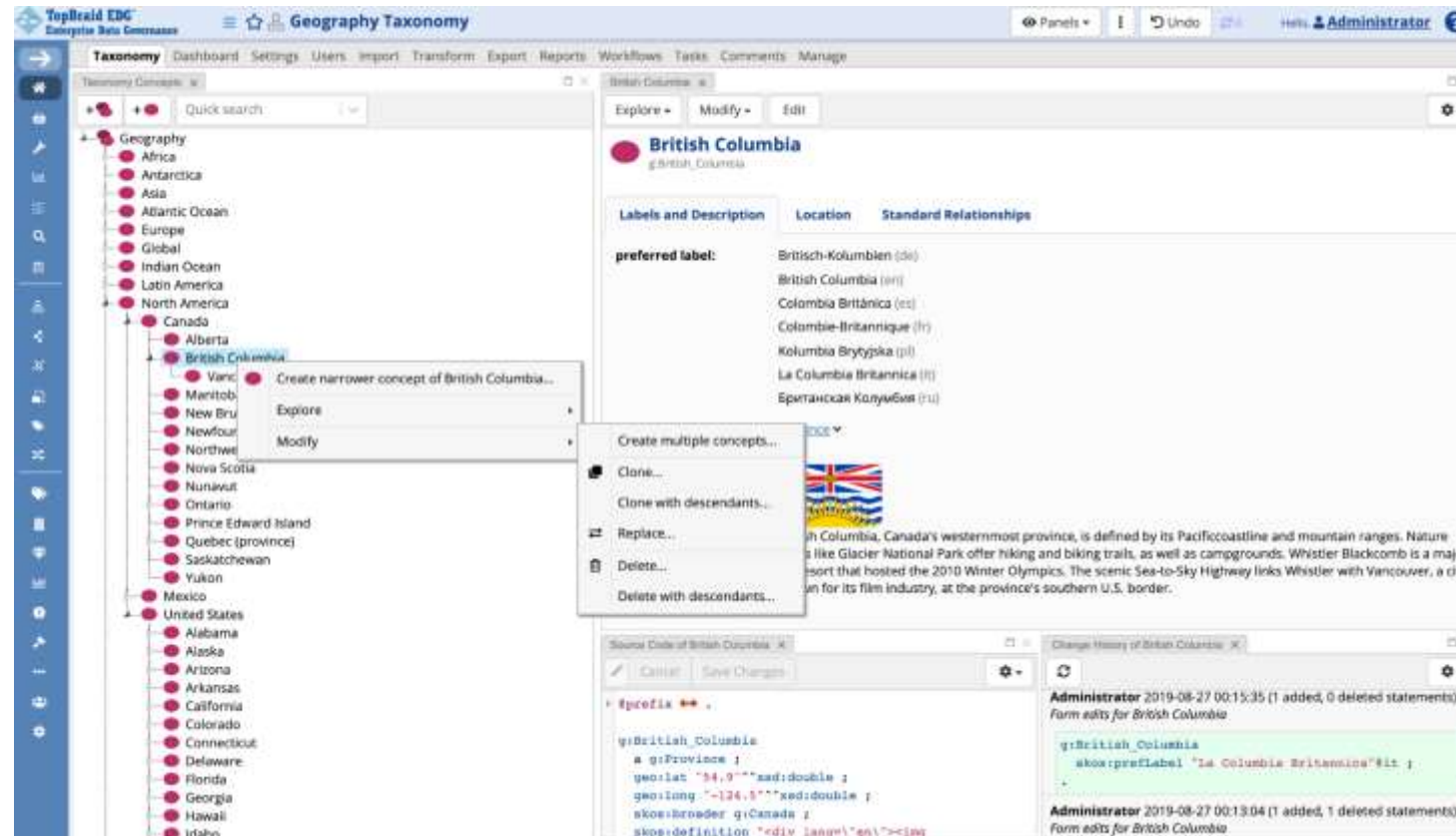


Taxonomies, Ontologies, Knowledge Graphs, Oh My!



The screenshot displays the TopBraid EDC interface for managing a Geography Taxonomy. On the left, a tree view shows a hierarchy of geographical entities, including Africa, Asia, Europe, North America, and Canada. Under Canada, various provinces and territories are listed, with British Columbia selected. A context menu is open over British Columbia, offering options like 'Create narrower concept of British Columbia...', 'Explore', 'Modify', 'Create multiple concepts...', 'Clone...', 'Clone with descendants...', 'Replace...', 'Delete...', and 'Delete with descendants...'. The main panel shows the details for 'British Columbia', including its labels in multiple languages (e.g., 'Britisch-Kolumbien (de)', 'British Columbia (en)', 'Columbia Britannica (it)', 'Kolumbia Brytyjska (pl)', 'La Columbia Britannica (fr)', 'Британская Колумбия (ru)') and a description. Below the details, there are two panels: 'Source Code of British Columbia' showing a JSON-LD snippet and 'Change History of British Columbia' showing a log of administrative changes.

Sept. 26, 2019 11:30am EDT

Taxonomies, Ontologies, Knowledge Graphs, Oh My!

- INTRODUCTION
 - Highlight examples of Taxonomies, Ontologies and Knowledge Graphs:
 - What are they? How are they different? How are they used?
 - Briefly discuss the technology behind them
- QUICK SURVEY
- DEMO
- WRAP-UP
- Q & A



Jesse Lambert



Irene Polikoff

FOUNDATION

- TopQuadrant was founded in 2001
- Strong commitment to standards-based approaches to data semantics

MISSION

- Empower people and drive results — by making enterprise information meaningful



FOCUS

- Provide comprehensive data governance solutions

Everyday Taxonomies

amazon laptop

1-16 of over 100,000 results for "laptop"

Amazon Prime

Eligible for Free Shipping

Department: Electronics, Computers & Accessories, Laptop Computers

Avg. Customer Review: 4.5 stars

Brand: Acer, Dell, HP, Samsung, ASUS, RCA, SquareTrade, Apple, AmazonBasics, AST Computer, Samsung Chromebook

