Schema.org in Two Parts: From Use to Extension

Part 1:
Fit for a Bibliographic Purpose

Richard Wallis
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Data Liberate
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@rjw
Independent Consultant, Evangelist & Founder
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  • Schema.org for bibliographic data
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- Google – on the Schema.org site and vocabulary
- OCLC - Global library cooperative
- FIBO – Financial Industry Business Ontology
Introducing schema.org: Search engines come together for a richer web

Posted: Thursday, June 02, 2011

Webmaster Level: All

Today we’re announcing schema.org, a new initiative from Google, Bing and Yahoo! to create and support a common set of schemas for structured data markup on web pages. Schema.org aims to be a one stop resource for webmasters looking to add markup to their pages to help search engines better understand their websites.

At Google, we’ve supported structured markup for a couple years now. We introduced rich snippets in 2009 to better represent search results describing people or containing reviews. We’ve since expanded to new kinds of rich snippets, including products, events, recipes, and more.

Example of a rich snippet: a search result enhanced by structured markup. In this case, the rich snippet contains a picture, reviews, and cook time for the recipe.

Adoption by the webmaster community has grown rapidly, and today we’re able to show rich snippets in search results more than ten times as often as when we started two years ago.

We want to continue making the open web richer and more useful. We know that it takes time and effort to add this markup to your pages, and adding markup is much harder if every search engine asks for data in a different way. That's why we've come together with other search engines to support a common set of schemas, just as we came together to support a common standard for Sitemaps in 2006. With schema.org, site owners can improve how their sites appear in search results not only on Google, but on Bing, Yahoo! and potentially other search engines as well in the future.

Now let's discuss some of the details of schema.org relevant to you as a webmaster:
Introducing schema.org: Search engines come together for a richer web

Posted: Thursday, June 02, 2011

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Today we’re announcing an open, interoperable, common set of schemas for structured data. schema.org provides a single resource for webmasters, software developers and content creators.

We’ve added more than 100 new types as well as ported over all of the existing rich snippets types. If you’ve looked at adding rich snippets markup before but none of the existing types were relevant for your site, it’s worth taking another look. Here are a few popular types:

- Creative works: CreativeWork, Book, Movie, MusicRecording, Recipe, TVSeries
- Embedded non-text objects: AudioObject, ImageObject, VideoObject
- Event
- Organization
- Person, LocalBusiness, Restaurant
- Product, Offer, AggregateOffer
- Review, AggregateRating

Or, view a full list of all schema.org types. The new markup types may be used for future rich snippets formats as we open the web richer and more useful. We know that it takes time and effort to add this markup and adding markup is much harder if every search engine asks for data in a different way.

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- A web vocabulary to describe stuff!
Knowledge Graph
Introducing the Knowledge Graph: things, not strings

May 16, 2012

Cross-posted on the Inside Search Blog

Search is a lot about discovery—the basic human need to learn and broaden your horizons. But searching still requires a lot of hard work by you, the user. So today I’m really excited to launch the Knowledge Graph, which will help you discover new information quickly and easily.

Take a query like [taj mahal]. For more than four decades, search has essentially been about matching keywords to queries. To a search engine the words [taj mahal] have been just that—two words.

But we all know that [taj mahal] has a much richer meaning. You might think of one of the world’s most beautiful monuments, or a Grammy Award-winning musician, or possibly even a casino in Atlantic City, NJ. Or, depending on when you last ate, the
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Knowledge Graph: things, not strings

The basic human need to learn and broaden our world views requires a lot of hard work by you, the user. So we've built the Google Knowledge Graph, which will help you discover things you might not have known were there.

