

Species  
2000



**Catalogue of Life**  
indexing the world's known species



# The Catalogue of Life: Infrastructure for Science

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<http://www.catalogueoflife.org/>

<http://www.itis.gov/>



First, a little more about ITIS...





## ITIS Goal

**Create an easily accessible database with reliable information  
on species names and their hierarchical classification**



## What is ITIS?

- Partnership
  - federal partnership with state, private, academic, international cooperators
  - taxonomic experts, compilers
  - stable base funding





## ITIS Partners





## ITIS Key Components

- Standard taxonomic reference tool
  - dynamic standardized database of biological names & related data (over **840,000** names)
  - accepted scientific names (single “best” name) in a classification, with synonyms, and common names
  - on-line lookup, downloads
  - seven kingdom coverage
  - regional and global checklists
  - Monthly updates, full database download, services



## ITIS Key Components

- **Taxonomic Serial Number (TSN) - unique for each scientific name**
  - **facilitates machine to machine - the TSN is a non-intelligent, unique and stable (more on this later!)**
- **Codes of Nomenclature dictate ITIS business rules**
- **rigorous proofing protocols and verification**
- **bibliographic/expert link**
  - **steward program insures scientific credibility**
- **working tools - Work Bench, TaxCompare, queries**



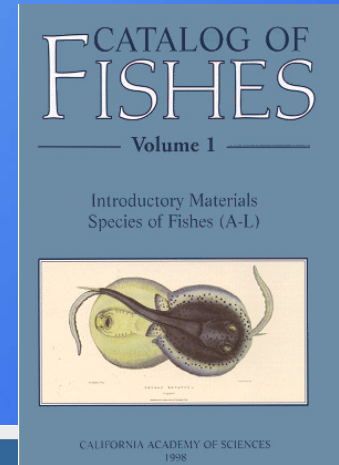
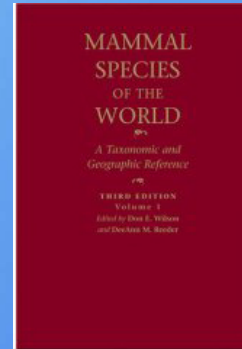
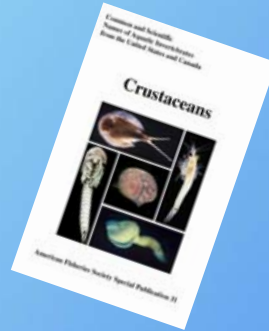
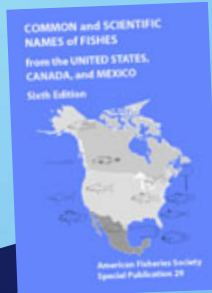
## ITIS Value to User Community

- Whom do we serve?
  - national and international
  - resource managers, scientists, biodiversity specialists, museum collections staff, librarians, park naturalists, students, editors...
  - bridge gap between systematics community and users – NSF cooperation
  - the public = access to our systematic opinions
  - GGI, EOL, BHL, CBOL, NCBI, GBIF...





# ITIS Data Sources



Journal information: **ZOOTAXA** 2007 (174), 1-25

**Tardigrade taxonomy: an updated check list of the taxa and a list of characters for their identification**

ROBERTO GUIDETTI & ROBERTO BERICLANI  
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**Abstract**

Since the most recent monograph on Tardigrada by Renaudelli & Micali (1983), many changes have been introduced in the systematics of this phylum which has gone through different revisions and has been expanded by several new taxa. Moreover, the number of species is consistently increased (almost doubled to more than 500 species) and new families and genera have been created, while many taxa have been amended. The difficulty in finding a complete, updated list of taxa and the problems with putting together all the newly proposed taxonomic criteria, led us to compile an updated list of Tardigrada taxa. This list is supplemented by a series of bibliographic references relevant to the nomenclature and/or the amended diagnosis of the taxa occurred after 1983, and a list of the main characters used in the diagnosis of the species. These lists are aimed at helping not only the specialists studying this group, but also researchers interested in biodiversity and those who have to refer to this animal group.

**Key words:** Tardigrada, systematics, check list, taxonomic criteria

Accepted by C.W. Beal: 12 Jan. 2007; published: 1 Feb. 2007

CALIFORNIA ACADEMY OF SCIENCES  
**ICHTHYOLOGY**  
Catalog of Fishes | Introduction | Checklist | Primary Types | Images | Collection Database | About the Department | Staff | Newsletter | Systematic Ichthyology | Funding Opportunities

California Academy of Sciences > Research > Ichthyology > Catalog of Fishes

On-Line Version, Updated April 17, 2006

Search the On-Line Catalog | About the On-Line Catalog | Introduction & Acknowledgements | Collection Abbreviations | Browse the Classifications | Lists | Determination on Searching for Species | Introduction on Searching for Genera | Determination on Searching for Extinction Check | About the User Interface | Table of Contents | Examples of Volume Entries | Order Form

**THE Catalog of Fishes ON-LINE**

Select the Database to search:  
 GENERA  SPECIES  REFERENCES

Comments: William Eschmeyer

**Search instructions:**  
 A search expression can be specified as:  
 • A single search term  
   > a word  
   > a phrase (multiple words) enclosed in double quotes - ["Jordan & Evermann"]  
   > a partial word or phrase enclosed in double quotes (" and ending with an asterisk (\*) - ["Hirsh\*"]  
 • Two (or more) search terms joined by one of three logical operators: ( and | or ) and not )  
 Terms can be grouped by using parentheses - see examples below.