Subscribe & Save

Computer RAM Capacity: 64 GB & Above, 32 GB, 24 GB, 16 GB, 12 GB, 8 GB, 6 GB, 4 GB, 3 GB, 2 GB

ebay watches

watches for men

watches for men - Watches, Parts & Accessories

watches for men - Smart Watches

watches women

watches lot

watches women free shipping

watches for kids

watches auction

watches box

watches invicta

watches gold antique

Categories: Jewelry & Watches, Watches, Parts & Accessories, Wristwatches, Wristwatch Bands, Parts, Tools & Guides, Pocket Watches

Gender: Men, Women

Brand: Rolex, Omega, Cartier, Breitling, Tissot, Swatch, Citizen, Casio, Seiko, Fossil, Michael Kors, Michael Kors Access, Michael Kors Smartwatch, Michael Kors Access Smartwatch, Michael Kors Access Smartwatch, Michael Kors Access Smartwatch

Display: Analog, Digital, Smartwatch

Movement: Automatic, Quartz, Mechanical, Automatic, Quartz, Mechanical, Automatic, Quartz, Mechanical

Band Material: Metal, Leather, Rubber, Silicone, Nylon, Fabric, Paper, Wood, Glass, Ceramic, Steel, Titanium, Carbon Fiber, Kevlar, Fiberglass, Carbon Fiber, Kevlar, Fiberglass, Carbon Fiber, Kevlar, Fiberglass

Band Color: Gold, Silver, Black, Brown, Blue, Green, Red, Orange, Yellow, Purple, Pink, White, Grey, Blue, Green, Red, Orange, Yellow, Purple, Pink, White, Grey

Face Color: White, Black, Brown, Blue, Green, Red, Orange, Yellow, Purple, Pink, White, Grey

Watch Shape: Round, Square, Rectangular, Oval, Triangular, Trapezoidal, Irregular

Case Material: Metal, Plastic, Rubber, Silicone, Nylon, Fabric, Paper, Wood, Glass, Ceramic, Steel, Titanium, Carbon Fiber, Kevlar, Fiberglass

DATA.GOV

DATA CATALOG

New England Coast

2,200 datasets for "New England Coast"

F00343: NOS Hydrographic Survey New York, 1990-05-07

F00340: NOS Hydrographic Survey New York, 1989-11-15

F00157: NOS Hydrographic Survey New York, 1983-10-29

F00262: NOS Hydrographic Survey New York, 1984-10-26

F00268: NOS Hydrographic Survey New York, 1984-10-23

F00293: NOS Hydrographic Survey New York, 1986-12-10

F00303: NOS Hydrographic Survey, Southern New England Coast, Connecticut and New York, 1988-08-25

Home Improvement > drill

1-38 of 1,000+ results

Refine by

Departments

Delivery & Pickup

Power Type

Price

Brand

Product Category

Voltage

Chuck Size

Customer Rating

Retailer

Special Offers

Chuck Type

Battery Type

Battery included

Color

Makita-KFD02Z 18V Lithium-Ion Cordless Drill

\$99.00

Sold & shipped by Acme Tools

Hyper-Tough HT Co Max Lithium Ion Co

***** 78

\$24.84 List: 69.99

2-day delivery Free pickup today!

Home > Search Results: "intel"

"INTEL"

Department: CPUs / Processors

Processors - Desktops (399+)

Motherboards: Intel Motherboards (399+)

Memory: Desktop Memory (399+), DIY PC Combs (224), Gaming Desktops (399+)

Manufacturer: Intel

Condition: Intel

Price: Intel

Seller: Intel

Useful Links: Intel

You May Also Be Interested In:

MSI Radeon RX 5 DirectX 12 RX 570 AF MK2 8G OC 8GB 256

Intel Core i9-9900K Coffee Lake 8-Core, 16-Thread, 3.6 GHz (5.0 GHz Turbo) LGA 1151 (300 Series) 95W...

\$494.99 (32 Offers)

Free Shipping

VIEW DETAILS

Intel Core i7-9700K Coffee Lake 8-Core 3.6 GHz (4.9 GHz Turbo) LGA 1151 (300 Series) 95W...

\$364.99 (13 Offers)

Sale Ends in 2 Days (Thu)

Free Shipping

What is a Knowledge Graph?

Robert De Niro



Peugeot 406



Paris, France

driven by

brand

headquarters

starred in

worked on

part of

1998

released

Prince Engine



actor

actor

worked on

part of



Natascha McElhone



E34 BMW M5



Munich, Germany

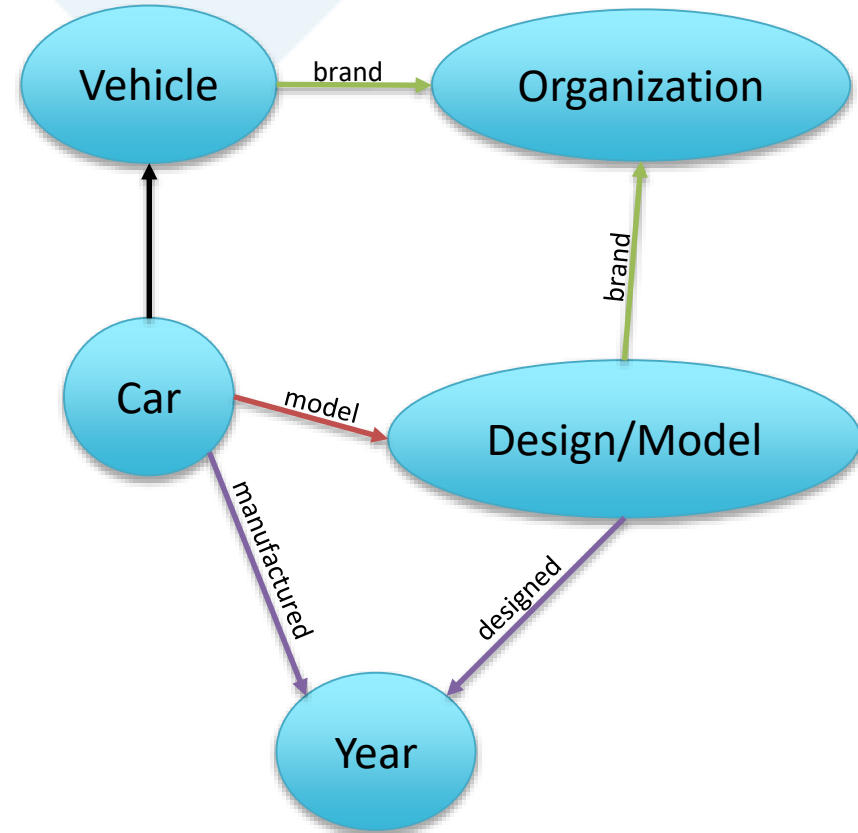
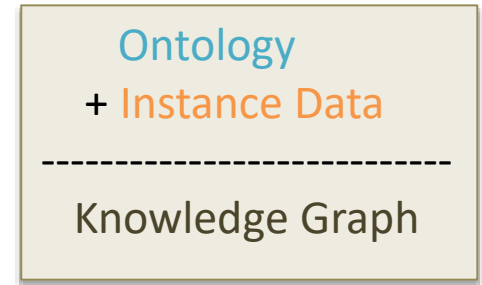
driven by