S. R. Ranganathan

Mathematician

Shiyali Ramamrita Ranganathan was a mathematician and librarian from India. His most notable contributions to the field were his five laws of library science and the development of the first major ... Wikipedia

Born: August 9, 1892, Sirkaazi, India
Died: September 27, 1972, Bengaluru, India
Parents: Ramamrita Ayyar, Sathaksharam
Education: Madras Christian College, University College London

Bart Simpson

Fictional Character

Bartolomeo JoJo "Bart" Simpson is a fictional character in the American animated television series The Simpsons and part of the Simpson family. Wikipedia

Played by: Nancy Cartwright
Born: April 1, 1979
Creator: Matt Groening
Gender: Male

People also search for

Homer Simpson, Marge Simpson, Lisa Simpson, Maggie Simpson, Moe Howard, Van Houten

Books

View 20+ more

People also search for

Paul Otlet, Melvil Dewey, Vejenga Venkatadri, Suzanne Breen, Michaelerman

View 1+ more
Knowledge Graph

Official Blog
Insights from Googlers into our products, technology, and the Google culture

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People also search for

View 15+ more

Homer Simpson  Marge Simpson  Lisa Simpson  Maggie Simpson  Milhouse Van Houten
Nancy Cartwright
Voice actress · nancycartwright.com

Nancy Jean Cartwright is an American voice actress, film and television actress, and comedienne. She is known for her long-running role as Bart Simpson on the animated television series The Simpsons. [Wikipedia](https://en.wikipedia.org/wiki/Nancy_Cartwright)

**Born:** October 25, 1957 (age 58), Dayton, Ohio, United States
**Height:** 1.52 m
**Spouse:** Warren Murphy (m. 1988–2002)
**Children:** Jackson Murphy, Lucy Mae Murphy
**Parents:** Frank Cartwright, Miriam Cartwright

**Profiles**
- [Twitter](https://twitter.com/nancycartwright)

**Movies and TV shows**
- [The Simpsons](https://en.wikipedia.org/wiki/The_Simpsons)
- [The Simpsons Movie](https://en.wikipedia.org/wiki/The_Simpsons_Movie)
- [Rugrats](https://en.wikipedia.org/wiki/Rugrats)
- [Kim Possible](https://en.wikipedia.org/wiki/Kim_Possible)
- [The Tracey Ulman Show](https://en.wikipedia.org/wiki/The_Tracey_Ulman_Show)

**People also search for**
- Homer Simpson
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- Lisa Simpson
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- Milhouse Van Houten
Google Knowledge Graph
Knowledge Graph
Knowledge Graph

Related Entities in a Graph
Knowledge Graph

Related Entities in a Graph

Bart Simpson
Born In Dayton Ohio
Played By Nancy Cartwright

Nancy Cartwright

Dayton Ohio
Knowledge Graph

Sources for the Graph
• Data embedded in website html
Using Schema.org

• Data embedded in website html
  - Microdata / RDFa / JSON-LD
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A de facto vocabulary for structured data on the web
A de facto vocabulary for structured data on the web

... and for bibliographic data and libraries?
OCLC adds Linked Data to WorldCat.org

DUBLIN, Ohio, USA, 20 June 2012—OCLC is taking the first step toward adding linked data to WorldCat by appending Schema.org descriptive mark-up to WorldCat.org pages. WorldCat.org now offers the largest set of linked bibliographic data on the Web. With the addition of Schema.org mark-up to all book, journal and other bibliographic resources in WorldCat.org, the entire publicly available version of WorldCat is now available for use by intelligent Web crawlers, like Google and Bing, that can make use of this metadata in search indexes and other applications.

Commercial developers that rely on Web-based services have been exploring ways to exploit the potential of linked data. The Schema.org initiative—launched in 2011 by Google, Bing and Yahoo! and later joined by Yandex—provides a core vocabulary for markup that helps search engines and other Web crawlers more directly make use of the underlying data that powers many online services.

