

Breaking Down Silos: Linking Multiple Taxonomies

Taxonomy Boot Camp
Washington, DC, November 8, 2022



Heather Hedden & Donna Popky

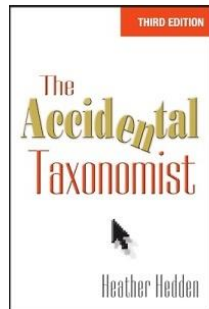
Speakers

Heather Hedden

Data & Knowledge Engineer
Semantic Web Company, Inc.



- Works on the professional services team of SWC serving PoolParty customers.
- Instructor of online, virtual, and onsite taxonomy courses and workshops.
- Former taxonomy consultant and staff taxonomist at various employers.
- Author of the book *The Accidental Taxonomist*, 3rd ed. (2022).



Donna Popky

Senior Taxonomy &
Information Architecture Specialist
Baker Library, Harvard Business School



- Member of the Information Management Team at the Harvard Business School.
- Has worked on taxonomy development, metadata creation, content structuring, data science and data governance for over 15 years.
- Holds advanced degrees in Linguistics and Library Science.

Outline

Heather Hedden

- Introduction to Taxonomy Linking
 - Linking types and standards
 - Mapping situations and methods
 - Linking in a taxonomy management system (PoolParty)

Donna Popky

- Harvard Business School Knowledge Hub and Spoke Model
 - Hub and spoke model
 - Hub development and mapping
 - Implementation: ETL, navigation, and search

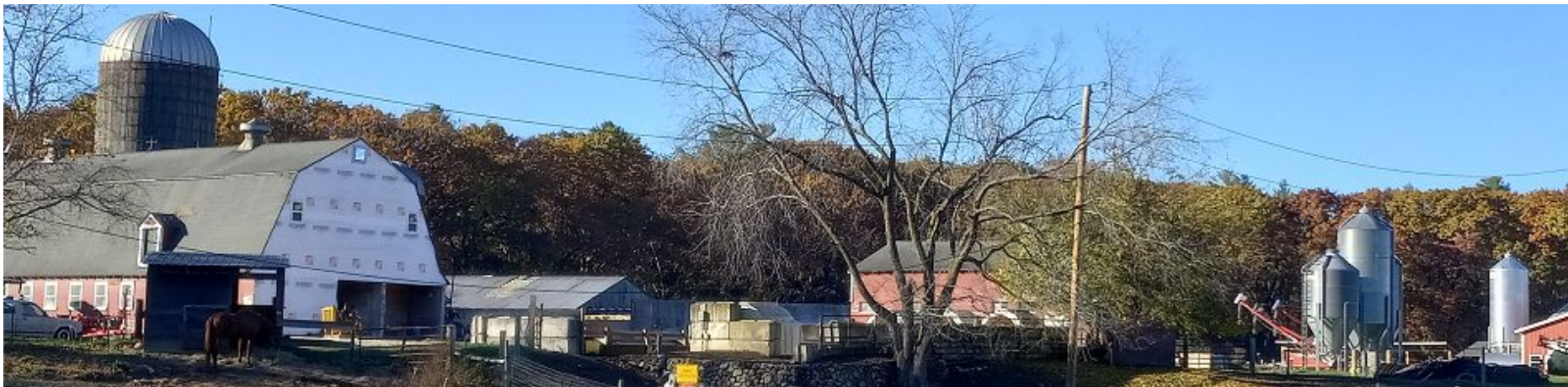
Breaking Down Silos

Silos need not (or cannot) be fully broken down

- Content in systems/applications with specific features
- Content owned and managed by their subject matter experts
- Content with specific users and delivery systems/user interfaces

But silos can be bridged, especially by means of metadata and taxonomies

- Sometimes with a shared taxonomy
- Sometimes by linking together separate taxonomies