brand

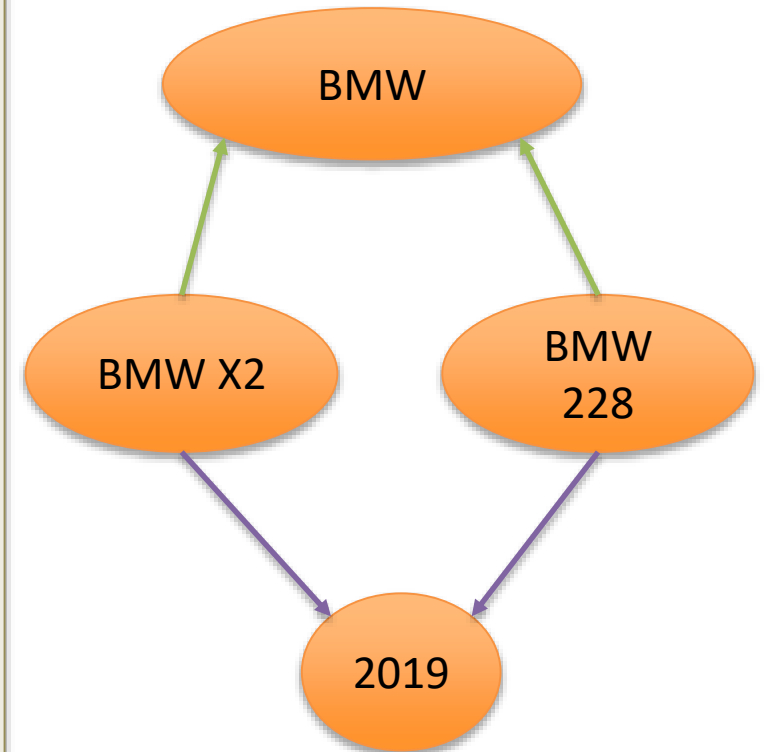
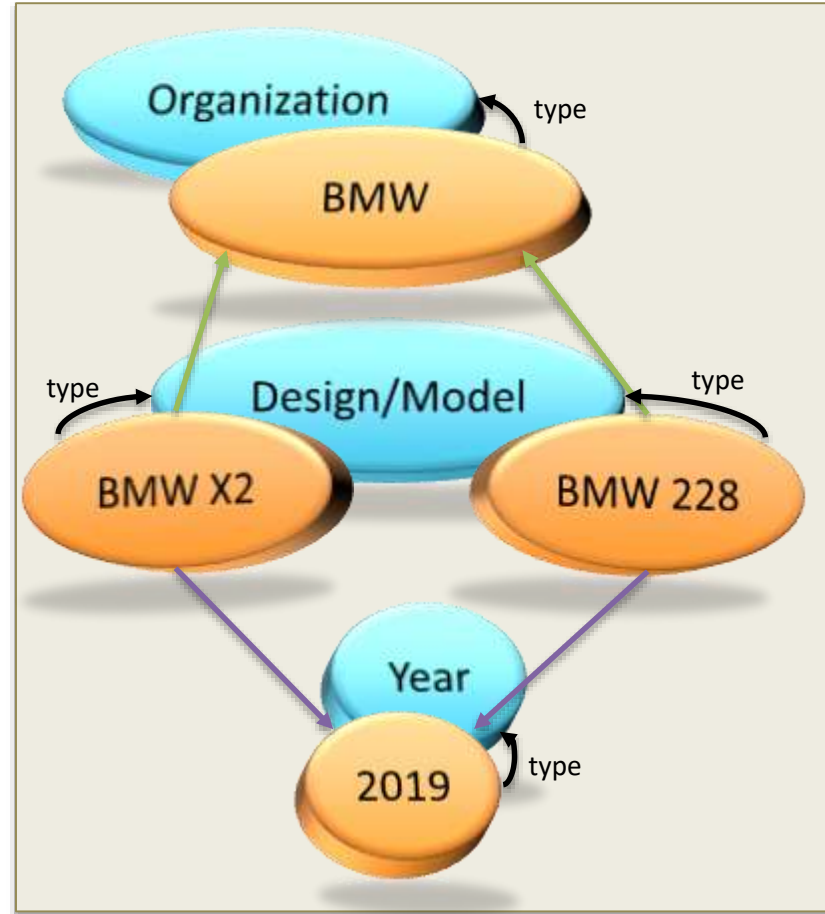
headquarters

starred in

Knowledge Graph Recipe



***Blueprint**



***Actuals**

But What About Taxonomy?

- Taxonomy in technology does not carry a definitive definition, it is **HOW THEY ARE USED** that matters.
- A major dimension of taxonomy is hierarchy.
- A taxonomy is more than just hierarchy.