Some examples of search expressions and the number of hits when that query is issued against the indicated database

Example of search	Search Expression	Database	Hits
single word	Balno	Genera	76
phrase	"Albi or Albulus ruber"	Species	1
	"Sphenops of Albulus ruber"	Species	21
	"Cernans sp"	Species	33
> and <	Cuvier or Valenciennes	References	51
> or <	Cuvier or Valenciennes	References	225
> and not <	Cuvier and Balno or Albulus sp	References	195

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# Solr Services



Home

About  
ITIS

Data  
Access  
and Tools

Get ITIS  
Data

Submit  
and  
Update  
Data

## ITIS Solr Web Services

The base URL for the ITIS Solr index based web service is: [http://services.itis.gov?q=\\*](http://services.itis.gov?q=*) where the initial query is a field in Solr and a value for it separated by a colon, such as: <http://services.itis.gov?q=tsn:182662>

ITIS is currently using Apache Solr Vers. 5.4. Output from ITIS Solr is available in XML (default), CSV, JSON, JS. For example, add "&wt=json" to the end of the query string to get JSON output returned like this <http://services.itis.gov?q=tsn:182662&wt=json>. [The Apache Solr Reference Guide](#) can be quite helpful in generating queries and using their output. It is also helpful in elucidating the finer points of field definitions and validation rules.

We've included some [ITIS Solr Web Service examples here](#).

### Tips for Using the ITIS Solr Index

**Regular Expressions.** ITIS Solr supports regular expressions. For example:

- [http://services.itis.gov?q=nameWolnd:/A-Za-z0-9\]\\*%20{0,0}\\*/](http://services.itis.gov?q=nameWolnd:/A-Za-z0-9]*%20{0,0}*/) - matches only monomials
- [http://services.itis.gov?q=nameWolnd:/A-Za-z0-9\]\\*%20{1,1}A-Za-z0-9\]\\*](http://services.itis.gov?q=nameWolnd:/A-Za-z0-9]*%20{1,1}A-Za-z0-9]*) - matches only binomials
- [http://services.itis.gov?q=nameWolnd:/A-Za-z0-9\]\\*%20{1,1}A-Za-z0-9\]\\*%20{1,1}A-Za-z0-9\]\\*](http://services.itis.gov?q=nameWolnd:/A-Za-z0-9]*%20{1,1}A-Za-z0-9]*%20{1,1}A-Za-z0-9]*) - matches only trinomial
- [http://services.itis.gov?q=nameWolnd:/A-Za-z0-9\]\\*%20{1,1}A-Za-z0-9\]\\*%20{0,1}A-Za-z0-9\]\\*](http://services.itis.gov?q=nameWolnd:/A-Za-z0-9]*%20{1,1}A-Za-z0-9]*%20{0,1}A-Za-z0-9]*) - matches only tetramomials

**Facets and Pivot Facets.** ITIS Solr supports simple and complex facets. For example, to get a list of the number of species by kingdom use: <http://services.itis.gov?q=rank:Species&rows=0&facet=true&facet.field=kingdom> If Solr will return a sample of full records along with the facet. You can also do complex facets called pivot facet full list of all valid species of birds with their common names use: [http://services.itis.gov?q=hierarchySoFar:rank:Species\\_AND\\_usage.valid&facet=true&facet.pivot=nameWolnd.vernacular&facet.limit=-1&facet.mincount=1](http://services.itis.gov?q=hierarchySoFar:rank:Species_AND_usage.valid&facet=true&facet.pivot=nameWolnd.vernacular&facet.limit=-1&facet.mincount=1) Facets are very computationally intensive, and therefore very slow, so please be considerate and conservative.

**Using JSONP.** ITIS Solr supports JSONP. In addition to supporting JSON output using "wt=json" alone, ITIS Solr also supports padded/wrapped JSON inside of any variable name that you choose (up to 30 characters) using "wt=json&varname=whateverNameYouWant". This means that you can call data from ITIS and display it directly in your web page without having to manipulate it on the server, and without violating the cross-origin policy for javascript. Please see the examples.

**Fuzzy Matching.** ITIS Solr supports customizable fuzzy matching. Use a tilde along with a value between 0 and 1 to indicate the level of fuzziness. For example: <http://services.itis.gov?q=nameWolnd:Liquidambar%20styraciflua~0.4> will match *Liquidambar styraciflua*.

**Escaping spaces and percent encoding in query strings.** Because you cannot always be sure how a browser will interpret strings with spaces, it is good practice to both escape and percent encode spaces in queries for strings that have spaces. For example: <http://services.itis.gov?q=nameWolnd:Poa%20annua>.

