PharmaSUG Japan: CDISC Library Update

Presented by CDISC Data Science Team
October 24, 2019

Agenda

1. CDISC Library High-Level Technical Overview
2. CDISC Library Demo

CDISC Library High-Level Technical Overview

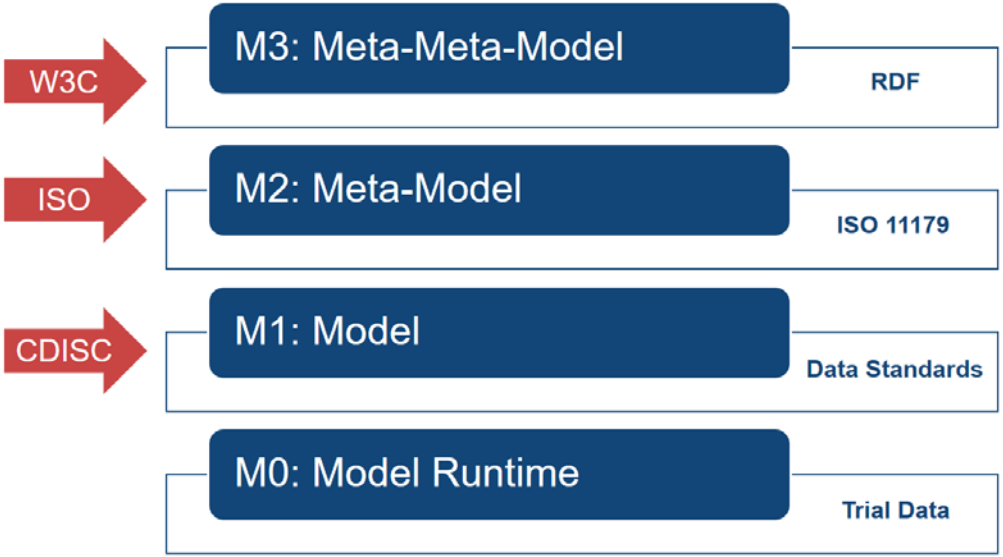
Technology Snapshot

cdisc LIBRARY
formerly SHARE

CDISC Library, ar chitecture using the
Resource Descrip deliver CDISC
standards metada ocesses.

CDISC Library pr d CDISC standards and
controlled terminc lards. CDISC Library is
the single, trustec esents a new way of
creating, maintair

In non-technical t ptive for the future. It
will continue to pr al needs.