- **A Taxonomy, done right, is a Knowledge Graph.**

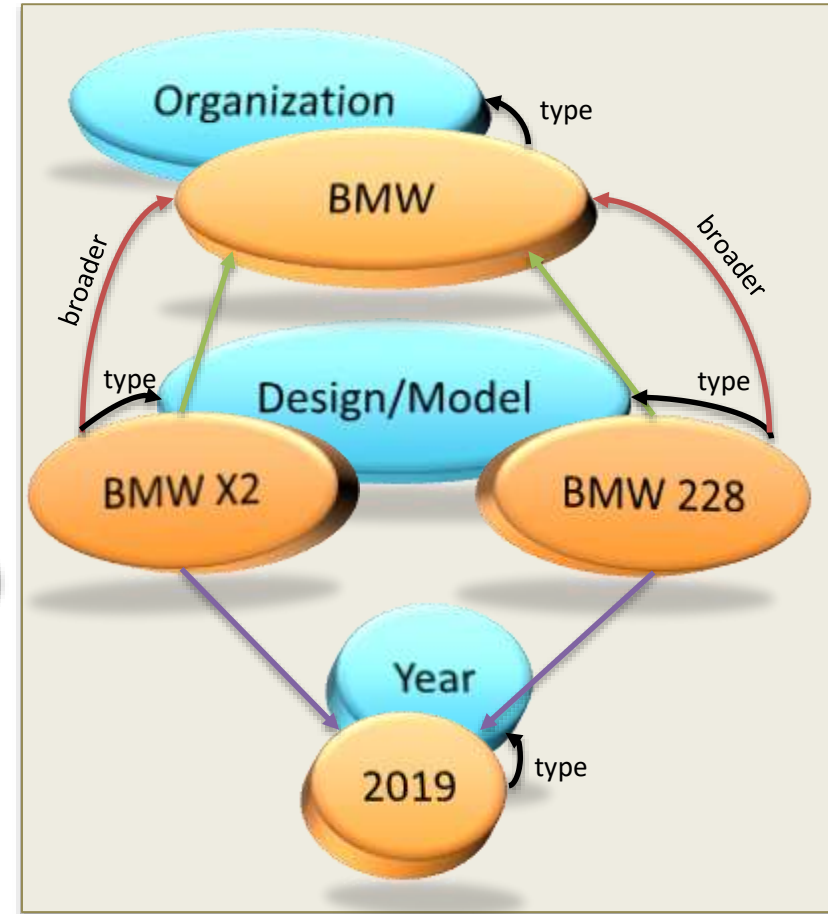
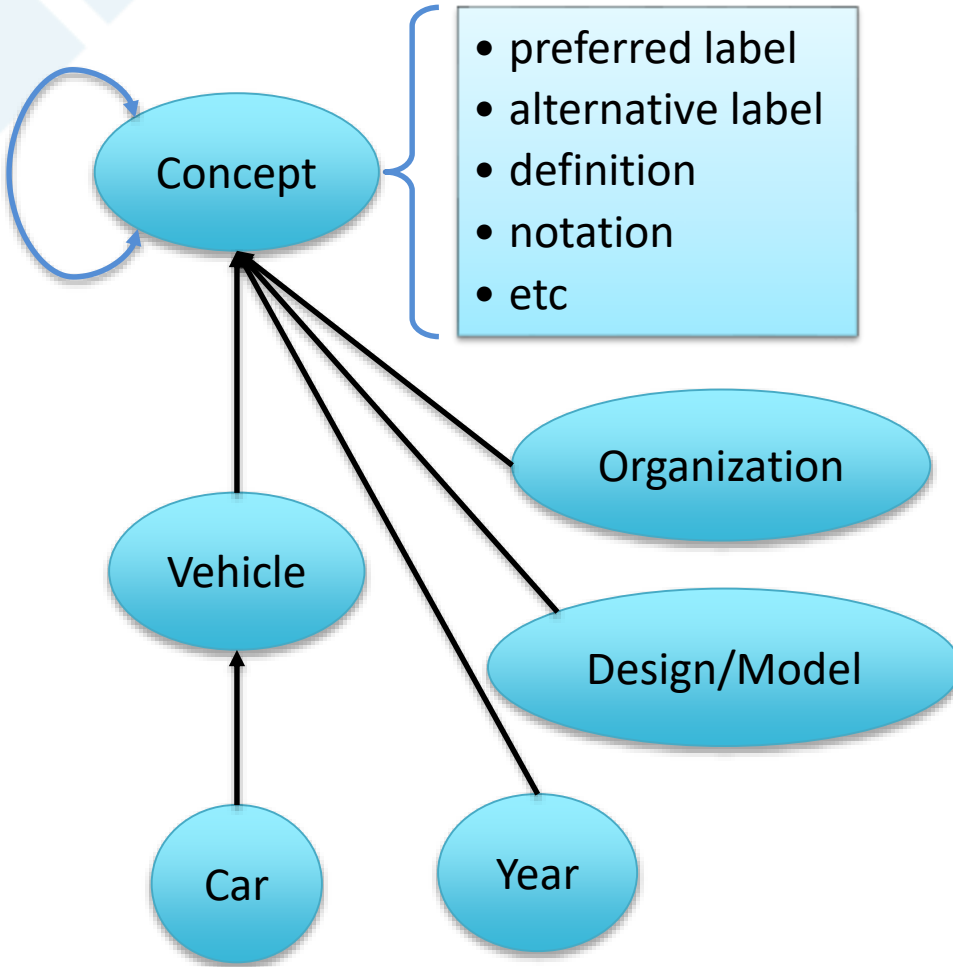
The Blueprint for Taxonomy is SKOS

- Wikipedia: Taxonomy is the practice and science of classification of things or concepts, including the **principles that underlie** such classification.
- W3C **SKOS** Reference: The Simple Knowledge Organization System is a **common data model** for knowledge organization systems such as thesauri, classification schemes, subject heading systems and taxonomies.
 - SKOS distinguishes between two basic categories of semantic relation: hierarchical and associative.
 - A hierarchical link between two concepts indicates that one is in some way more general ("**broader**") than the other ("narrower").
 - An associative link between two concepts indicates that the two are inherently "**related**", but that one is not in any way more general than the other.