### Field Descriptions

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  <int name="QTime">0</int>
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  <str name="unit2">alalunga</str>
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    (Thunnus)$Thunnus alalunga$
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</arr>
- <arr name="hierarchySoFarWRanks">
  - <str>
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    (Thunnus)$Species:Thunnus alalunga$
  </str>
</arr>
- <arr name="hierarchyTSN">
  - <str>
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A combined effort

Species 2000 and ITIS  
*Catalogue of Life*  
Partnership

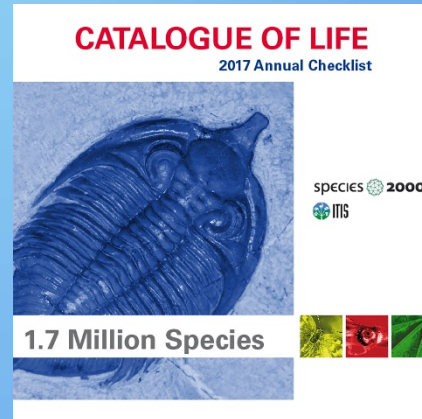






# Species 2000 and ITIS *Catalogue of Life*

Annual CD-ROM



Dynamic Checklist [ww.catalogueoflife.org/](http://www.catalogueoflife.org/)

Species 2000  
ITIS

Catalogue of Life: 29th May 2017  
indexing the world's known species

English French Spanish Chinese Russian Portuguese Dutch German Polish Lithuanian Thai  
Vietnamese

Browse Search Info

Search the **Catalogue of Life** - updated edition around the year

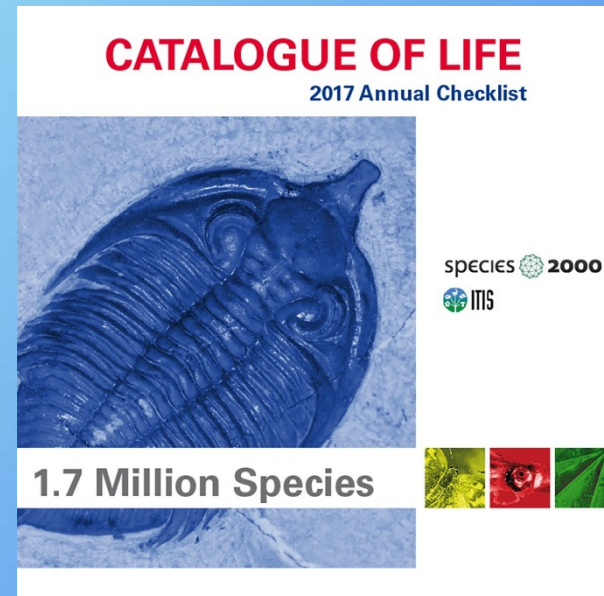
Search for:

Show extinct taxa (+)  
 Match whole words only

Search

Annual Checklist Interface v1.9 r2126ab0 developed by Naturalis Biodiversity Center. Please note, this site uses [cookies](#). If you continue to use the site we will assume that you agree with this.



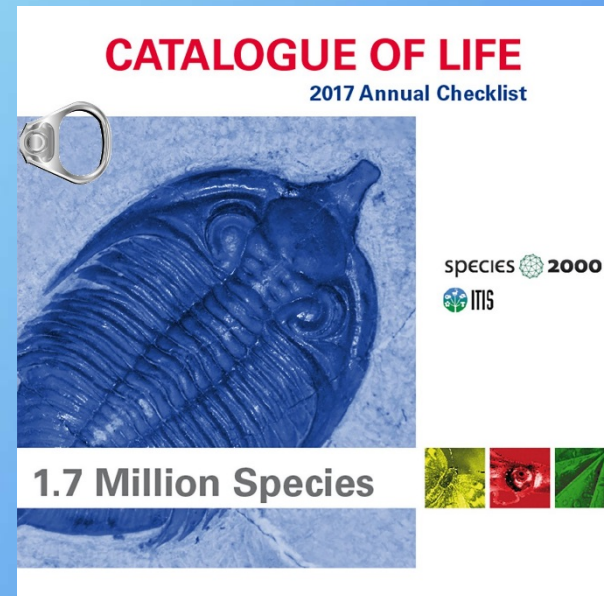


The Catalogue of Life is an expert (taxonomist) knowledge-base composed of global species datasets (GSDs) that cover most of described life.



WHO?





What is the relationship between the Objective and Subjective ?  
What is the relationship between Nomenclature and Taxonomy?