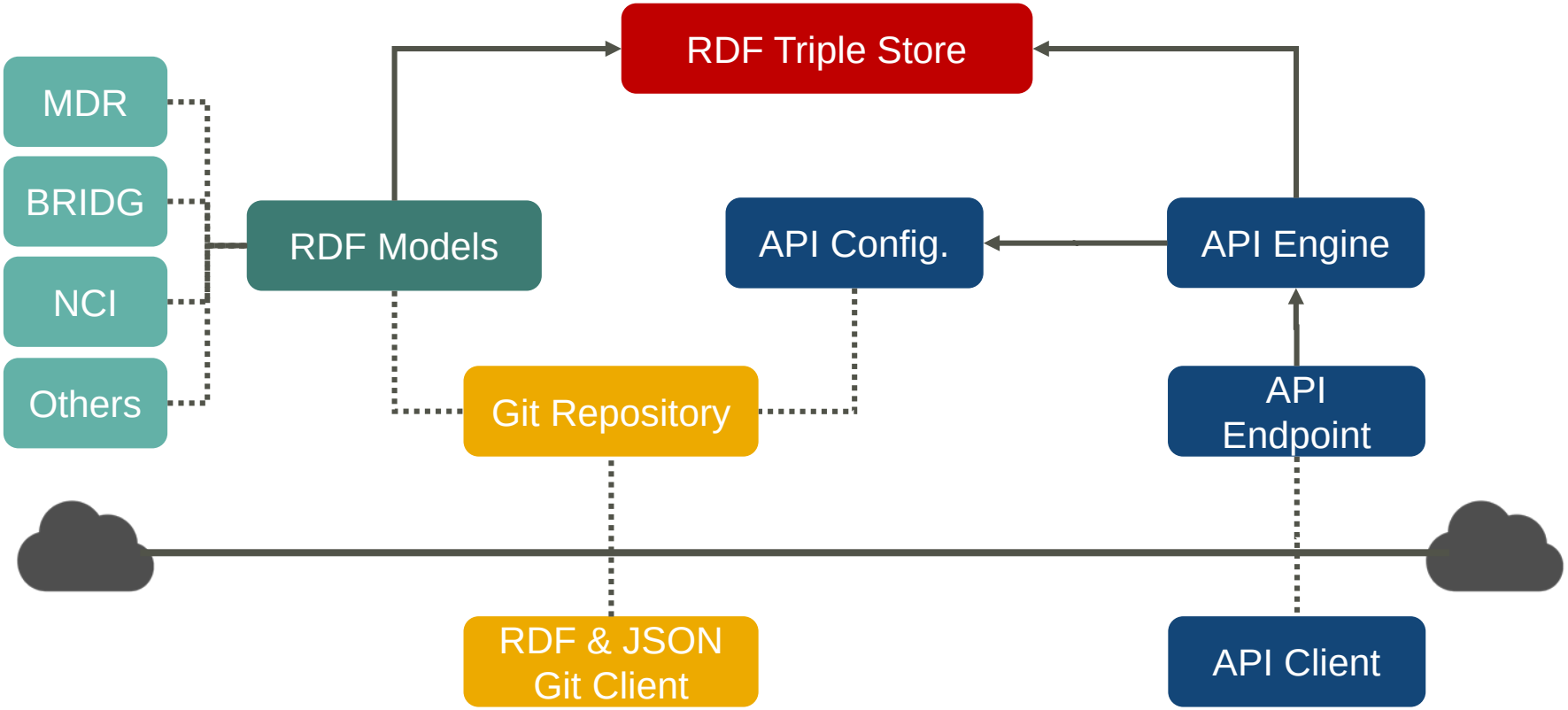


Accessibility Possibilities

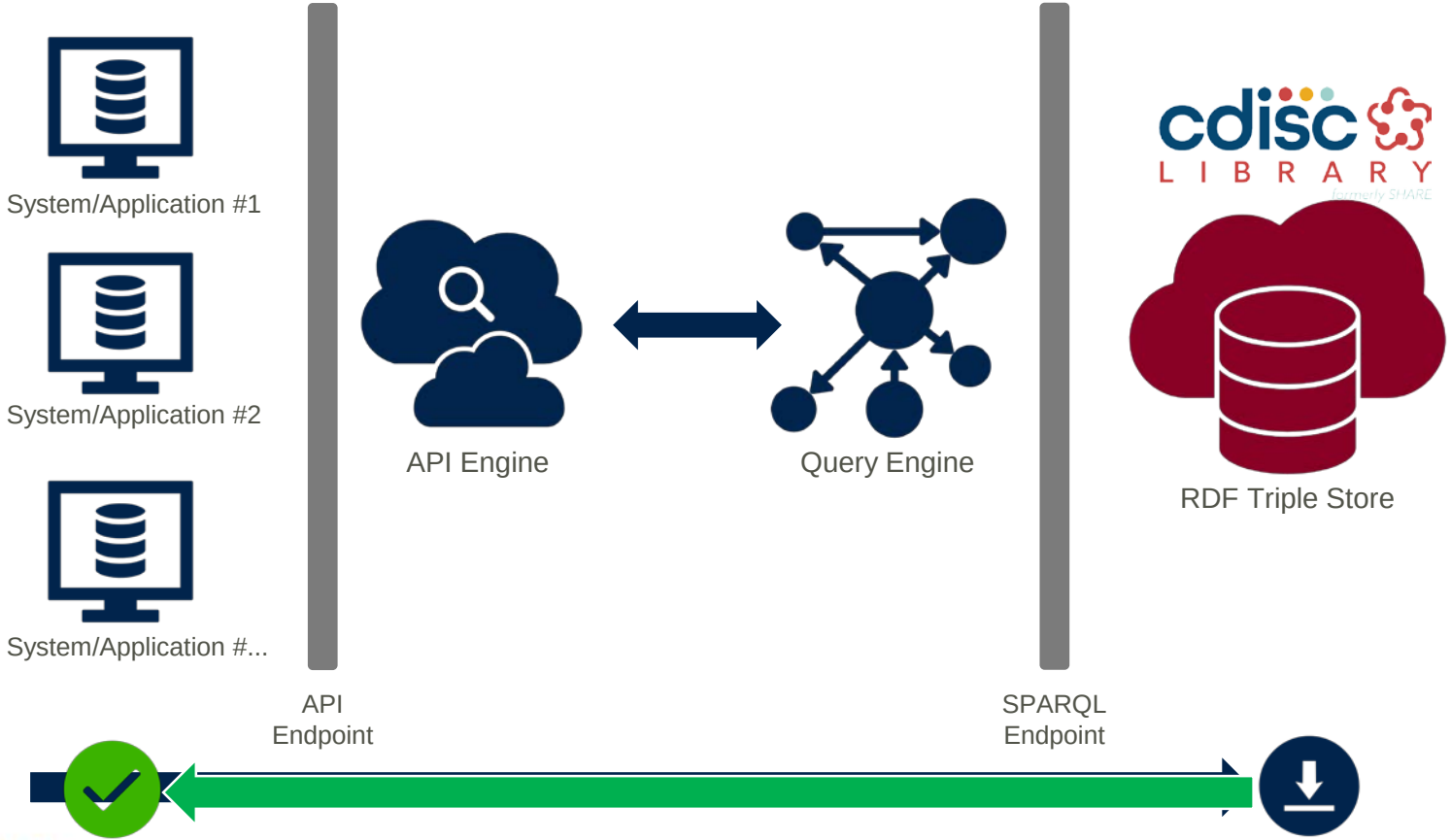
cdisc LIBRARY