Ontology

Adding Taxonomy to the Recipe

- *broader
- related
- close match
- etc

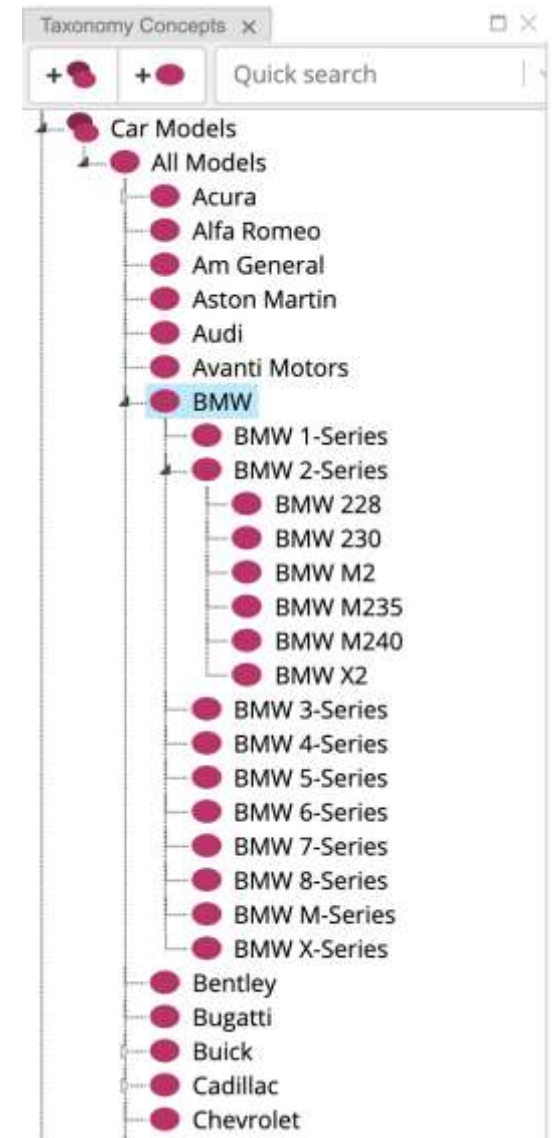


- Car Models
- All Models
- Acura
- Alfa Romeo
- Am General
- Aston Martin
- Audi
- Avanti Motors
- BMW**
 - BMW 1-Series
 - BMW 2-Series
 - BMW 228
 - BMW 230
 - BMW M2
 - BMW M235
 - BMW M240
 - BMW X2
 - BMW 3-Series
 - BMW 4-Series
 - BMW 5-Series
 - BMW 6-Series
 - BMW 7-Series
 - BMW 8-Series
 - BMW M-Series
 - BMW X-Series
- Bentley
- Bugatti
- Buick
- Cadillac
- Chevrolet

*A broader form of 'Is-A' is broader :)

Taxonomies in e-Commerce

The screenshot shows the cars.com website with a search bar and a dropdown menu for BMW models. The search bar includes options for "Search by Make" and "Search by Body Style". The dropdown menu is open, showing a list of BMW models including 1-Series, 2-Series, 3-Series, 4-Series, 5-Series, 6-Series, 7-Series, 8-Series, M-Series, and X-Series. The website header includes navigation links for "Cars for Sale", "Sell Your Car", "Service & Repair", "Research", and "Videos & Reviews". A banner image shows a blue SUV driving on a dirt road.



Same Domain, Different Use

Luxury cars ▾

[Overview](#) [Ratings & Reliability](#) [Recommended](#) [Buying Guide](#)

Luxury cars Ratings

Luxury cars offer a premium driving experience by combining pampering interior comfort and refined performance with proven advanced safety features.

View our [ratings and reviews](#), and browse our [buying guide](#) to find the best luxury car for you.

Find Luxury cars Ratings

Select Make ▾ Select Model ▾ Select Year ▾ [Go](#)



Luxury entry-level cars (4)

Small, upscale, and dressed in prestige branding, these entry-level luxury cars often promise more than they deliver. These can be rebranded, upgraded versions of mainstream models that command a price premium.

[Luxury entry-level cars](#)



Luxury compact cars (15)

This popular segment features truly sporty, luxurious models from prestige brands. Optional equipment can make the prices soar. Reliability varies widely.

[Luxury compact cars](#)



Luxury midsize cars (17)

Truly polished cars, the best midsize models define luxury with space, power, and a pampering driving experience. Expect all the latest bells and whistles. AWD is widely available.

[Luxury midsize cars](#)



Ultra-luxury cars (7)

The top of the car hierarchy, ultra-luxury sedans stand out for their premium packaging, potent powertrains, and leading-edge technology. These are big sedans that command big prices, but they providing a rewarding experience for both driver and passengers.

[Ultra-luxury cars](#)



Luxury entry-level SUVs (10)

A first step into the realm of prestige brands, these entry-level models tend to offer some premium touches but fall short of a true luxury experience. These can be derived from humble, rather basic vehicles. Well-equipped mainstream models can be smart alternatives.

[Luxury entry-level SUVs](#)



Luxury compact SUVs (16)

These models feel like the essence of a premium brand, compressed into a small package. Performance, handling, and amenities can rise to true luxury levels, though often the price can grow just as precipitously. Cabin space and modest base-level amenities tend to be compromises.

[Luxury compact SUVs](#)



Luxury midsize SUVs (19)

Power, convenience, and comfort are hallmarks of luxury midsize vehicles. Expect high-tech features, premium packaging, and coddling comfort. Many models offer a third seating row. All-wheel drive and advanced safety features are a given.

[Luxury midsize SUVs](#)



Luxury large SUVs (6)

As roomy, do-it-all vehicles, large luxury SUVs typically provide three seating rows, generous cabin space, and commensurate cargo capacity. Expect the very latest in comfort and convenience tech. Some models are better suited to towing and off-roading.