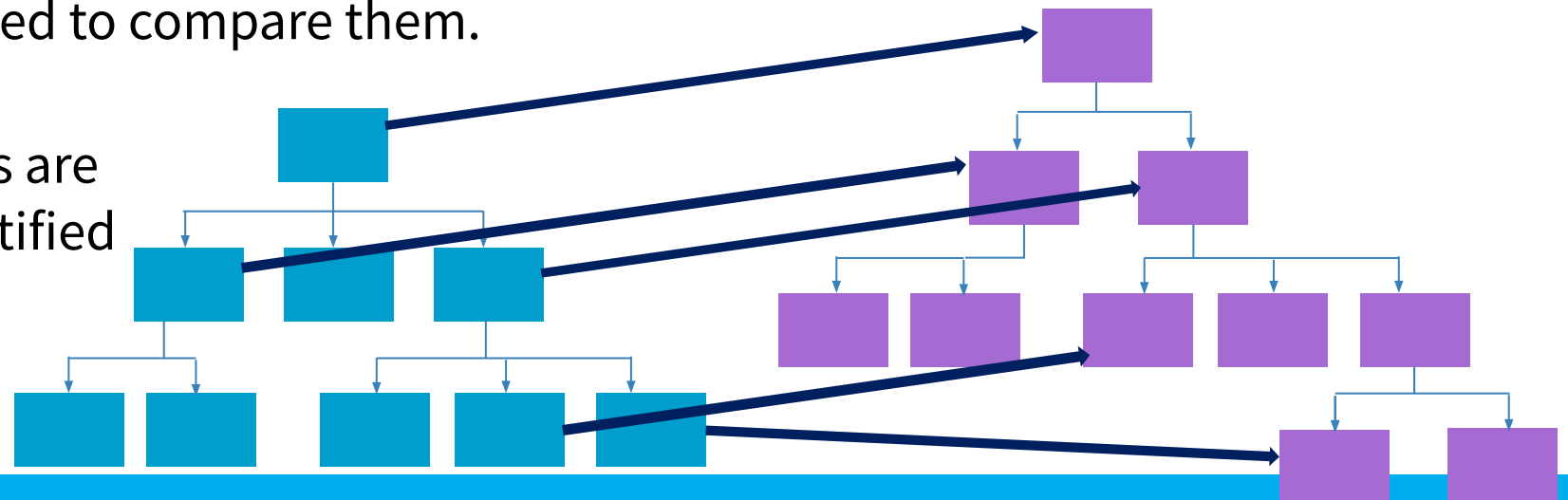
Intro to Linking Taxonomies

Why link taxonomies?

1. There is a reason to keep them distinct (distinct content, users, applications, management), *and...*
2. There is a need to query/access/manage all content or all taxonomies together.

How to link taxonomies

- ▶ Taxonomies are put into a single system with linking capabilities.
 - ▷ A linking feature of a taxonomy management system or scripting is used to compare them.
- ▶ Matches between individual concepts are automatically identified and then manually approved as links.



Taxonomy linking types and directions



Directional - “Mapping”

from one taxonomy to another with sufficiently equivalent and narrower-to-broader hierarchical links

- One taxonomy may be used for another in the front end.
- A taxonomy can be enriched with added concepts. > First step for merging



Bidirectional

- With equivalent (exact match) links, so that taxonomies and content can be shared. (**HBS case study**)
- With associative and/or hierarchical links, so that users can navigate to new content.



SKOS supports links across different concept schemes

SKOS names these cross-scheme links “mapping properties”

<https://www.w3.org/TR/skos-reference/#mapping>



"These properties are used to state mapping (alignment) links between SKOS concepts in different concept schemes, where the links are inherent in the meaning of the linked concepts."

- `exactMatch`
- `closeMatch`
- `broadMatch`
- `narrowMatch`
- `relatedMatch`

SKOS supports links across different concept schemes

SKOS names these cross-scheme links “mapping properties”

<https://www.w3.org/TR/skos-reference/#mapping>



"These properties are used to state mapping (alignment) links between SKOS concepts in different concept schemes, where the links are inherent in the meaning of the linked concepts."

- **exactMatch** – exact match, bidirectional, in all circumstances
- **closeMatch** – close match, bidirectional, in sufficient circumstances or in context
- **broadMatch** – has broader concept in the other taxonomy; inverse of narrowMatch
- **narrowMatch** – has narrower concept in the other taxonomy; inverse of broadMatch
- **relatedMatch** – has related concept in the other taxonomy; bidirectional

ISO 25964-2 *Thesauri and interoperability with other Vocabularies*

Part 2: Interoperability with other vocabularies (2013)

Inter-vocabulary mapping is the principal focus.



- Addresses the theory and method of various kinds of mappings.
- Addresses both one-way directional mapping, and multi-directional.
- Considers also mapping between thesauri and other kinds of vocabularies: synonym rings, classification schemes, subject heading schemes, taxonomies, terminologies, name authority lists, and ontologies.

Mapping directionality

from a tagged taxonomy (source) **to** a retrieval/user-interface taxonomy (target)

Consider the tagged-taxonomy/source terms as alternative labels for the retrieval taxonomy/target terms.

- Equivalent meaning is for the context.
- Narrower-to-broader matches are OK: a narrower concept in a tagging taxonomy may be mapped to a broader concept in the retrieval taxonomy, if no equivalent exists in the retrieval taxonomy.
- Many-to-one mappings are OK.



Mapping Taxonomies: Methods

Mapping directionality



Computer Hardware & Software	N	Computer Hardware
Computer Hardware & Software	N	Computer Software
Consumer Electronics & Appliances Stores	N	Consumer Electronics
Electrical & Electronic Manufacturing	Y	Electrical/Electronic Manufacturing
Health Care Services & Hospitals	Y	Hospital & Health Care
Sporting Goods Stores	Y	Sporting Goods
Automotive Parts & Accessories Stores	Y	Automotive
Biotech & Pharmaceuticals	N	Pharmaceuticals
Cable	N	Internet
Casual Restaurants	Y	Restaurants
Financial Analytics & Research	N	Research



Industries - G

Industries (100)