OCLC is working with the Schema.org community to develop and add a set of vocabulary extensions to WorldCat data. Schema.org and library specific extensions will provide a valuable two-way bridge between the library community and the consumer Web. Schema.org is working with a number of other industries to provide similar sets of extensions for other specific use cases.
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### Linked Data

#### More info about Linked Data

```html
<http://www.worldcat.org/oclc/52541937>
```

<table>
<thead>
<tr>
<th>library:holdingsCount</th>
<th>&quot;682&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>library:oclcnum</td>
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<td>skos:inScheme</td>
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### Schema.org for bibliographic description?

**Surprisingly effective:**

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- Book type

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• datePublished property
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• about property
Surprisingly effective:

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- about property
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Not available:

- title property
Schema.org experience in WorldCat.org

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Need for a ‘Library’ extension to Schema?
Motivation
Why bother?
Motivation for sharing data
Motivation for sharing data
Why Catalog?

So we can find things
Why Catalog?

So we can find things

Why Share on the Web?

Motivation for sharing data
Why Catalog?
So we can find things

Why Share on the Web?
So today’s users can find our things
Where are our users?

Motivation for sharing data
Where are our users?

Motivation for sharing data
Schema.org for bibliographic description?
Schema.org for bibliographic description?

Where next?
Where next?

- Localised extension - http://purl.org/Library
Schema.org
for bibliographic description?

Where next?

• Localised extension - http://purl.org/Library
Where next?

- Localised extension - http://purl.org/Library
- Library centric vocabularies
Schema.org
for bibliographic description?

Where next?

• Localised extension - http://purl.org/Library
• Library centric vocabularies
  - Bibo, RDA, Dublin Core, etc.
Library Linked Data

Virtual International Authority File (VIAF)

British Library

German National Library

Spanish National Library

Swedish National Library

Data Liberate
Library Linked Data

VIAF
Virtual International Authority File

Open Linked Data - Silos
Library Linked Data

Open Linked Data - Silos

Behind a vocabulary barrier
Schema.org for bibliographic description?

Where next?

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  - Bibo, RDA, Dublin Core, etc.
Where next?

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Schema.org
for bibliographic description?

Where next?

• Localised extension - http://purl.org/Library ✗
• Library centric vocabularies ✗
  - Bibo, RDA, Dublin Core, etc.
• New library standard - (LoC BIBFRAME?)
• Foundation for the future of bibliographic description
• Foundation for the future of **bibliographic** description

• Eventual replacement for Marc 21
• Foundation for the future of **bibliographic** description
• Eventual replacement for Marc 21
• Identify *information* entities
• Foundation for the future of bibliographic description
• Eventual replacement for Marc 21
• Identify information entities
• Conversion from Marc
• Foundation for the future of bibliographic description
• Eventual replacement for Marc 21
• Identify information entities
• Conversion from Marc
• Publish in RDF – Linked Data
Where next?

• Localised extension - http://purl.org/Library
• Library centric vocabularies - Bibo, RDA, Dublin Core, etc.
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• Proposals for Schema.org enhancement
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• New library standard - (LoC BIBFRAME?) ✗
• Proposals for Schema.org enhancement ✔
  - How?
Schema Bib Extend
W3C Community Group (SchemaBibEx)
Schema Bib Extend
W3C Community Group (SchemaBibEx)

W3C Community and Business Groups

Community & Business Groups → Schema Bib Extend Community Group

Schema Bib Extend Community Group

The mission of this group is to discuss and prepare proposal(s) for extending Schema.org schemas for the improved representation of bibliographic information markup and sharing. The group will seek consensus around, and support for, proposal(s) to the W3C WebSchemas Group. This Community Group will not, itself, produce technical specifications.

Get involved!
Anyone may join this Community Group. All participants in this group have signed the W3C Community Contributor License Agreement (CLA).

JOIN THIS GROUP
or learn how to join or request an account.