[Luxury large SUVs](#)

Different Ways to Organize Car Models

Taxonomy Concepts

- Car Models
 - All Models
 - Acura
 - Alfa Romeo
 - Am General
 - Aston Martin
 - Audi
 - Avanti Motors
 - BMW
 - BMW 1-Series
 - BMW 2-Series
 - BMW 228
 - BMW 230
 - BMW M2
 - BMW M235
 - BMW M240
 - BMW X2
 - BMW 3-Series
 - BMW 4-Series
 - BMW 5-Series
 - BMW 6-Series
 - BMW 7-Series
 - BMW 8-Series
 - BMW M-Series
 - BMW X-Series
 - Bentley
 - Bugatti
 - Buick
 - Cadillac
 - Chevrolet
 - Chrysler
 - Daewoo
 - Daihatsu

BMW 228

Labels and Description

preferred label: BMW 228

alternative label: 228

type: Concept

Standard Relationships

broader concept: BMW 2-Series

preferred label: BMW 2-Series

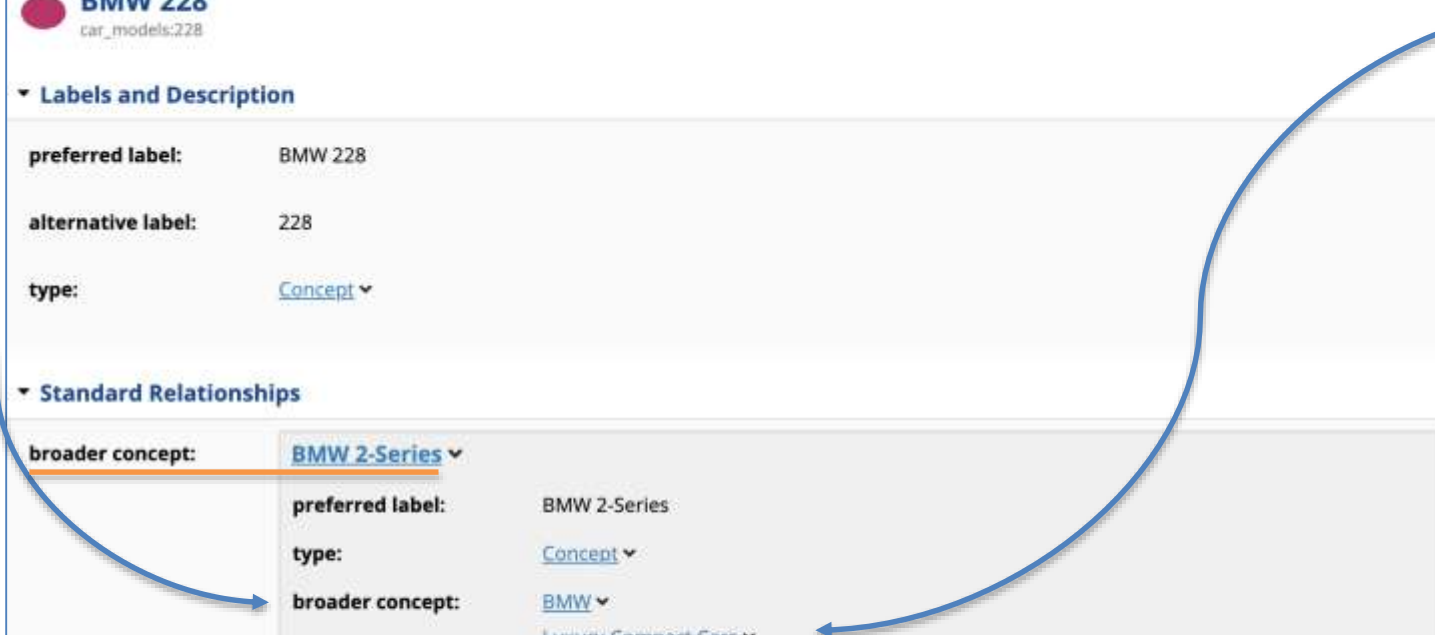
type: Concept

broader concept: BMW

narrower concept: BMW 228, BMW 230, BMW M2, BMW M235, BMW M240, BMW X2

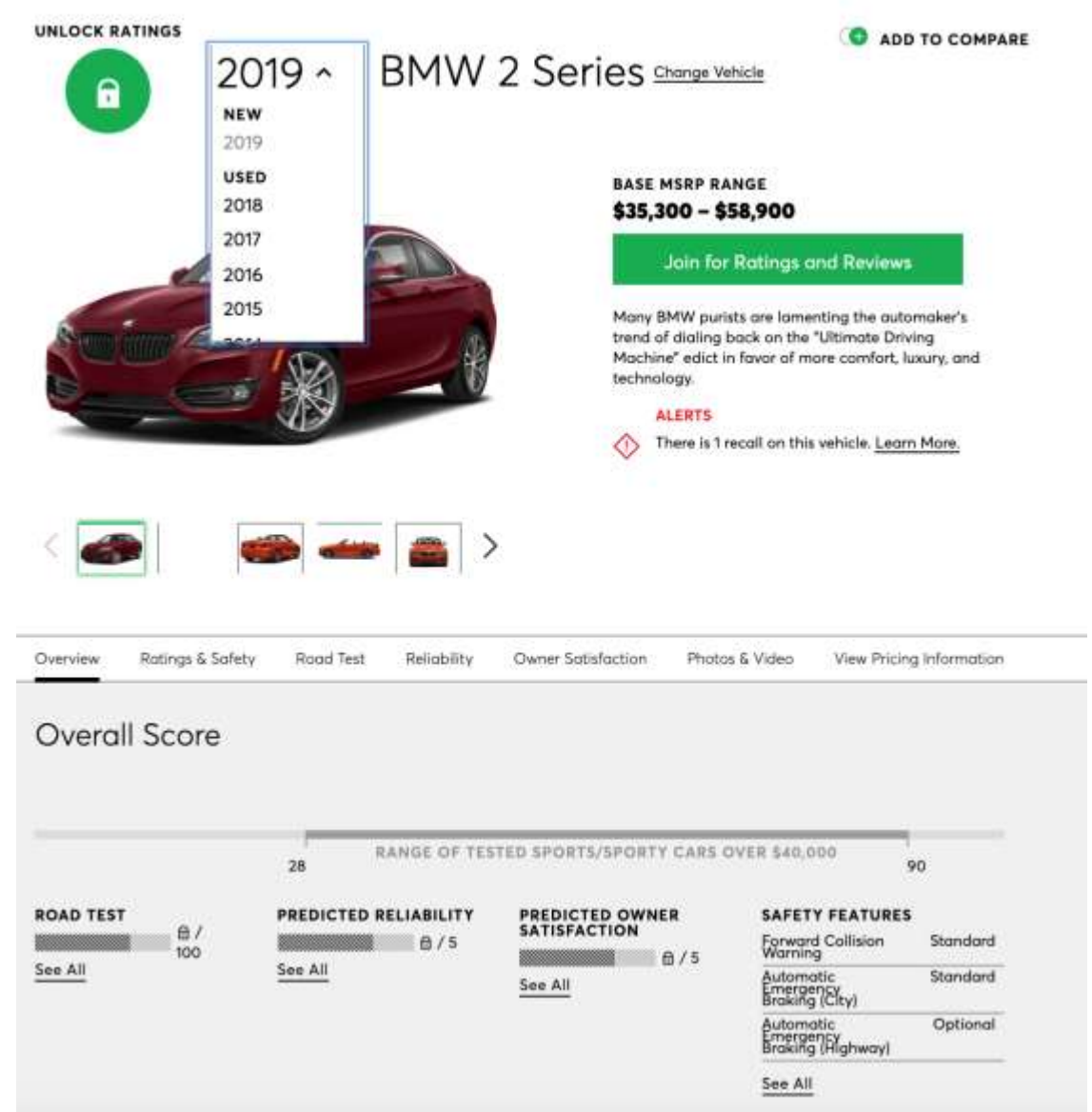
Taxonomy Concepts

- Car Types
 - Convertibles
 - Hybrid EVs
 - Luxury Cars
 - Luxury Compact Cars
 - Acura TLX
 - BMW 2-Series
 - BMW 228
 - BMW 230
 - BMW M2
 - BMW M235
 - BMW M240
 - BMW X2
 - BMW 3-Series
 - Buick Regal
 - Cadillac CT5
 - Genesis G70
 - Infiniti Q50
 - Jaguar XE
 - Kia Stinger
 - Lexus IS
 - Mercedes-Benz C-Class
 - Tesla Model 3
 - Volkswagen Arteon
 - Volvo S60
 - Luxury Compact SUVs
 - Luxury Entry-level Cars
 - Luxury Entry-level SUVs
 - Luxury Large SUVs
 - Luxury Midsize Cars
 - Luxury Midsize SUVs
 - Ultra-luxury Cars
 - Minivans
 - Pickup Trucks



Each Site has a Purpose

- Cars.com lists cars for sale
- Consumer Reports provides information about cars
 - Its taxonomy may have 2019, 2018, etc. BMW 2 Series
 - But may not have BMW 228 model
 - Information it would need to capture for BMW 2 Series is also different



UNLOCK RATINGS

2019 ^ BMW 2 Series [Change Vehicle](#)

NEW
2019
USED
2018
2017
2016
2015

BASE MSRP RANGE
\$35,300 – \$58,900

[Join For Ratings and Reviews](#)


Many BMW purists are lamenting the automaker's trend of dialing back on the "Ultimate Driving Machine" edict in favor of more comfort, luxury, and technology.


ALERTS
There is 1 recall on this vehicle. [Learn More.](#)


Overview Ratings & Safety Road Test Reliability Owner Satisfaction Photos & Video View Pricing Information

Overall Score

28 RANGE OF TESTED SPORTS/SPORTY CARS OVER \$40,000 90

ROAD TEST  8 / 100 [See All](#)

PREDICTED RELIABILITY  8 / 5 [See All](#)

PREDICTED OWNER SATISFACTION  8 / 5 [See All](#)

SAFETY FEATURES

Forward Collision Warning	Standard
Automatic Emergency Braking (City)	Standard
Automatic Emergency Braking (Highway)	Optional

[See All](#)

Demonstration

- Quick survey
- What you'll see
 - Common use cases (ex. better search)
 - Navigating many Taxonomies