formerly SHARE

API & UI

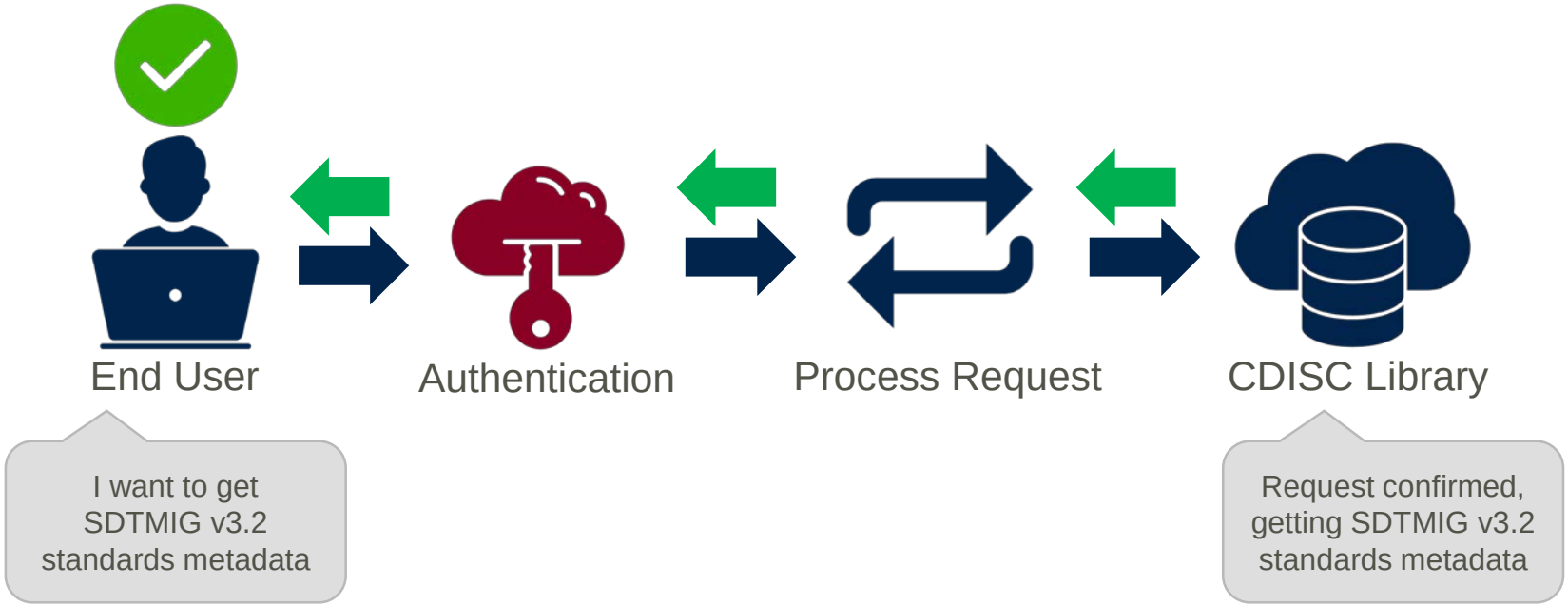
API System Diagram



API Access Overview



API Access Overview (cont.)