# Nomenclature

Original usages/combinations

Subsequent combinations  
(homotypic synonyms)

Objective (code-governed)  
heterotypic synonyms

Spelling variations

Links to literature

**Objective:**  
facts based  
on rules  
(taxonomic  
codes) and  
evidence





# Taxonomy

Catalogs of taxa

Subjective assertions of  
heterotypic synonyms

Higher (above genus)  
classifications

Phylogeny

**Subjective:**  
opinions based  
on evidence





Prokaryotic Nomenclature Up-to-Date

Genus: **Macrococcus**

Species: **in total: 7** [show all details](#)

bovicus  
brunensis

carouselicus  
caseolyticus

Name: ***Macrococcus caseolyticus***

Authors: (Schleifer et al. 1982) Kloos et al. 1998

Status: comb. nov. (VP)

Reference: Int. J. Syst. Bacteriol. 48:871\* [[Literature](#)]

Type strain: ATCC 13548, DSM 20597

Synonym(s): *Staphylococcus caseolyticus* (basonym)

If one of the synonyms is linked this will take you to the *correct name* used by the DSMZ

more information: [LPSN \(J.P. Euzéby/A.C. Parte\)](#)

Names strings to  
nomenclature

Nomenclature







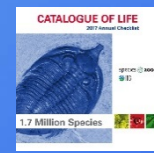


**Browse taxonomic tree**

Show statistics  Show providers  Show extinct taxa (\*)

- ▾ Animalia
- ▾ Archaea
- ▾ Bacteria
  - ▾ Phylum Acidobacteria
  - ▾ Phylum Actinobacteria
  - ▾ Phylum Firmicutes
    - ▾ Class Bacilli
      - ▾ Order Bacillales
        - ▾ Family Alicyclobacillaceae
        - ▾ Family Bacillaceae
        - ▾ Family Listeriaceae
        - ▾ Family Paenibacillaceae
        - ▾ Family Pasteuriaceae
        - ▾ Family Planococcaceae
        - ▾ Family Sporolactobacillaceae
        - ▾ Family Staphylococcaceae
          - ▾ Genus *Jeotgalicoccus*
          - ▾ Genus *Macroccoccus*
            - Macroccoccus bovicus*
            - Macroccoccus brunensis*
            - Macroccoccus caruselicus*
            - Macroccoccus caseolyticus*
            - Macroccoccus equiperlicus*

# Taxonomy



Genus	Species	Authority	Year	Country
<i>Macroccoccus</i>	<i>Macroccoccus brunensis</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus bovicus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus equiperlicus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus caseolyticus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus caruselicus</i>	Stroobants & Barmann	2008	South Africa

# Nomenclature

Genus	Species	Authority	Year	Country
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<i>Macroccoccus</i>	<i>Macroccoccus bovicus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus equiperlicus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus caseolyticus</i>	Stroobants & Barmann	2008	South Africa
<i>Macroccoccus</i>	<i>Macroccoccus caruselicus</i>	Stroobants & Barmann	2008	South Africa

<http://www.catalogueoflife.org/>

**Name Strings**

<http://www.itis.gov/>

English French Spanish Chinese Russian Portuguese Dutch German Polish Lithuanian Thai Vietnamese

Browse Search Info


Browse taxonomic tree

Show statistics Show providers Show extinct taxa (\*)

- Animalia
- Archaea
- Bacteria
  - Phylum Acidobacteria
  - Phylum Actinobacteria
  - Phylum Firmicutes
    - Class Bacilli
      - Order Bacillales
        - Family Alicyclobacillaceae
        - Family Bacillaceae
        - Family Listeriaceae
        - Family Paenibacillaceae
        - Family Pasteuriaceae
        - Family Planococcaceae
        - Family Sporolactobacillaceae
        - Family Staphylococcaceae
          - Genus *Jeotgalicoccus*
          - Genus *Macrococcus*
            - Macrococcus bovicus*
            - Macrococcus brunensis*
            - Macrococcus caruselicus*
            - Macrococcus caseolyticus*
            - Macrococcus equiperlicus*

- Browse
- Search
- Info

Species Details : *Macrococcus caseolyticus* (Schleifer et al., 1982) Kloos et al., 1998



Accepted scientific name: *Macrococcus caseolyticus* (Schleifer et al., 1982) Kloos et al., 1998 (accepted name)

Synonyms: *Staphylococcus caseolyticus* Schleifer et al., 1982 (synonym)

Common names: -

Kingdom	Bacteria	CoL	LSID
Phylum	Firmicutes	CoL	LSID
Class	Bacilli	CoL	LSID
Order	Bacillales	CoL	LSID
Family	Staphylococcaceae	CoL	LSID
Genus	<i>Macrococcus</i>	CoL	LSID

Distribution: -  
 Environment: -  
 Additional data: -

Latest taxonomic scrutiny: 02-Mar-2015

Source database: ITIS Global, Apr 2016 99% ★★★★★

Bibliographic citation: Orrell T. (custodian) (2017). ITIS Global: The Integrated Taxonomic Information System (version Apr 2016). In: Roskov Y., Abucay L., Orrell T., Nicolson D., Bailly N., Kirk P.M., Bourgoin T., DeWalt R.E., Decock W., De Wever A., Nieukerken E. van, Zarucchi J., Penev L., eds. (2017). Species 2000 & ITIS Catalogue of Life, 22nd March 2017. Digital resource at [www.catalogueoflife.org/col](http://www.catalogueoflife.org/col). Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-8858.

