

Schema.org

Ole Berg

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1 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

2 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

3 Structure of Schema.org

3.1 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

3 Structure of Schema.org

3.2 Structure of the *s:Thing*-hierarchy

Not a tree structure!

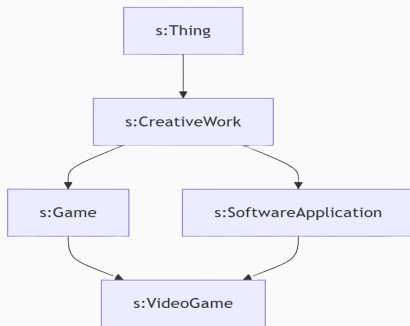


Figure 1: Hierarchy of *s:VideoGame*

3 Structure of Schema.org

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

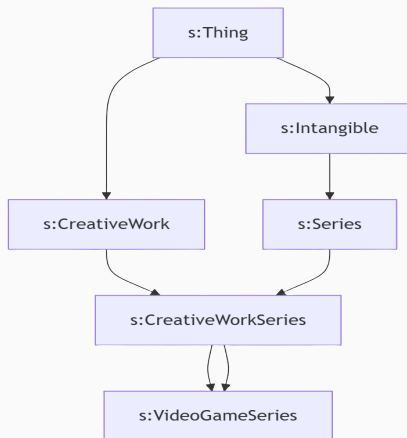


Figure 2: Hierarchy of *s:VideoGameSeries*

3 Structure of Schema.org

3.3 Properties

- Container for the attributes of an item
- Link two types:
 1. Type and data type
 2. Type and another type
- Have domain and range definitions
- 1484 properties

3 Structure of Schema.org

3.4 Domain and range of properties

- **Domain:** Types the property can be used on
- **Range:** Expected types of property values
- Subtypes can **extend range**
- Domain and range are **disjunctive**

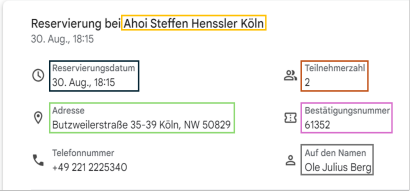
3 Structure of Schema.org

3.5 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 $27 = 12 + 12 + 3$)

4 Real-world examples

Screenshot from the Gmail web app



Reservierung bei Ahoi Steffen Henssler Köln
30. Aug., 18:15

Reservierungsdatum
30. Aug., 18:15

Teilnehmerzahl
2

Adresse
Butzweilerstraße 35-39 Köln, NW 50829

Bestätigungsnummer
61352

Telefonnummer
+49 221 2225340

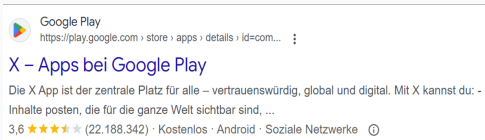
Auf den Namen
Ole Julius Berg

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

4 Real-world examples



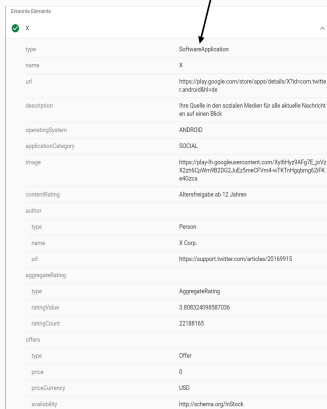
Google Play
<https://play.google.com/store/apps/details?id=com...>

X – Apps bei Google Play

Die X App ist der zentrale Platz für alle – vertrauenswürdig, global und digital. Mit X kannst du: - Inhalte posten, die für die ganze Welt sichtbar sind, ...

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<https://schema.org/SoftwareApplication>



Expanded Elements

✓ X

type	SoftwareApplication
name	X
url	https://play.google.com/store/apps/details?id=com.twitter.android&hl=de
description	Ihre Quelle in den sozialen Medien für alle aktuelle Nachrichten auf einen Blick
operatingSystem	ANDROID
applicationCategory	SOCIAL
image	https://play-lh.googleusercontent.com/Xy8Hzr3AFg7E_x0/zXZzhCqWm6D0G2AMz5meCPVm4-wTKTnlgpimgGqFKe4Gzsa
contentRating	Altersfreigabe ab 12 Jahren
author	
type	Person
name	X Corp.
url	https://support.twitter.com/articles/20166915
aggregateRating	
type	AggregateRating
ratingValue	3.600524785567036
ratingCount	22188165
offers	
type	Offer
price	0
priceCurrency	USD
availability	http://schema.org/InStock

<https://search.google.com/test/rich-results/result?id=UthXcS6-Xqn7iYN4FG8JQ>

Figure 4: Schema.org usage in rich snippets

5 Limitations 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

6 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?

7 Sources I

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