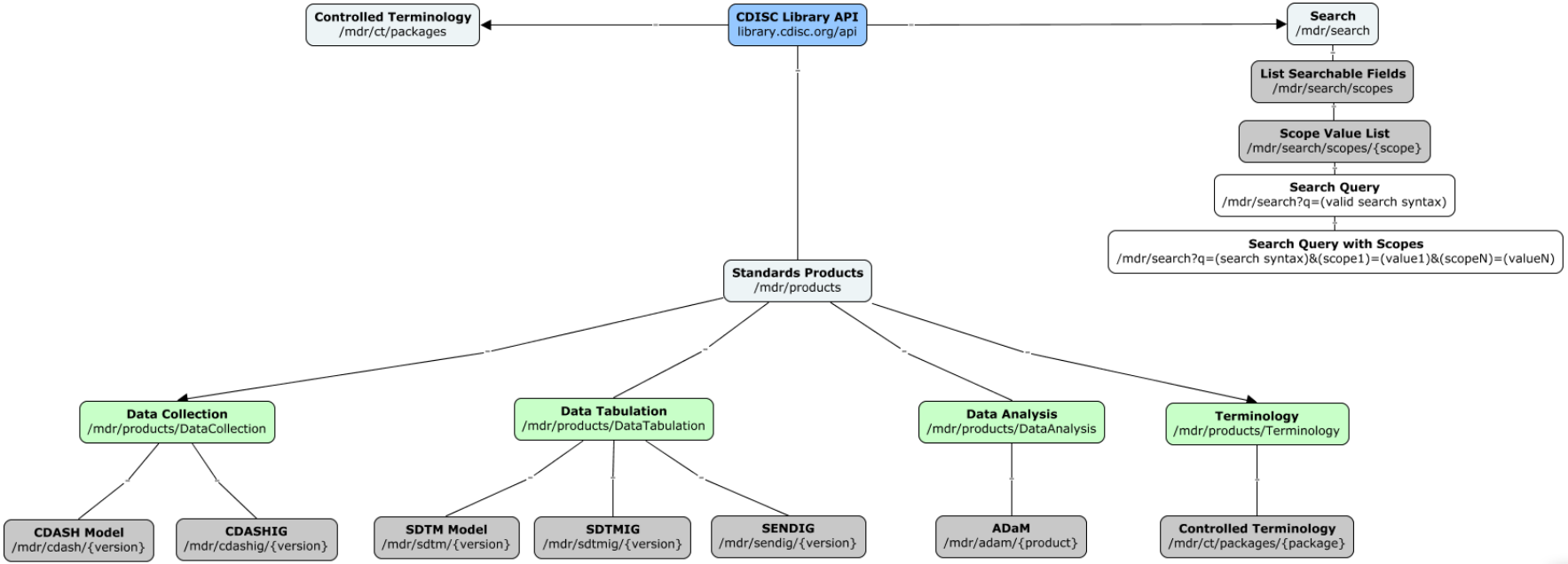


API Endpoint's

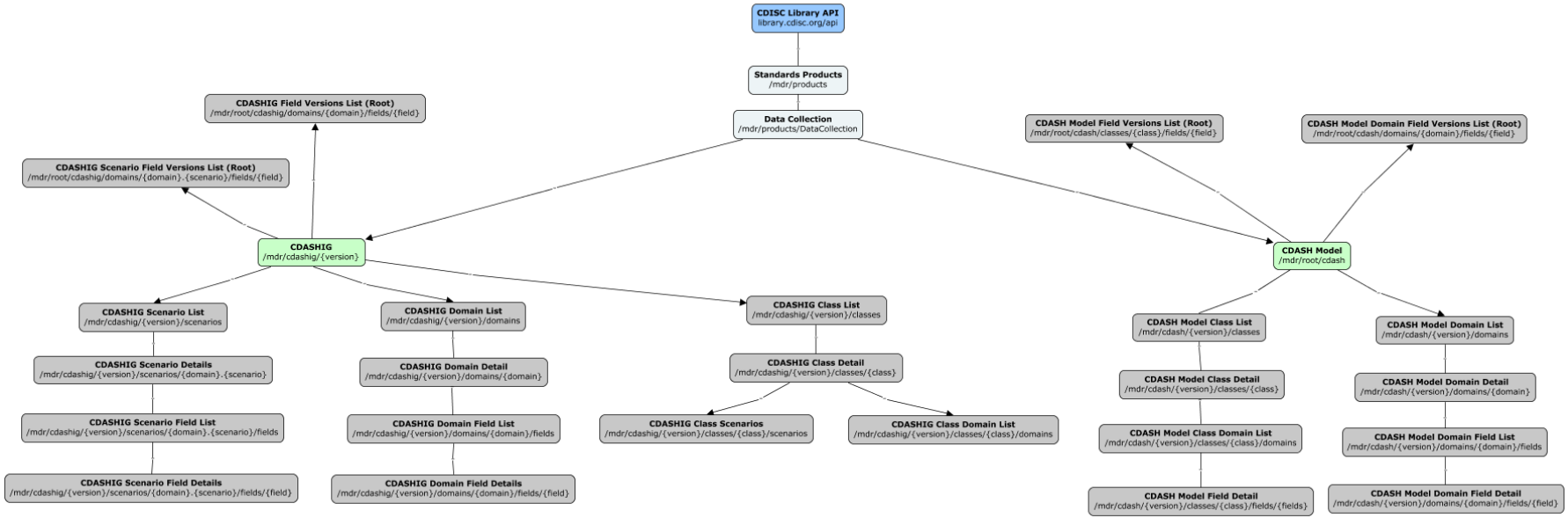
SDTM Implementation Guide (SDTMIG)