Online resource: [http://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=963080](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=963080)



ITIS Global: The Integrated Taxonomic Information System (version Apr 2016)

Species: *Macrococcus caseolyticus*

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Order	Bacillales	CoL	LSID
Family	Staphylococcaceae	CoL	LSID
Genus	<i>Macrococcus</i>	CoL	LSID

Distribution: -  
 Environment: -  
 Additional data: -

Latest taxonomic scrutiny: 02-Mar-2015

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Nomenclature

ITIS Global: The Integrated Taxonomic Information System (version Apr 2016)

Species: *Macrococcus caseolyticus*

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Classification:

Kingdom	Bacteria	CoL	LSID
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Order	Bacillales	CoL	LSID
Family	Staphylococcaceae	CoL	LSID
Genus	<i>Macrococcus</i>	CoL	LSID

Distribution: -  
 Environment: -  
 Additional data: -

Latest taxonomic scrutiny: 02-Mar-2015

Source database: ITIS Global, Apr 2016 99% ★★★★★

Bibliographic citation: Orrell T. (custodian) (2017). ITIS Global: The Integrated Taxonomic Information System (version Apr 2016). In: Roskov Y., Abucay L., Orrell T., Nicolson D., Bailly N., Kirk P.M., Bourgoin T., DeWalt R.E., Decock W., De Wever A., Nieukerken E. van, Zarucchi J., Penev L., eds. (2017). Species 2000 & ITIS Catalogue of Life, 22nd March 2017. Digital resource at [www.catalogueoflife.org/col](http://www.catalogueoflife.org/col). Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-8858.

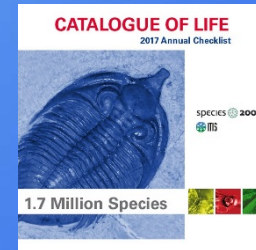
Online resource: [http://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=963080](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=963080)



Hey CoL, is this the correct name for this taxon?



Sorry GBIF, I've never heard of that taxon name.



# Why a Catalogue of Life Plus?



Recently, we analyzed many cases on how the Catalogue of Life is used by individuals and initiatives. The majority of these cases analyzed did not find all of the content in from CoL to meet the user's programmatic needs.

*Why?* Although the CoL is the most comprehensive compellation of Life, there remains:

- 1) Known GAPS of Taxonomic Groups
- 2) Missing content in currently covered Taxonomic Groups
  - Synonyms
  - Subsequent combinations
  - Orthographic variants





A new system and approach is needed that retains the Catalogue of Life as the expert knowledge base as the primary product

### Key Features:

- Broaden names coverage through homotypic synonyms & expanded editorial human resources
- Enable stable names and taxon identifiers
- Annotations & feedback

Increase the efficiency of those providing GSDs by:

- Expanding the curation of facts
- Making fact checking work of the GSDs more efficient
  - Allowing taxonomists to focus on taxonomy
- Expanding the utility of their work



**Plants**  
(IPNI)

**Zoology**  
(ICZN/  
GNUB)

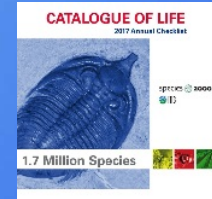
**Bacteria**  
(DSMZ/  
LPSN)

