Schema.org

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Motivation and history

- End of 2010s: Augmentation of search with structured data
- First focus on 10 verticals (e. g. recipes, events)
- Led to a proliferation of formats across search engines and prevented scaling
- In 2011 joint initiative by Bing, Google, and Yahoo (and later Yandex)
- **Goal**: *Single* schema across all topics; *single* vocabulary for webmasters
- **Result**: Schema.org

Basic information and usage

- Schema.org is a vocabulary, not an ontology
- Designed for annotation of webpage content
- Enables rich markup of search results
- Also used in emails, e. g. for reservations in restaurants
- Used by embedding Microdata or JSON-LD code in HTML
- JSON-LD syntax more popular
- In 2022 38 % of PLDs used Schema.org annotations
- Up from 3 % in 2013

Items and (data) types

- Items are things in the real world, we wish to describe
- Three hierarchies of types (classes)
  - s:Thing and its subtypes; e. g. s:Event
  - s:DataType and its subtypes; e. g. s:Date
  - s:Enumeration and its subtypes; e. g. s:DayOfWeek
- Types inherit properties from one or multiple supertypes
- 811 types, 14 data types, 89 enumerations, 495 enum members

Structure of the *s:Thing*-hierarchy

Not a tree structure

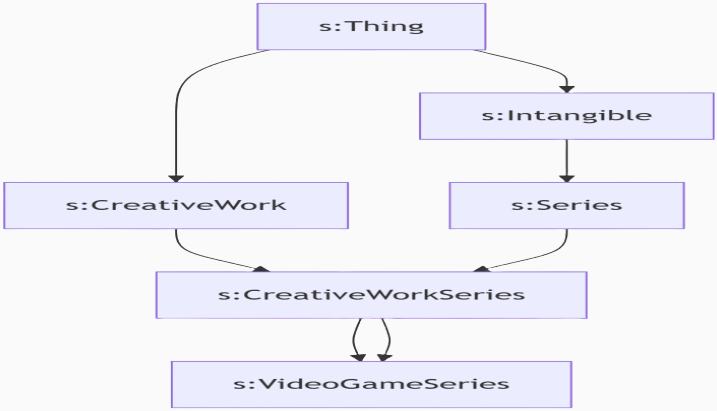


Figure 1: Hierarchy of s:VideoGame

Structure of the *s:Thing*-hierarchy (cont.)

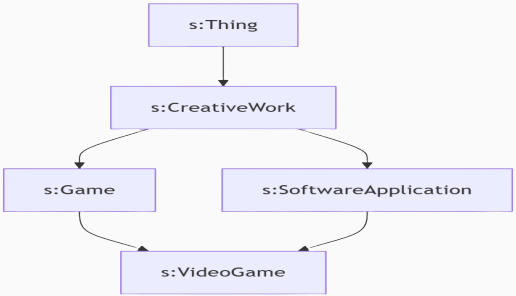


Figure 2: Hierarchy of s:VideoGameSeries

Properties

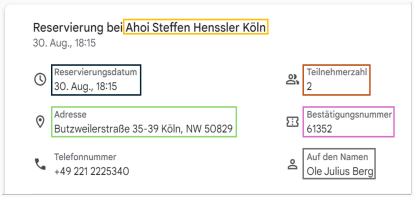
- Link two types:
  1. Type and data type
  2. Type and another type
- Have domain and range definitions
- **Domain**: Types the property can be used on
- **Range**: Expected types of property values
- Subtypes can extend range
- Domain and range are disjunctive
- 1484 properties

Example of the properties of a type

- s:FoodEstablishmentReservation
- s:Thing > s:Intangible > s:Reservation > s:FoodEstablishmentReservation
- Properties:
  - s:startTime | range: *s:Time* or *s:DateTime* | from s:FoodEstablishmentReservation
  - s:underName | range: s:Person or s:Organization | from s:Reservation
  - s:name | range: *s:Text* | from s:Thing
  - . . . many more. . . (in total $27 = 12 + 12 + 3$)

A real-world example (rmail)

Screenshot from the Gmail web app



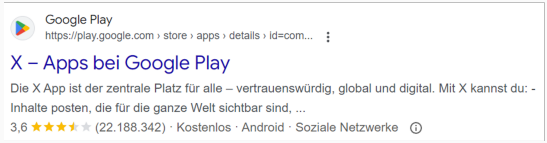
Extract from the HTML embedded in the confirmation email

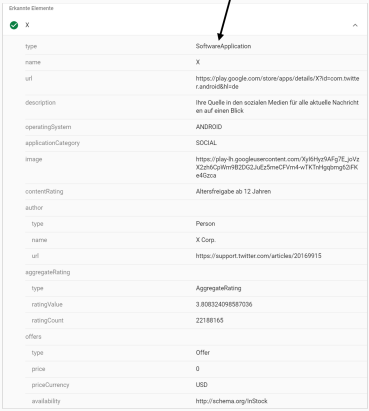

```
{
  "@context": "http://schema.org",
  "@type": "FoodEstablishmentReservation",
  "reservationNumber": "61352",
  "reservationStatus": "http://schema.org/ReservationConfirmed",
  "underName": {
    "@type": "Person",
    "name": "Ole Julius Berg"
  },
  "reservationFor": {
    "@type": "FoodEstablishment",
    "name": "Ahoi Steffen Henssler Köln",
    "address": {
      "@type": "PostalAddress",
      "streetAddress": "Butzweilerstraße 35-39",
      "addressLocality": "Köln",
      "addressRegion": "NW",
      "postalCode": "50829",
      "addressCountry": "Deutschland"
    }
  },
  "startTime": "2024-08-30T18:15:00+02:00",
  "partySize": "2",
  "modifiedTime": "2024-08-28T19:09:09.334Z",
  "modifyReservationUrl": "...",
  "cancelReservationUrl": "...",
  "url": "..."
}
```


Figure 3: Schema.org usage in an email confirmation of a reservation

Another real-world example (rich snippets)

https://schema.org/SoftwareApplication





https://search.google.com/test/rich-results/result?id=UtfvXcS6-Xqn7jYN4FG8JQ

Test for yourself: https://search.google.com/test/rich-results

Limitation and criticism

- Explicit design for webpage content
- Limited transferability to other domains
- Addressed by hosted and external extensions
- Adoption has plateaued
- Some criticism of missing local ranges

Conclusion

Thank you for attending my presentation!

Do you think that Schema.org still has unused potential?

Or are the extensions all we can expect?

Sources I

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Sources II

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