GET	/mdr/sdtmig/{version}	Get SDTMIG Product
GET	/mdr/sdtmig/{version}/classes	Get SDTMIG Class List
GET	/mdr/sdtmig/{version}/classes/{class}	Get SDTMIG Class
GET	/mdr/sdtmig/{version}/classes/{class}/datasets	Get SDTMIG Class Dataset List
GET	/mdr/sdtmig/{version}/datasets	Get SDTMIG Dataset List
GET	/mdr/sdtmig/{version}/datasets/{dataset}	Get SDTMIG Dataset
GET	/mdr/sdtmig/{version}/datasets/{dataset}/variables	Get SDTMIG Dataset Variable List
GET	/mdr/sdtmig/{version}/datasets/{dataset}/variables/{var}	Get SDTMIG Dataset Variable
GET	/mdr/root/sdtmig/datasets/{dataset}/variables/{var}	Get Root SDTMIG Dataset Variable

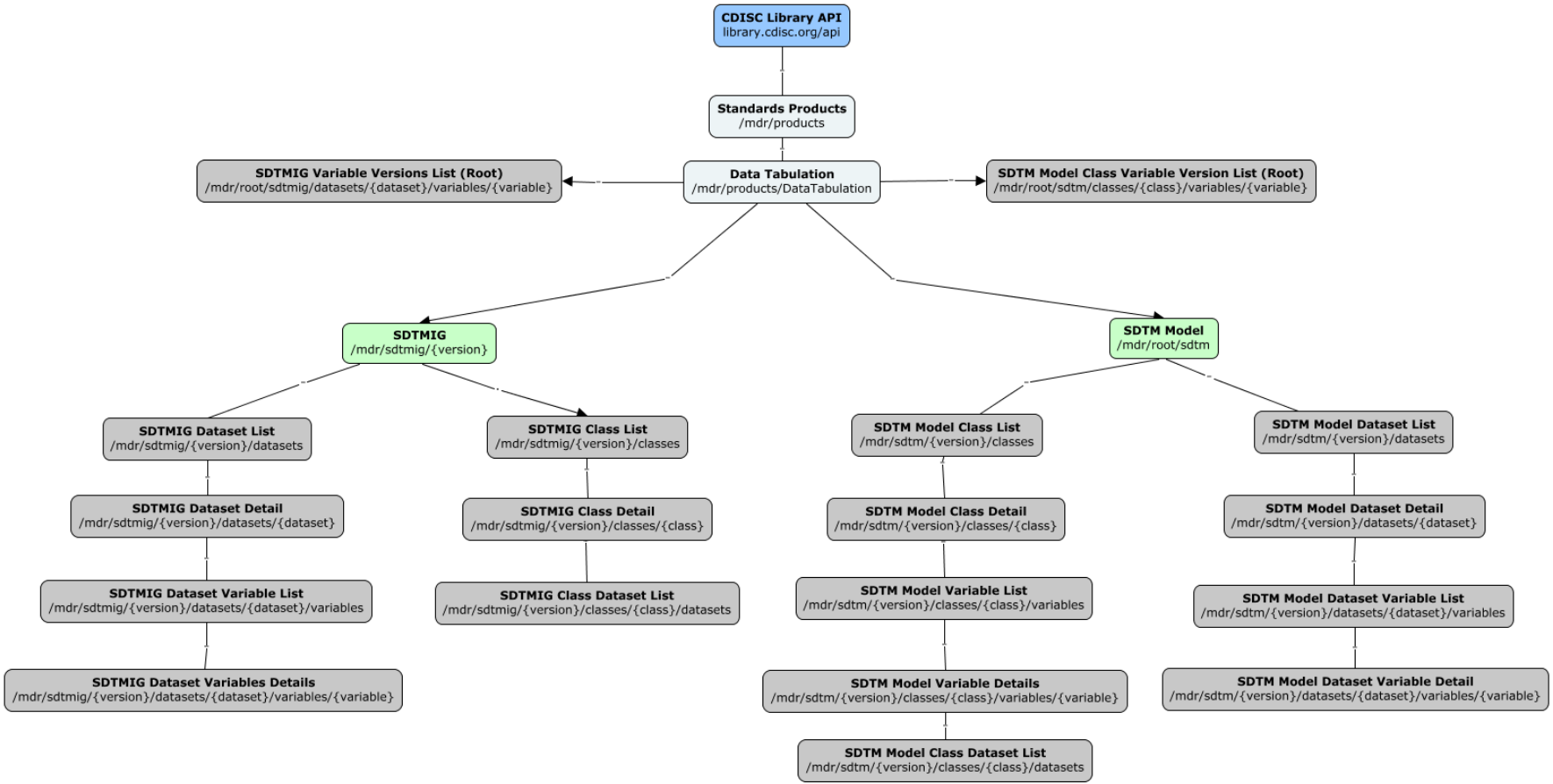
API Taxonomy: Top Level



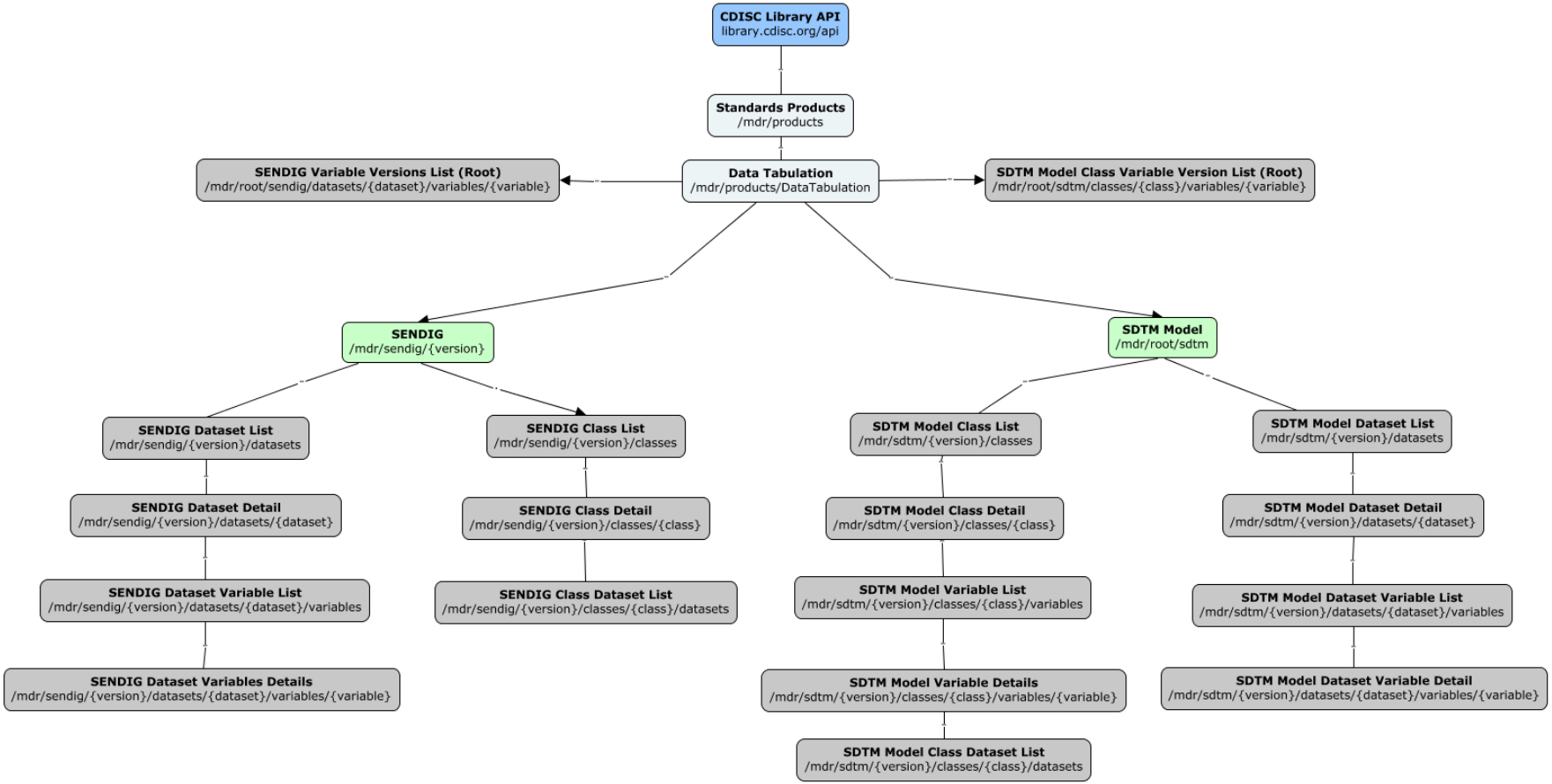
API Taxonomy: CDASH/CDASHIG



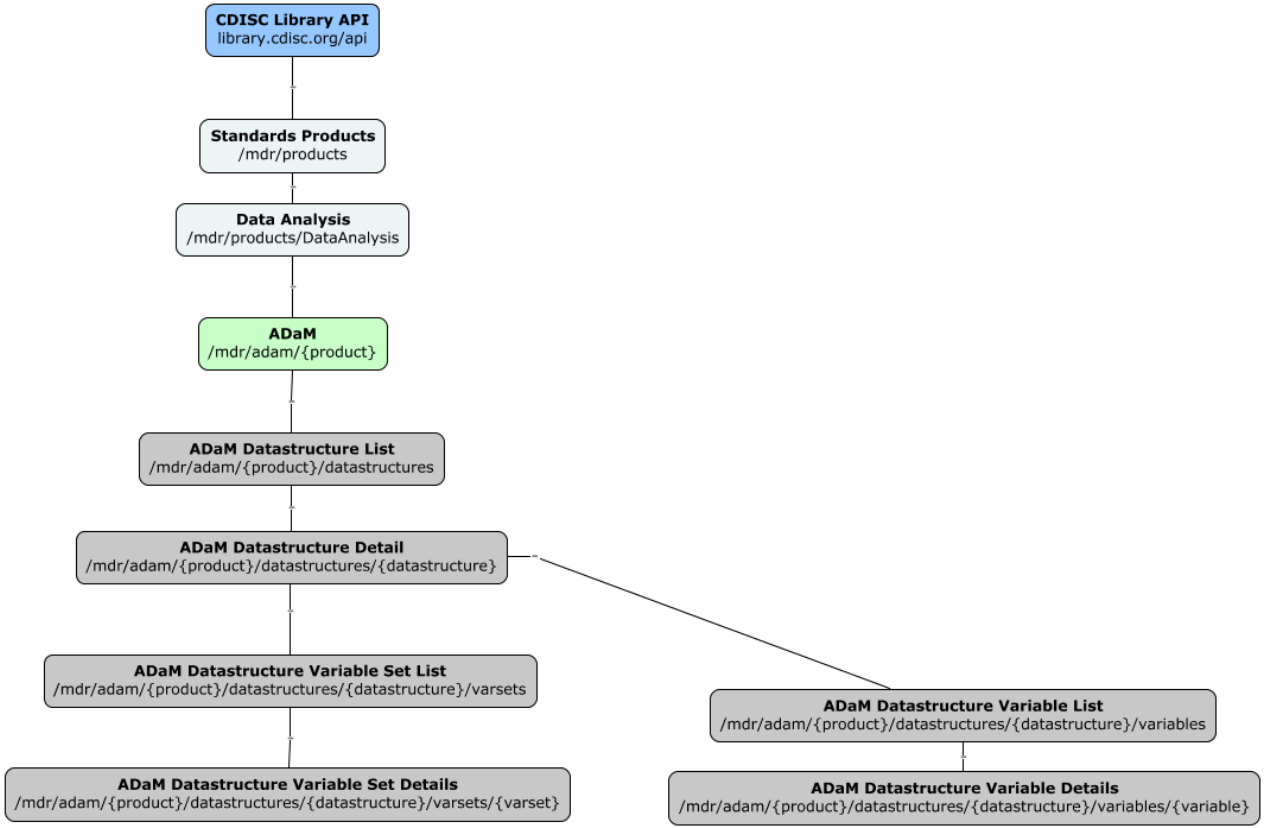
API Taxonomy: SDTM/SDTMIG



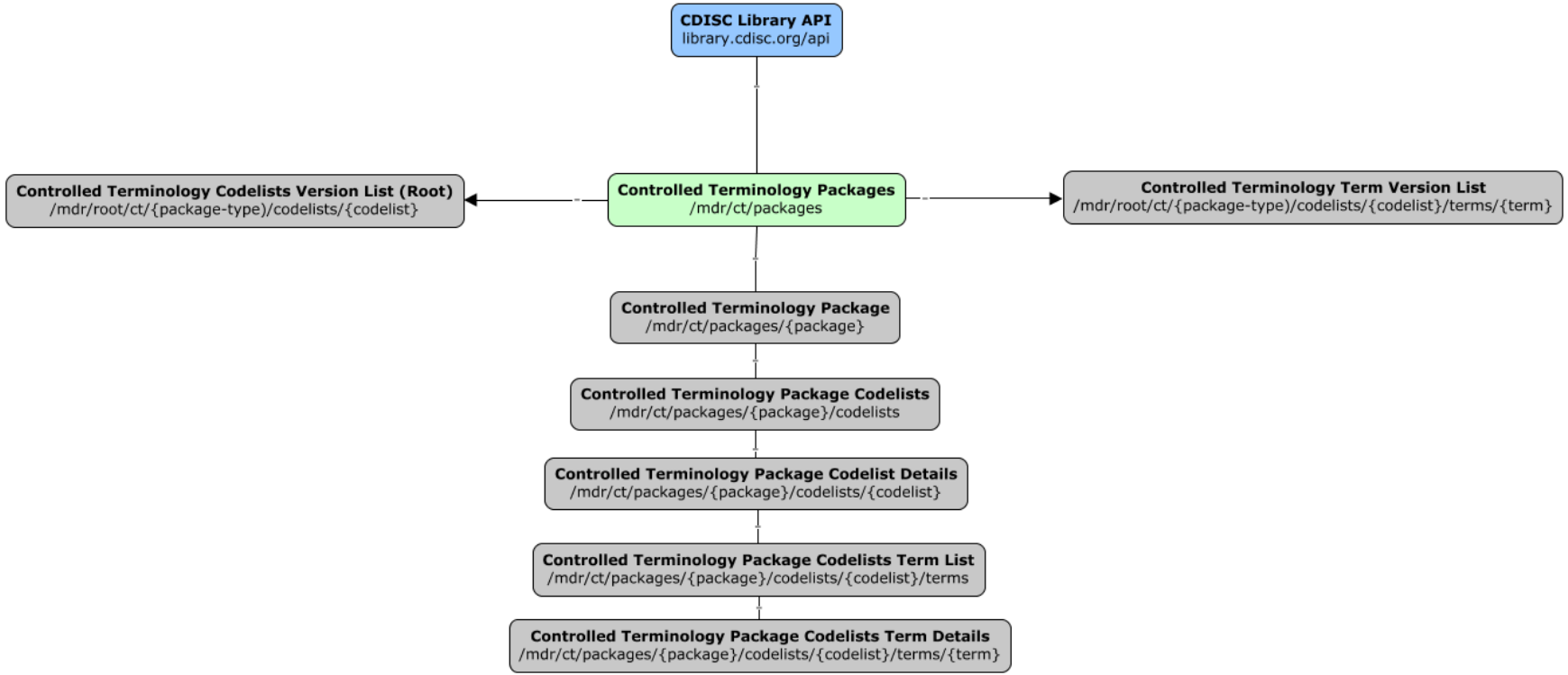
API Taxonomy: SDTM/SENDIG



API Taxonomy: ADaM



API Taxonomy: CT



API via Postman Illustration

GET https://library.cdisc.org/api/mdr/sdtmig/3-2 Send Save

Params Authorization Headers (2) Cookies Code

KEY Bulk Edit

Example of XML Request & Retrieval

What ways can CDISC Library API be accessed?