Participants
Richard Wallis
Chair

October Meeting
Richard Wallis
Posted on October 12, 2012

W3C Community Group
Schema Bib Extend

Working in a Community Group
it’s like herding cats.
Schema Bib Extend
Working in a Community Group

• Working towards consensus

it’s like herding cats.
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• Silence equates to consent
Schema Bib Extend
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• ‘Start’ by leaving your experience at the door

Community Cat Herding
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- Working towards consensus
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- What can we do with Schema.org - as it is now

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• What can we do with Schema.org - as it is now
• Then fill in the gaps

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• Then fill in the gaps
• Is this relevant to the Web?

I ❤️ HERDING CATS

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- What can we do with Schema.org - as it is now
- Then fill in the gaps
- Is this relevant to the Web?
- Will this aid discovery?
Schema.org Support for Bibliographic Relationships and Periodicals

[Guest post by Richard Wallis, OCLC & Dan Scott, Laurentian University]

With the addition of three new types, the latest version of schema.org introduces support for describing the relationship between, Articles and the Periodicals in which they were published, along with potentially related PublicationIssues & PublicationVolumes. For example:

- The article "The semantic web" was published in May 2001, in volume 284, issue 5 of Scientific american on pages 28 through 37.
- The editors for that issue included Mark Alpert, Steve Ashley, and Carol Ezzell.

You can now also describe creative works that span multiple parts using the hasPart and isPartOf properties, and you can express relationships between a conceptual representation of a creative work and physical examples of that work using the exampleOfWork and workExample properties. For example:

- The Lord of the Rings is a trilogy consisting of three separate books.
Less commercial wording

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• Less commercial wording
• Citation

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• The article "The semantic web" was published in May 2001, in volume 284, issue 5 of *Scientific American* on pages 28 through 37.

• That issue of *Scientific American* contained 33 other articles listed at http://www.nature.com/scientificamerican/journal/v284/n5/index.html.

• The editors for that issue included Mark Alpert, Steve Ashley, and Carol Ezzell.

You can now also describe creative works that span multiple parts using the hasPart and isPartOf properties, and you can express relationships between a conceptual representation of a creative work and physical examples of that work using the exampleOfWork and workExample properties. For example:

• *The Lord of the Rings* is a trilogy consisting of three separate books.


Less commercial wording

Citation

Work relationships
Less commercial wording

Citation

Work relationships

Periodical - PublicationIssue - PublicationVolume
Less commercial wording

Citation

Work relationships

Periodical - PublicationIssue - PublicationVolume

Multi-volume works
Less commercial wording

Citation

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Periodical - PublicationIssue - PublicationVolume

Multi-volume works

Many bibliographic examples
Extending Schema.org

Please may we have some more
Extending Schema.org

Please may we have some more

• Continue proposing enhancements
Extending Schema.org

Please may we have some more

• Continue proposing enhancements
  - Maybe too bibliographic/library focused
Extending Schema.org

Please may we have some more

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• An Extension vocabulary from Schema?
Extending Schema.org

Please may we have some more

- Continue proposing enhancements
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- An Extension vocabulary from Schema?
  - BiblioGraph.net

Option for extending Schema.org
BiblioGraph.net
Extending Schema.org
BiblioGraph.net
Extending Schema.org

Schema Structure

Terms described on this site have been assembled as an extension to the core types and properties defined by Schema.org. The Editor of BiblioGraph.net will track changes to the published terms from Schema.org and update this site to reflect them.

When appropriate terms were not available in Schema.org, proposals from the Schema Bib Extend W3C Community Group were initially looked to for suitable options. Terms are added to the BiblioGraph.net namespace, with acknowledgement where appropriate of examples from other vocabularies such as Dublin Core, Bibo, etc., that provided inspiration. A goal is to keep the number of namespaces in BiblioGraph.net described data to a minimum with a preference for only two - schema: & bgn:

The terms on this site are defined in rdfa source files, which are directly accessible:
- Core Schema.org vocabulary: /docs/schema_org_rdfa.html
- BiblioGraph.net terms: /bibliograph_net_rdfa.html

Browse the Schemas

Starting at the top, one page per type

Full list of types

BiblioGraph.net types:

- Agent
- Atlas
- BlurayDisc
BiblioGraph.net
Extending Schema.org

- Created by OCLC for the community
Created by OCLC for the community

- Open - same license as Schema.org
BiblioGraph.net
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  - Some candidates for Schema.org proposals
We are pleased to announce the public release of Schema.org 2.0 which brings several significant changes and additions, not just to the vocabulary, but also to how we grow and manage it, from both technical and governance perspectives.