 - Editing Taxonomies and Ontologies
 - Crosswalking Taxonomies
 - Quality
 - GraphQL

DEMO

Enterprise Capabilities Across Knowledge Graphs

- **Collaboration:** Event notifications, tasks and comments.
- **Governance:** Configurable workflows with virtual work-in-progress copies of changes for controlled review and approval. Custom defined subject areas, governance roles, configurable dashboards with metrics.
- **Editing with Access Control and Audit Trail:** Different editor applications for different asset collection types, multi-lingual, cloning, merging, rich text support, batch edit operations for selected groups of assets, full audit history.
- **Importing:** From RDBMs, spreadsheets, XML, DDL, RSS feeds, SPARQL endpoints and other formats.
- **Discovery and Enrichment:** Auto-mapping of crosswalks, automated tagging of content, and data rules for validation and reasoning.
- **Search, Reporting and Visualization:** Parametric and faceted search. Built-in reporting. Visual navigation.
- **Systems Integration:** Integrate with enterprise systems via Web Services and APIs.

Conclusion

- Taxonomies are everywhere
- Ontology as blueprints for Taxonomies and Knowledge Graphs
- Hierarchical relationships and associative relationships are equally important and SKOS gives us a foundation
- We saw TopBraid EDG in action, creating and connecting Knowledge Graphs

- You may have noticed a new UI/UX...



... Questions?

TopBraid EDG 6.3 Provides Market Leading Support for Taxonomies and Ontologies

- Taxonomy Editing and Management:
 - TopBraid EDG makes it easy to create taxonomies and to use them to power search, document classification, content navigation and other applications
 - See: ***Taxonomy Editing and Management in TopBraid EDG 6.3.pdf*** *

- Ontology Editing and Management:
 - Ontologies and ontology modeling are central to TopBraid EDG since ontologies define schemas for all other types of asset collections, including taxonomies (knowledge graphs)
 - See: ***Ontology Editing and Management in TopBraid EDG 6.3.pdf*** *

* These overview slide presentations will be made available with the other webinar resources including the recording, slides used in the webinar, and Q & A

To Learn More about TopBraid EDG's Support for Taxonomy, Ontology and Knowledge Graph Management

EDG Product Info:

- <https://www.topquadrant.com/products/topbraid-enterprise-data-governance/>
- <https://www.topquadrant.com/products/topbraid-edg-vocabulary-management/>

Contact us: at info@topquadrant.com to:

- Discuss vocabulary management solutions (glossaries, taxonomies, ontologies)
- Request a more targeted demo of TopBraid EDG – Vocabulary Management
- Ask for a free EDG evaluation account

More Resources ...

