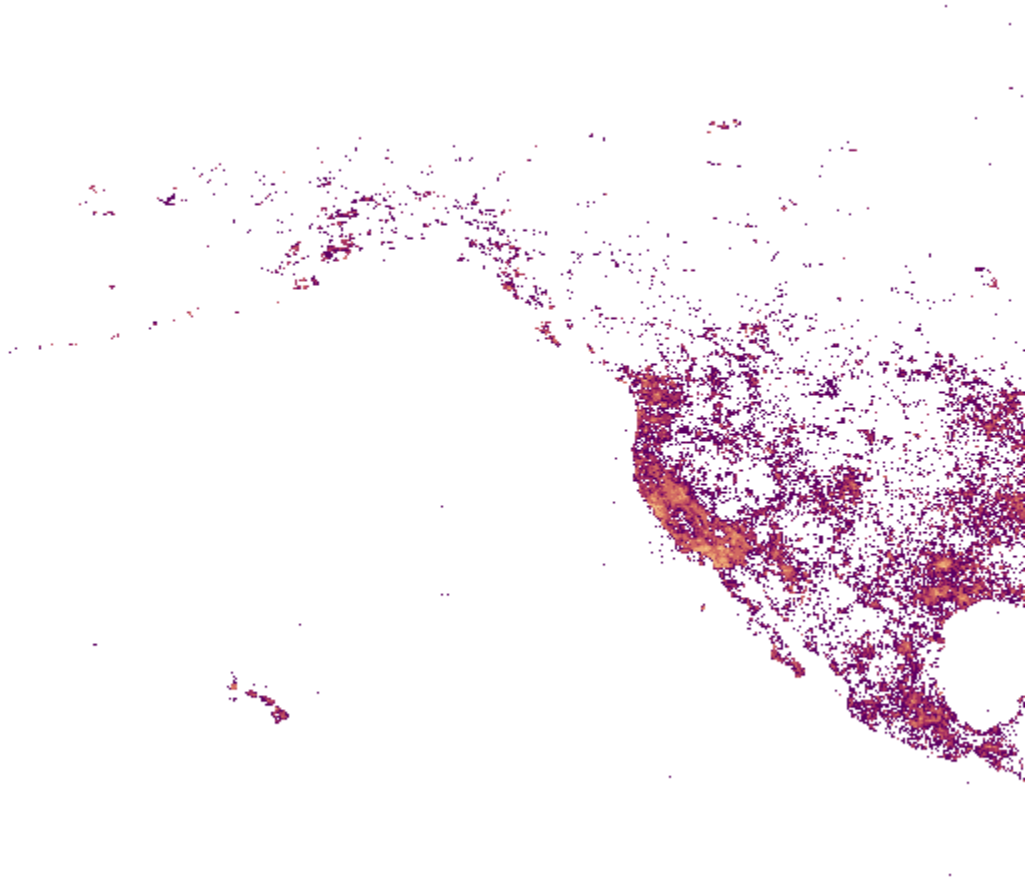


http://api.gbif.org/v1/map/density/tile?x=4381&y=2564&z=13&resolution=8

MAP API CURRENTLY BEING ENHANCED

https://api.gbif.org/v2/map/occurrence/density/1/0/0@1x.png?srs=EPSG:4326&style=purpleYellow.point&year=2010,2017&taxonKey=6

Plants in western portions of North America



API CLIENTS

Java Clients in GBIF GitHub repositories

- https://github.com/gbif

R Client run by ROpenScience

- https://github.com/ropensci/rgbif/

Python client by ROpenScience

- https://pypi.python.org/pypi/pygbif

Most integrators use HTTP natively

- Documentation on https://www.gbif.org/developer

Thank you