As schema.org adoption has grown, a number of groups with more specialized vocabularies have expressed interest in extending schema.org with their terms. Examples of this include real estate, product, finance, medical and bibliographic information. Even in something as common as human names, there are groups interested in creating the vocabulary for representing all the intricacies of names. Groups that have a special interest in one of these topics often need a level of specificity in the vocabulary and operational independence. We are introducing a new extension mechanism which we hope will enable these and many other groups to extend schema.org.

Over the years, Schema.org has taken steps towards become more open. Today, there is more community participation than ever before. The newly formed W3C Schema.org Community Group is now the main forum for schema collaboration, and provides the public-schemaorg@w3.org mailing list for discussions. Schema.org issues are tracked on GitHub. The day to day operations of Schema.org, including decisions regarding the schema, are handled by a newly formed steering group, which includes representatives of the sponsor companies, the W3C and some individuals who have
Extensions in Schema.org

Schema.org 2.0

We are pleased to announce the public release of Schema.org 2.0. The release includes many new and additions, not just to the vocabulary, but also to the governance perspectives.

As schema.org adoption has grown, there has been increased interest in extending schema.org with their terms. We are interested in creating the vocabulary for representing all the intricacies of domains, ranges, superclasses, etc. as well. Extensions have to be consistent with the core schema.org. Every item in the core (i.e., http://schema.org/) also in every extension. Extensions might overlap with each other in contexts (e.g., two extensions defining terms for financial institutions, one calling it FinancialBank and another calling it FinancialInstitution), but we should not have the same term being reused to mean something completely different (e.g., FinancialBank and SavingsAccount). We should not have two extensions, one using Bank to mean river bank and the other using Bank to mean financial institution.

Reviewed/hosted Extensions

Each reviewed extension (say, x11) gets its own chunk of schema.org namespace: x11.schema.org. The items in that extension are created and maintained by the creators of that extension. Reviewed extensions are very different from proposals. A proposal, if accepted, with modifications could slip into the core.
Extension Mechanism

Schema.org provides a core, basic vocabulary for describing the kind of entities the most common web applications need. There is often a need for more specialized and/or deeper vocabularies, that build upon the core. The extension mechanisms facilitates the creation of such additional vocabularies.

With most extensions, we expect that some small frequently used set of terms will be in core schema.org, with a longer tail of more specialized terms in the extension.

Types of extensions

There are two kinds of extensions: reviewed/hosted extensions and external extensions. Both kinds of extensions typically add subclasses and properties to the core. Properties may be added to existing and/or new classes. More generally, they are an overlay on top of the core, and so they may add domains, ranges, superclasses, etc, as well. Extensions have to be consistent with the core schema.org.

FinanceBank and other calling it FinancialInstitution, but we should not have the same term being reused to mean something completely different e.g., FinancialInstitution.

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Extensions in Schema.org
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Reviewed/hosted Extensions

Each reviewed extension (say, A1) gets its own chunk of schema.org namespace: a1.schema.org. The items in that extension are created and maintained by the creators of that extension. Reviewed extensions are very different from proposals: A proposal, if accepted, will modifications could slip in.

