Hypermedia as the engine of application state


Shown here is a mindmap describing a medical or health science concept. Each node (a discrete piece of knowledge) is linked to other nodes.

State diagram is the analogue in data science and system design. A state diagram is a model of deterministic graph with nodes and arcs.
The nodes are called state, the arcs are transition. One may follow a transition to go from one state to another, and to navigate around the entire graph.

The Role of HATEOAS in CDISC Library API

- The heart of the CDISC Library is the API
- A couple of important constraints for REST API:
  - Each response contains links for next requests
  - Server provides clients a uniform method for determining what contents can be retrieved, actions can be performed, and formats can be represented
- Flattened representation for the linked data world of information
An API response in JSON format when querying about SDTMIG v3.2

```
name: "SDTMIG v3.2"
label: "Study Data Tabulation Model v3.2 (Final)"
description: "CDISC Version 3.2 (V3.2) - Administration (FDA)."
source: "Prepared by the CDISC Study Data Standards Team"
effectiveDate: "2013-11-26"
registrationStatus: "Final"
version: "3.2"

(classes:
  0: (-)
  1: (-)
  2: (-)
  3:
    ordinal: "4"
    name: "Events"
    label: "Events Observation Class"
    description: "This SDTM class captures C, C103372, 2018-06-29"
    _links:
      self:
        href: "/mdr/sdtmig/3.2/classes/Events"
title: "Events Observation Class"
type: "Class"
modelClass: (-)
parentProduct: (-)
parentClass: (-)
subclasses: []
priorVersion: (-)

datasets: [-]
```
This is the response after following the hyperlink given `/mdr/sdtmig/3-2/classes/Events`.

In other words, it is a state transition from SDTMIG v3.2 to the SDTMIG v3.2 Events class.
A link ("href") is provided for one of the SDTM dataset objects accessible ("type"), whose name is Adverse Events Class ("title").

These links, for state transitions, align with the standards' hierarchy: classes > domains > variables > codelists.

```

description: "This SDTM class captures C, C103372, 2018-06-29")

links:
  self: {}
  modelClass: {}
  parentProduct: {}
  parentClass: {}
  subclasses: []
  priorVersion: {}

datasets:
  0:
    ordinal: "10"
    name: "AE"
    label: "Adverse Events"
    description: "An events domain that co..IN, C49561, 2018-00-29")
    datasetStructure: "One record per adverse event per subject"
    _links:
      self:
        href: "/mdr/sdtmig/3-2/datasets/AE"
        title: "Adverse Events"
        type: "SDTM Dataset"
      parentProduct: {}
      parentClass: {}
      priorVersion: {}
      datasetVariables: []
```

Two endpoints are useful:

- `/mdr/products`
- `/mdr/products/{product-family}`

Where, product family is one of these:

- Terminology
- DataCollection
- DataTabulation
- DataAnalysis

Highlighted is a link to the a CDISC Controlled Terminology package after querying for a full product listing.

Notice it is using the same uniform interface for linking.