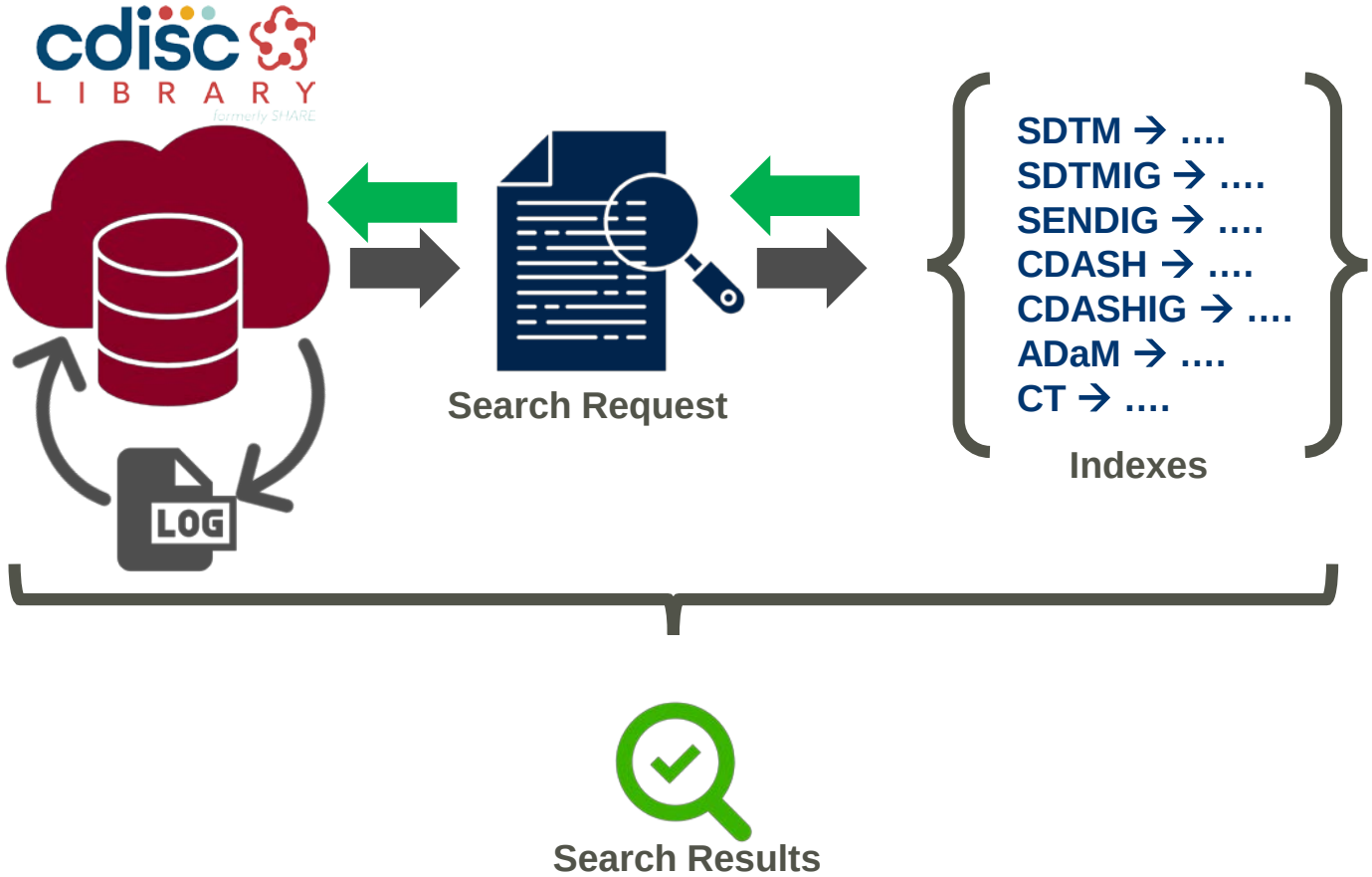
- **API Tools:** Postman, Insomnia, SoapUI, Katalon, etc.
- **Systems:** MDRs, CDMS, CTMS, EDCs, etc.
- **Applications:** Validators, Editors, ETLs, etc.
- **Macros/Code:** SAS, Python, Julia, R, Go, Rust, XML, etc.
- **Web Browser:** FireFox, Chrome, IE, Opera, Brave, Safari, etc.

And possibly others not described above


```
22          <href>/mdr/sdtmig/3-1-3</href>
23          <title>Study Data Tabulation Model Implementation Guide: Human Clinical Trials Version 3.1.3 (Final)</title>
24          <type>Implementation Guide</type>
25      </priorVersion>
26  </_links>
27  <class>
28      <ordinal>1</ordinal>
```


Build Browse

ElasticSearch



Slide Note: *Reference https://www.datasciencecentral.com

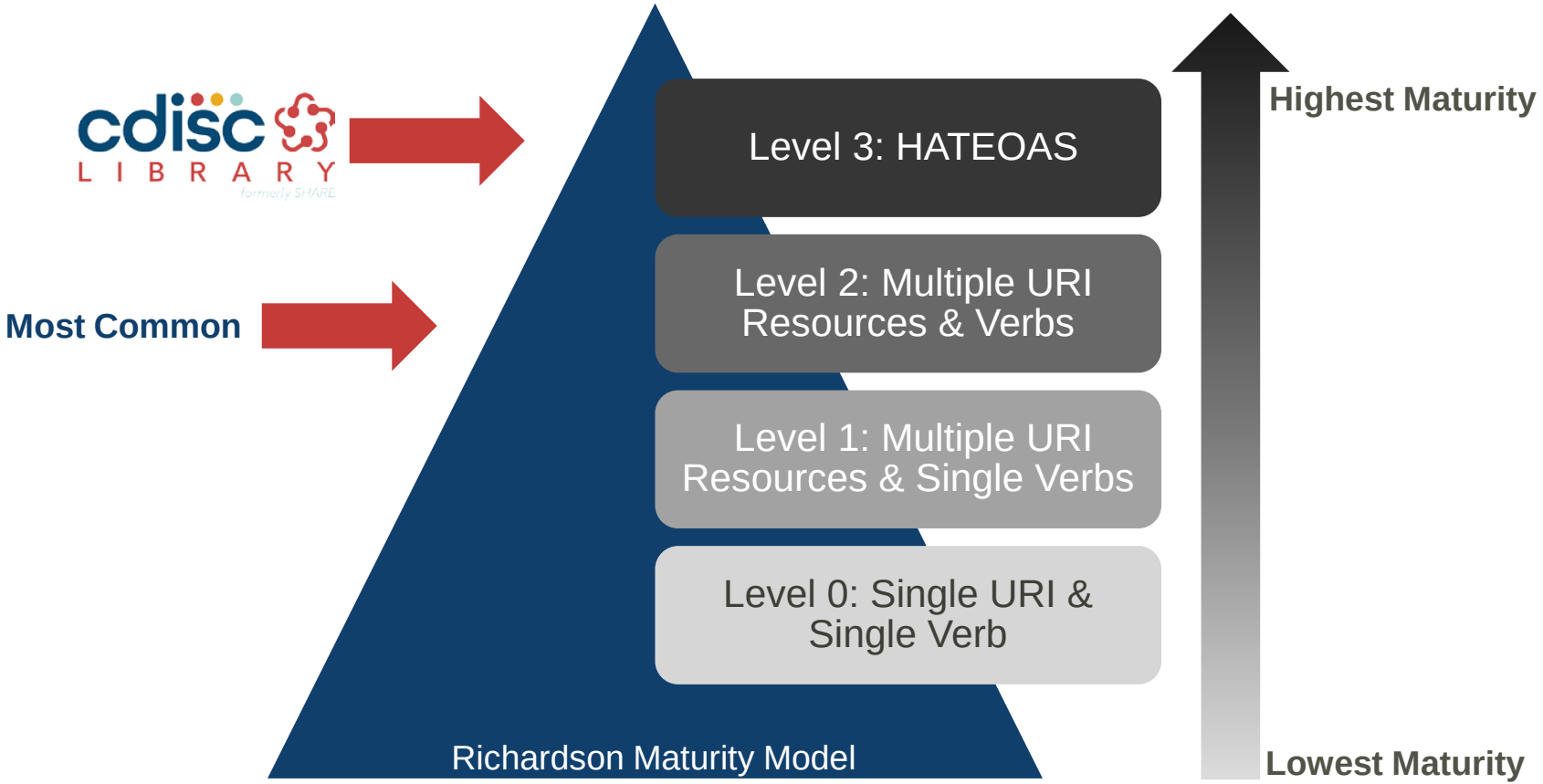
ElasticSearch (cont.)

```
GET
{
  "q
}
```