- Accounting (0)
- Advertising & Marketing (0)
- Aerospace & Defence (0)
- Airlines (0)
- Architectural & Engineering Services (0)
- Automotive Parts & Accessories Stores (0)
- Auto Repair & Maintenance (0)
- Banks & Credit Unions (0)
- Beauty & Personal Accessories Stores (0)
- Biotech & Pharmaceuticals (0)
- Brokerage Services (0)
- Building & Personnel Services (0)
- Business Service Centers & Copy Shops (0)
- Cable, Internet & Telephone Providers (0)
- Car Rental (0)
- Casual Restaurants (0)
- Catering & Food Service Contractors (0)
- Chemical Manufacturing (0)
- Colleges & Universities (0)
- Commercial Equipment Rental (0)
- Computer Hardware & Software (0)

Project Linking

Tree View

List View

Batch Linking

Mapping Type

SKOS

exactMatch

Industries - L

Industries

- Accounting
- Airlines/Aviation
- Alternative Dispute Resolution
- Alternative Medicine
- Animation
- Apparel & Fashion
- Architecture & Planning
- Arts and Crafts
- Automotive
- Aviation & Aerospace
- Banking
- Biotechnology
- Broadcast Media

Example in PoolParty taxonomy management software:
The mapping of one KOS on industries to another KOS on industries, using the Project Linking feature.

PROJECTCORPORATOOLSVANCED

enSearch Thesaurus Concepts

Industries - L

Industries (147)

Accounting (0)

Airlines/Aviation (0)

Alternative Dispute Resolution (0)

Alternative Medicine (0)

Animation (0)

Apparel & Fashion (0)

Architecture & Planning (0)

Arts and Crafts (0)

Automotive (0)

Aviation & Aerospace (0)

Banking (0)

Biotechnology (0)

Broadcast Media (0)

Building Materials (0)

Business Supplies and Equipment (0)

Capital Markets (0)

Chemicals (0)

Civic & Social Organization (0)

Civil Engineering (0)

Commercial Real Estate (0)

Computer & Network Security (0)

Computer Games (0)

Computer Hardware (0)

Computer Networking (0)

Computer Software (0)

Construction (0)

Consumer Electronics (0)

Select Project:

Industries - G

Link

Search or Drag a Concept Scheme or Concept here

Batch Linking Results

Status	Local Label	Linked Label	Match Type	Linking Scheme	Linking Predicate
▼ Pending	Accounting@en	Accounting@en	prefLabel <p>prefLabel</p>	SKOS	exactMatch
▼ Pending	Airlines/Aviation@en	Airlines@en	prefLabel/altLabel	SKOS	exactMatch
▼ Pending	Banking@en	Banks & Credit Unions@en	prefLabel <p>altLabel</p>	SKOS	exactMatch
▼ Pending	Chemicals@en	Chemical Manufacturing@en	prefLabel/altLabel		
▼ Pending	Construction@en	Construction@en	prefLabel/prefLabel		
▼ Pending	Consumer Goods@en	Consumer Products Manufacturing@en	prefLabel/altLabel		
▼ Pending	Defense & Space@en	Aerospace & Defence@en	prefLabel/altLabel	SKOS	exactMatch
▼ Pending	Electrical/Electronic Manufacturing@en	Electrical & Electronic Manufacturing@en	prefLabel/altLabel	SKOS	exactMatch
▼ Pending	Food & Beverages@en	Food & Beverage Manufacturing@en	prefLabel/altLabel	SKOS	exactMatch

Batch linking results, matching preferred labels to each other, or alternative-to-preferred labels, for manual approval or editing.


Industries - L
Industries (147)
Accounting (0)
Airlines/Aviation (0)
Alternative Dispute Resolution (0)
Alternative Medicine (0)
Animation (0)
Apparel & Fashion (0)
Architecture & Planning (0)
Arts and Crafts (0)
Automotive (0)
Aviation & Aerospace (0)
Banking (0)
Biotechnology (0)
Broadcast Media (0)
Building Materials (0)
Business Supplies and Equipment (0)
Capital Markets (0)
Chemicals (0)
Civic & Social Organization (0)
Civil Engineering (0)
Commercial Real Estate (0)
Computer & Network Security (0)
Computer Games (0)
Computer Hardware (0)
Computer Networking (0)
Computer Software (0)
Construction (0)
Consumer Electronics (0)
Consumer Goods (0)
Consumer Services (0)
Cosmetics (0)
Dairy (0)
Defense & Space (0)
Design (0)
Education Management (0)


Accounting



<https://hedden-information.poolparty.biz/Industries-L/1>


Add to Collection
Add to Blacklist
Delete


Details
Notes
Documents
Linked Data
Triples
Visualization
Quality Management


SKOS  +

Broader Concepts




Narrower Concepts
 



Related Concepts




Top Concept of Concept Schemes

[Industries](#)



Exact Matching Concepts
 [Accounting](#)



Linked Project: Industries - G


 


Close Matching Concepts
 


Broader Matching Concepts
 


Narrower Matching Concepts
 


Related Matching Concepts
 


Preferred Label
 Accounting


Alternative Labels


Hidden Labels


Notation


Scope Notes


Example


Definitions


Concept details
Advanced SKOS view
displays the various SKOS
mapping types.