Examples of  
other sources of  
nomenclatural  
data

**Fungi**  
(Index Fungorum)

**Compilation**  
(GNI)

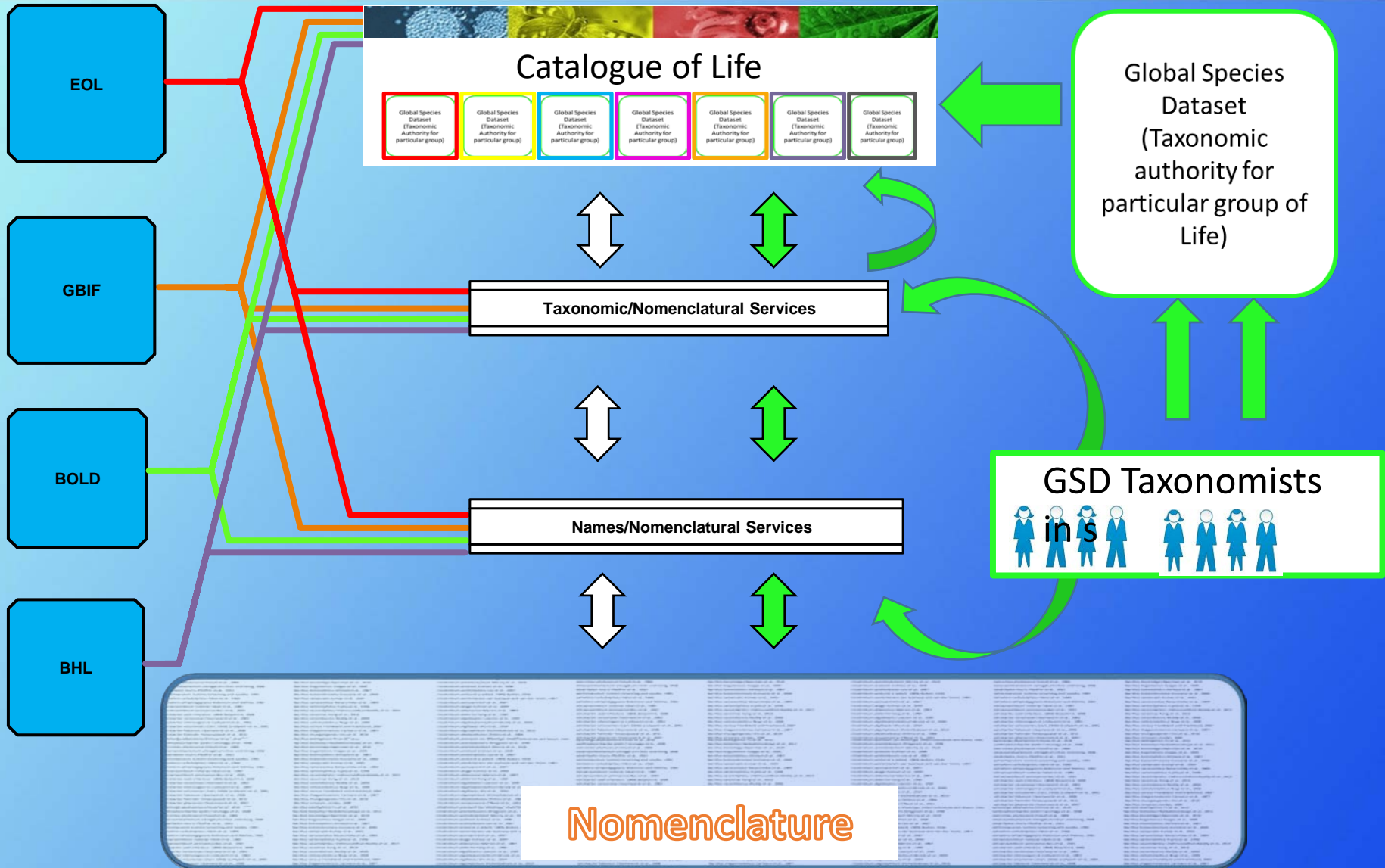
**Compilation**  
(GBIF GUB)