- **Words**: (race AND ethnicity) OR age
- **Phrases:** “One record” OR “per subject”
- **Specify Field:** Label=“Study Identifier”
- **Wildcard:** AGE* OR *DTC
- **RegEx:** Description: /s?dtmig(ath[en]if)/
- **Proximity (Edit Distance of 3):** “supplemental”^3
- **Date Range:** date:[2019-09-09 TO 2020-01-09]
- **Date Before:** date:{* TO 2020-01-09}
- **Number Range:** ordinal:[6 TO 10]
- **Number Range Exclusive:** ordinal:[1 TO 5}
- **Number Ranges Unbounded:** ordinal:>8

And more…

Hypermedia



Slide Note: *Reference: https://restfulapi.net/richardson-maturity-model/

Hypermedia (cont.)


```
"ordinal": "10",
"name": "AE",
"label": "Adverse Events",
"d
"d
"_
    {
        "ordinal": "28",
        "name": "AEACN",
        "label": "Action Taken with Study Treatment",
        "description": "Describes changes to the study treatment as a result of the event. AEACN is
            AEACNOTH is for actions unrelated to dose adjustments of study treatment. Examples of AE
            DOSE REDUCED, DOSE INCREASED, DOSE NOT CHANGED, UNKNOWN or NOT APPLICABLE.",
        "role": "Record Qualifier",
        "simpleDatatype": "Char",
        "core": "Exp",
        "_links": {
            "self": {
                "href": "/mdr/sdtmig/3-2/datasets/AE/variables/AEACN",
                "type": "SDTM Dataset Variable"
            },
            "codelist": [
        "type": "Class"
    },
    "priorVersion": {
        "href": "/mdr/sdtmig/3-1-3/datasets/AE",
        "title": "Adverse Events",
        "type": "SDTM Dataset"
```


Slide Note: JSON media type shown.

Hypermedia (cont.)

Computer science

From Wikipedia, the free encyclopedia

"Computer sciences" redirects here. For the American corporation, see Computer Sciences Corporation.

Computer science is the study of processes that interact with data and that can be represented as data in the form of programs. It enables the use of algorithms to manipulate, store, and communicate digital information. A computer scientist studies the theory of computation and the practice of designing software systems.[1]

Its fields can be divided into theoretical and practical disciplines. Computational complexity theory is highly abstract, while computer graphics emphasizes real-world applications. Programming language theory considers approaches to the description of computational processes, while computer programming itself involves the use of programming languages and complex systems. Human–computer interaction considers the challenges in making computers useful, usable, and accessible.

Not to be confused with information science.

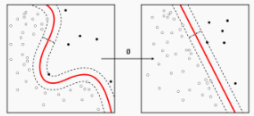
Data science is a multi-disciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from dat[illegible] various forms, both structured and unstructured,[1][2] similar to data mining.

Data science is a "concept to unify statistics, data analysis, machine learning and their related methods" in order to "understand and analyze actual p[illegible]omena" with data.[3] It employs techniques and theories drawn from many fields within the context of mathematics, statistics, information science, and computer science.

Turing award winner Jim Gray imagined data science as a "fourth paradigm" of science (empirical, theoretical, computational and now data-driven) and asserted that "everything about science is changing because of the impact of information technology" and the data deluge.[4][5]

In 2012, when Harvard Business Review called it "The Sexiest Job of the 21st Century",[6] the term "data science" became a buzzword. It is now often used interchangeably with earlier concepts like business analytics,[7] business intelligence, predictive modeling, and statistics. Even the suggestion that data science is sexy was paraphrasing Hans Rosling, featured in a 2011 BBC documentary with the quote, "Statistics is now the sexiest subject around."[8] Nate Silver referred to data science as a sexed up term for statistics.[9] In many cases, earlier approaches and solutions are now simply rebranded as "data science" to be more attractive, which can cause the term to become "dilute[d] beyond usefulness."[10] While many university programs now offer a data science degree, there exists no consensus on a definition or suitable curriculum contents.[7] To its discredit, however, many data-science and big-data projects fail to deliver useful results, often as a result of poor management and utilization of resources.[11][12][13][14]

Machine learning and data mining



Problems [show]

Supervised learning (classification • regression) [show]

Clustering [show]

Dimensionality reduction [show]

Structured prediction [show]

Anomaly detection [show]

unstructured, similar to **data** mining.

Master in Data Science · Information science · Master of Science in Business ...

Slide Note: Google search uses a mixture of RDFa, Python, C/C++. Java, PHP.

Evolution of Media Types

SDTM-IG DM (Demographics) as JSON

What future media types can we expect?

- **ODM-XML** (Operational Data Model as XML)
- **YAML** (YAML Ain't Markup Language)
- **JSON-LD** (JavaScript Object Notation for Linked Data)
- **TOML** (Tom’s Obvious, Minimal Language)
- **CSON** (CoffeeScript Object Notation)

Maybe others….

CDISC Library Demo

- Sample RDF Graph in CDISC Library
- Hypermedia Representation from REST API
- Navigation within Data Standards Browser

https://www.cdisc.org/2020-cdisc-technicon

cdisc LIBRARY
formerly SHARE

Access CDISC Library now!

CDISC Membership Inquiry: https://www.cdisc.org/register
CDISC Library: https://www.cdisc.org/cdisc-library

Thank You!