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Extension Mechanism

- Reviewed / hosted extensions
  - Schema.org namespace - ex1.schema.org

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Extension Mechanism

- Reviewed / hosted extensions
  - Schema.org namespace - ex1.schema.org

- External extensions
Extension Mechanism

- Reviewed / hosted extensions
  - Schema.org namespace - ex1.schema.org

- External extensions
  - external namespace - schema.example.com
• First two hosted extensions
First two hosted extensions
- bib.schema.org - auto.schema.org
• First two hosted extensions
  - bib.schema.org - auto.schema.org

• Contents:
• First two hosted extensions
  - bib.schema.org - auto.schema.org

• Contents:
  - SchemaBibex proposals
• First two hosted extensions
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• Contents:
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  - some BiblioGraph.net types/properties
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• Contents:
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  - proposals from the Comics community
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• Contents:
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• Review process:
First two hosted extensions
- bib.schema.org - auto.schema.org

Contents:
- SchemaBibex proposals
- some BiblioGraph.net types/properties
- proposals from the Comics community

Review process:
- term name & description tweaks
First two hosted extensions
- bib.schema.org - auto.schema.org

Contents:
- SchemaBibex proposals
- some BiblioGraph.net types/properties
- proposals from the Comics community

Review process:
- term name & description tweaks
- drop proposed Agent Type
bib.schema.org extension
Schema.org Hosted Extension: Bibliographic Extension

Schema.org is a set of extensible schemas that enables webmasters to embed structured data on their web pages for use by search engines and other applications. For more details, see the homepage.

This is the front page for the Bibliographic Extension, whose short name is: bib

You are viewing the Bibliographic Extension within schema.org. It defines terms such as Audiobook, Thesis, ComicStory, and workTranslation. For more details see the W3C BibExtend Community Group's wiki.

This should be considered a pre-final preview release; final changes may be made after wider community review.

Terms defined or referenced in the 'bib' extension.

Types (11)
Atlas, Audiobook, Chapter, Collection, ComicCoverArt, ComicIssue, ComicSeries, ComicStory, CoverArt, Newspaper, Thesis

Properties (18)
abridged, artist, colorist, duration, inSupportOf, inker, letterer, pageEnd, pageStart, pagination, penciler, publishedBy, publisherImprint, readBy, translationOfWork, translator, variantCover, workTranslation

Enumeration values (1)
GraphicNovel
Terms defined or referenced in the 'bib' extension.

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bib.schema.org extension
Examples in the wild
Examples in the wild

Bibliographic Schema.org usage
Fit for a Bibliographic Purpose
Fit for a Bibliographic Purpose

schema.org
Fit for a Bibliographic Purpose

bib.schema.org

schema.org
Fit for a Bibliographic Purpose

BiblioGraph.net

bib.schema.org

schema.org
Fit for a Bibliographic Purpose

Schema.org fit for a bibliographic purpose
Fit for a Bibliographic Purpose

The vocabulary tools to describe bibliographic resources on the web for broad discovery
Fit for a Bibliographic Purpose

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Fit for a Bibliographic Purpose

The vocabulary tools to describe bibliographic resources on the web for broad discovery

(Not a replacement for library metadata exchange That is a more specific task)
Fit for a Bibliographic Purpose

What's next?
Fit for a Bibliographic Purpose

What's next?

Schema.org fit for a bibliographic purpose
Fit for a Bibliographic Purpose

What's next?

implementation

Schema.org fit for a bibliographic purpose
Fit for a Bibliographic Purpose

What's next?

Adoption

Innovators 2.5%
Early Adopters 13.5%
Early Majority 34%
Late Majority 34%
Laggards 16%

implementation

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Fit for a Bibliographic Purpose

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What's next?

becoming part of the graph

Schema.org fit for a bibliographic purpose
Schema.org in Two Parts: From Use to Extension

Part 2: Extending Potential Possibilities

Richard Wallis
Evangelist and Founder
Data Liberate
richard.wallis@dataliberate.com
@rjw

Schema.org a more practical view
Schema.org in Two Parts: From Use to Extension

Part 1:
Fit for a Bibliographic Purpose

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