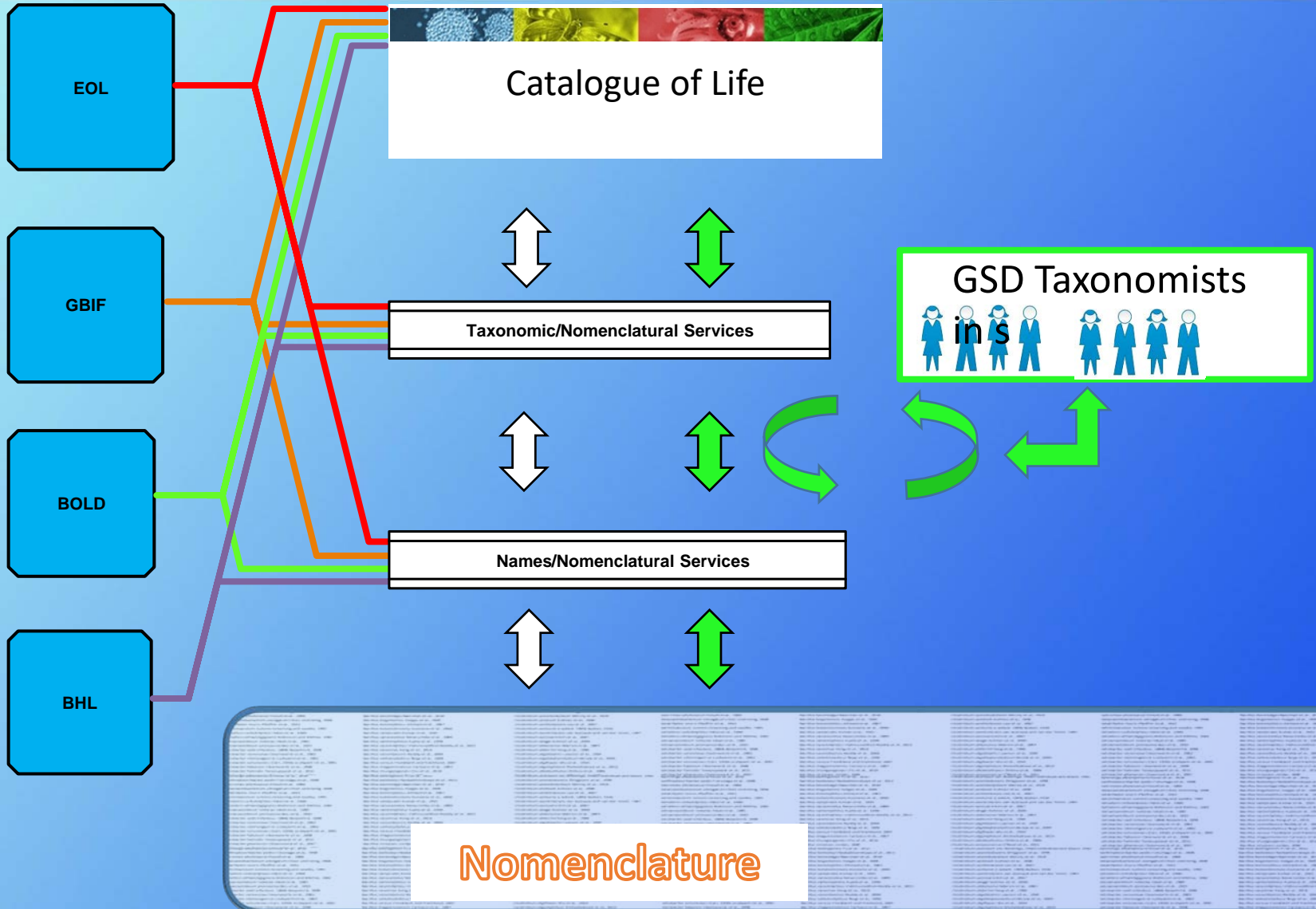


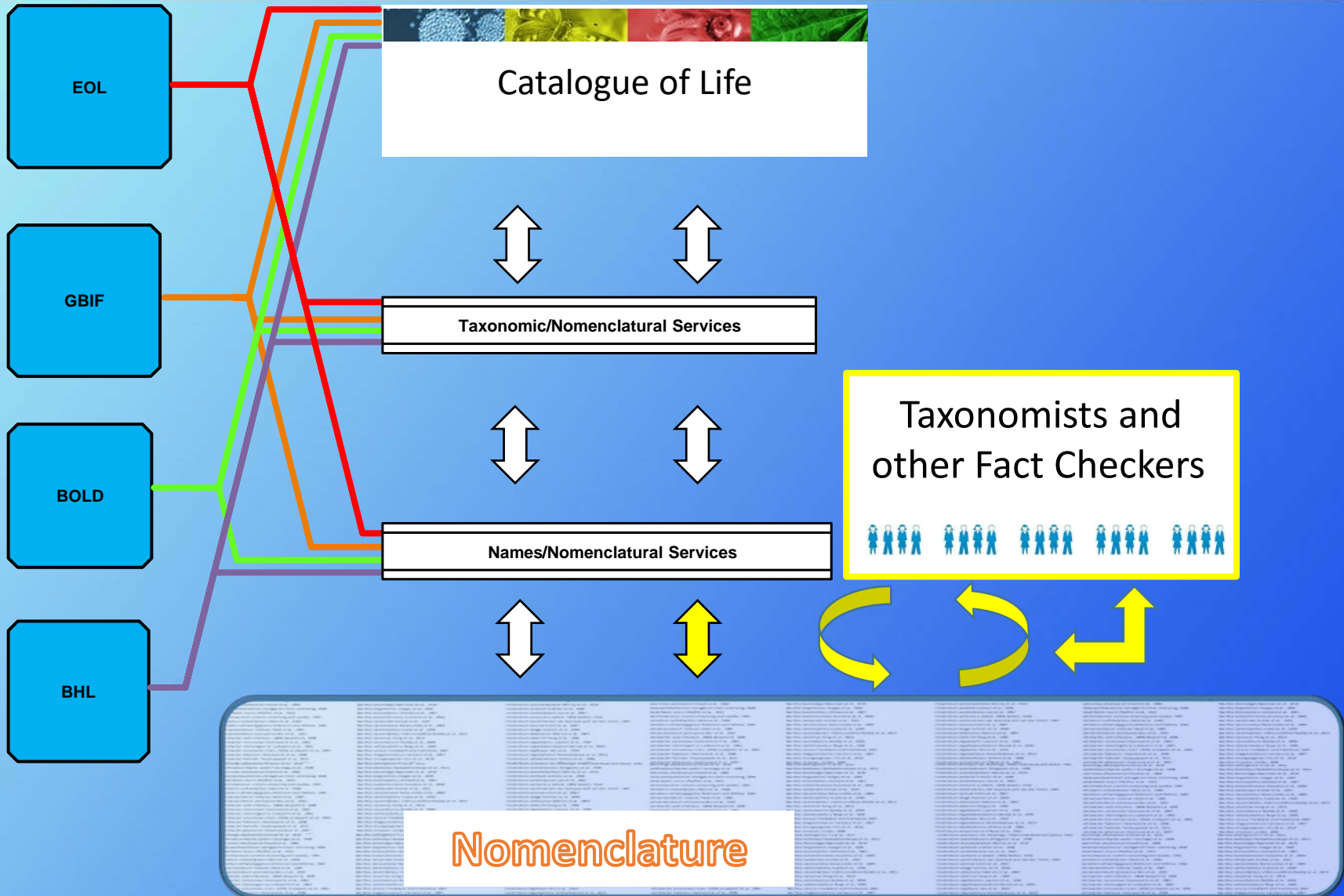




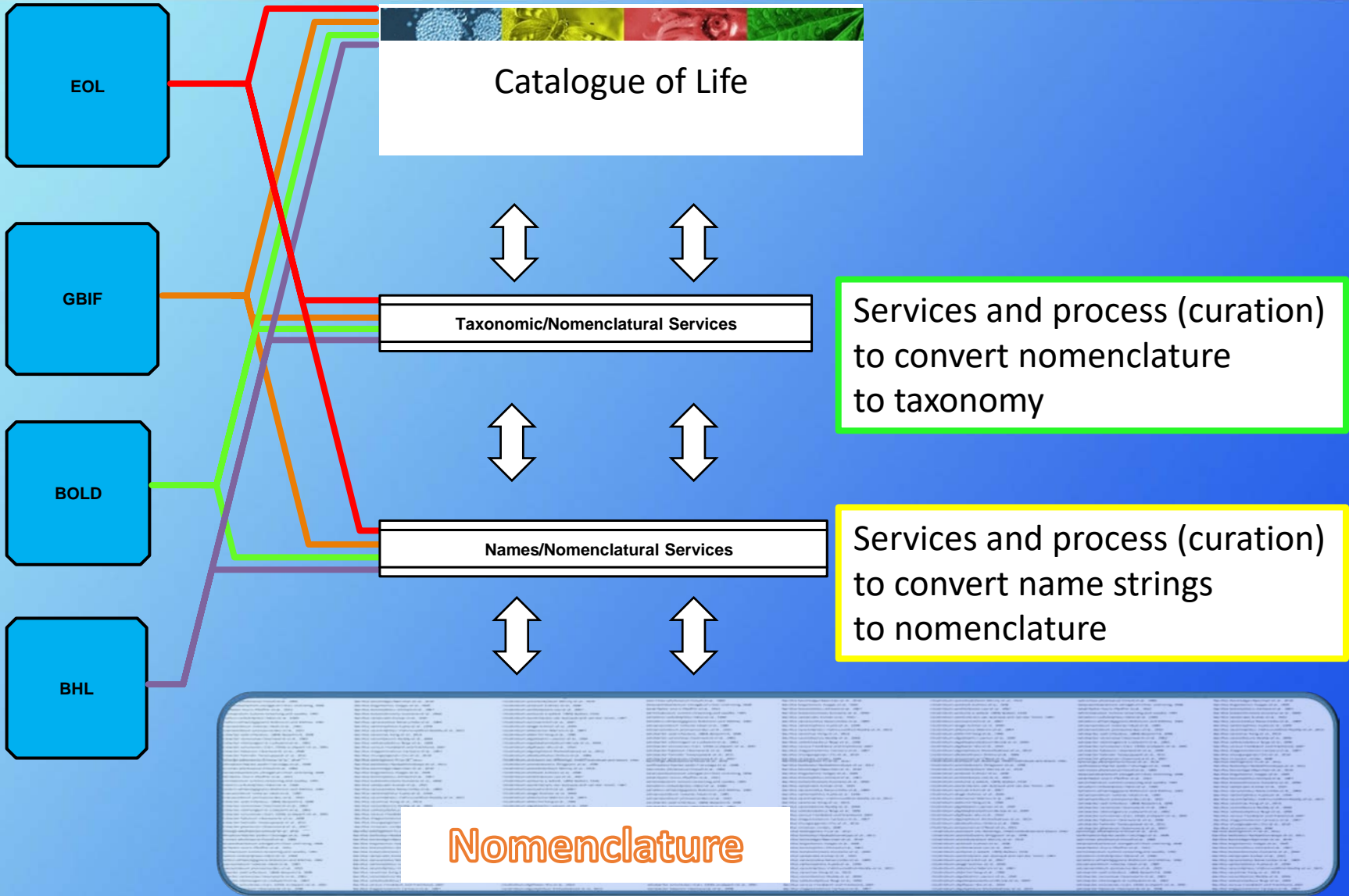












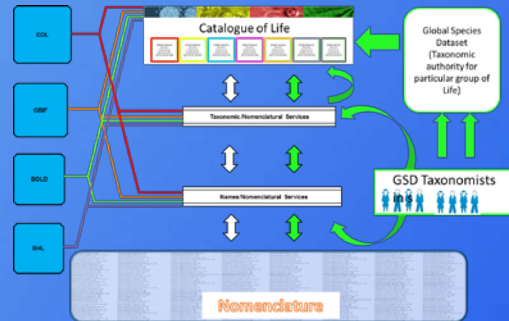




Hey CoL, is this correct name for this taxon?



No, that is not the current name for that taxon, please use...



# Why a Catalogue of Life Plus?



# Why a Catalogue of Life Plus?

## *Without taxonomy, it isn't biology*

A robust (more complete), Catalogue of Life is infrastructure for science because:

- It increases precision of searches and organization of information
- It increases the exchange of knowledge
- It is a link between the past and the future