More Webinar Recordings, Slides, Q&A:

- <https://www.topquadrant.com/knowledge-assets/topquadrant-webinars/>

Short Videos:

- TopBraid EDG “Quick Grok” Videos
<https://www.topquadrant.com/knowledge-assets/videos/>
- TopBraid EDG Animated Video
<http://www.topquadrant.com/EDGvideoemail/>

Blog:

- <https://www.topquadrant.com/the-semantic-ecosystems-journal/>

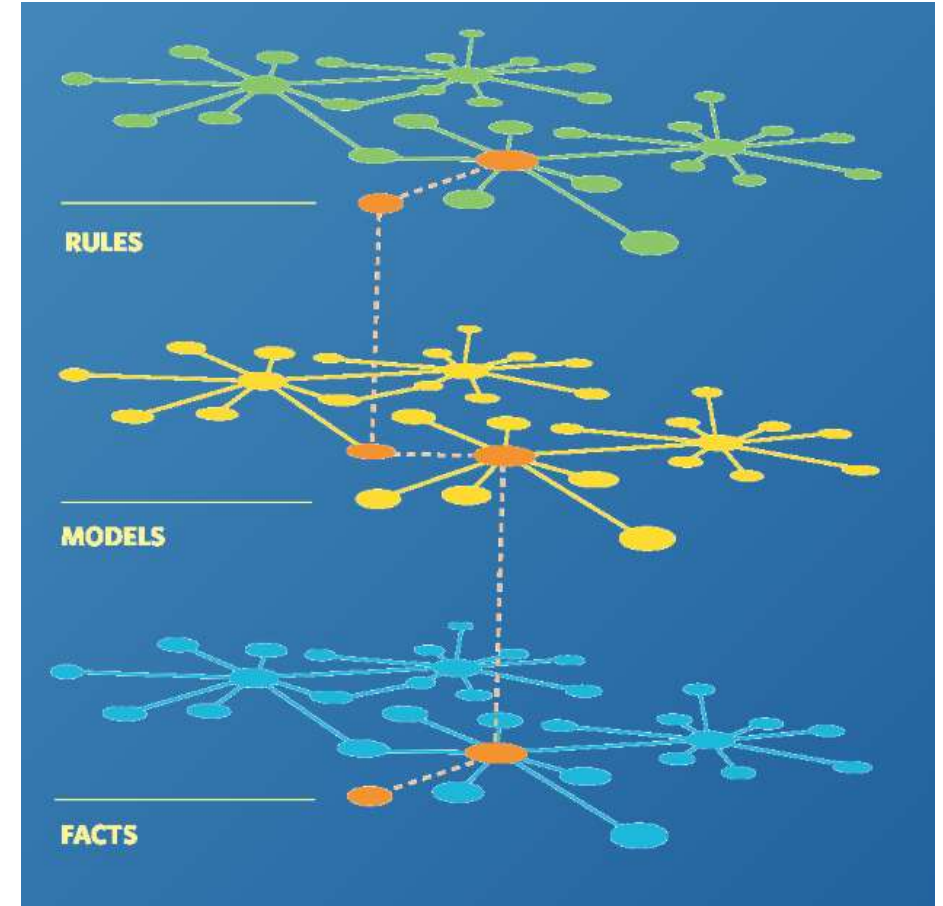
Data Governance White Papers

- <https://www.topquadrant.com/knowledge-assets/whitepapers/https://www.topquadrant.com/knowledge-assets/whitepapers/>

Benefits of a Knowledge Graph based Platform for Data Governance 2.0

TopBraid Enterprise Data Governance (EDG):

- Is flexible and extensible, based on standards
- Integrates reasoning and machine learning
- Enables people (UI) and software (APIs/web services) to view, follow and query
- Bridges data and metadata “silos” for a seamless data governance
- Delivers Knowledge-driven data governance



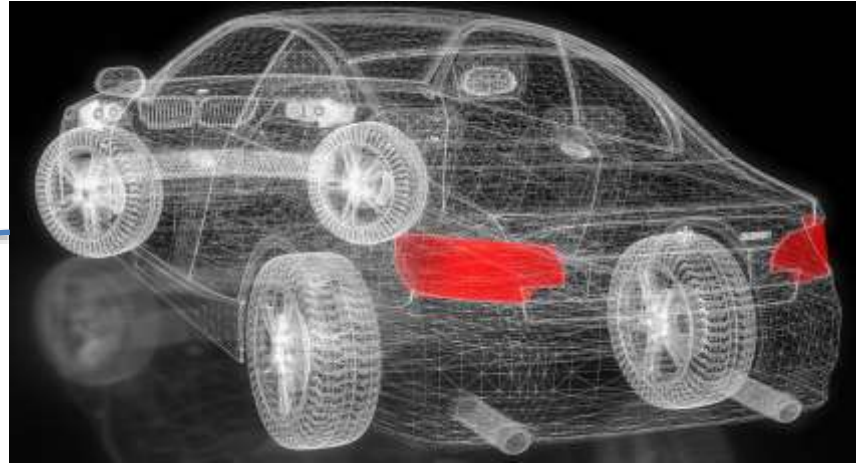
As an enterprise knowledge graph infrastructure, TopBraid EDG supports Data Governance 2.0 and applications of AI / ML

When Does Taxonomy Stop and other (Master, Operational) Data Start?

Taxonomy Concepts

Quick search

- Car Models
 - All Models
 - Acura
 - Alfa Romeo
 - Am General
 - Aston Martin
 - Audi
 - Avanti Motors
 - BMW
 - BMW 1-Series
 - BMW 2-Series
 - BMW 228**
 - BMW 230
 - BMW M2
 - BMW M235
 - BMW M240
 - BMW X2
 - BMW 3-Series
 - BMW 4-Series
 - BMW 5-Series
 - BMW 6-Series
 - BMW 7-Series
 - BMW 8-Series
 - BMW M-Series
 - BMW X-Series
 - Bentley
 - Bugatti
 - Buick
 - Cadillac
 - Chevrolet
 - Chrysler
 - Daewoo
 - Daihatsu



The category, model, design, etc of a car.

VS



BMW CERTIFIED

\$28,975 | 29,097 mi.

2016 BMW 228i xDrive

FAIR PRICE

Ext. Color: White | Transmission: Automatic
Int. Color: Black | Drivetrain: AWD

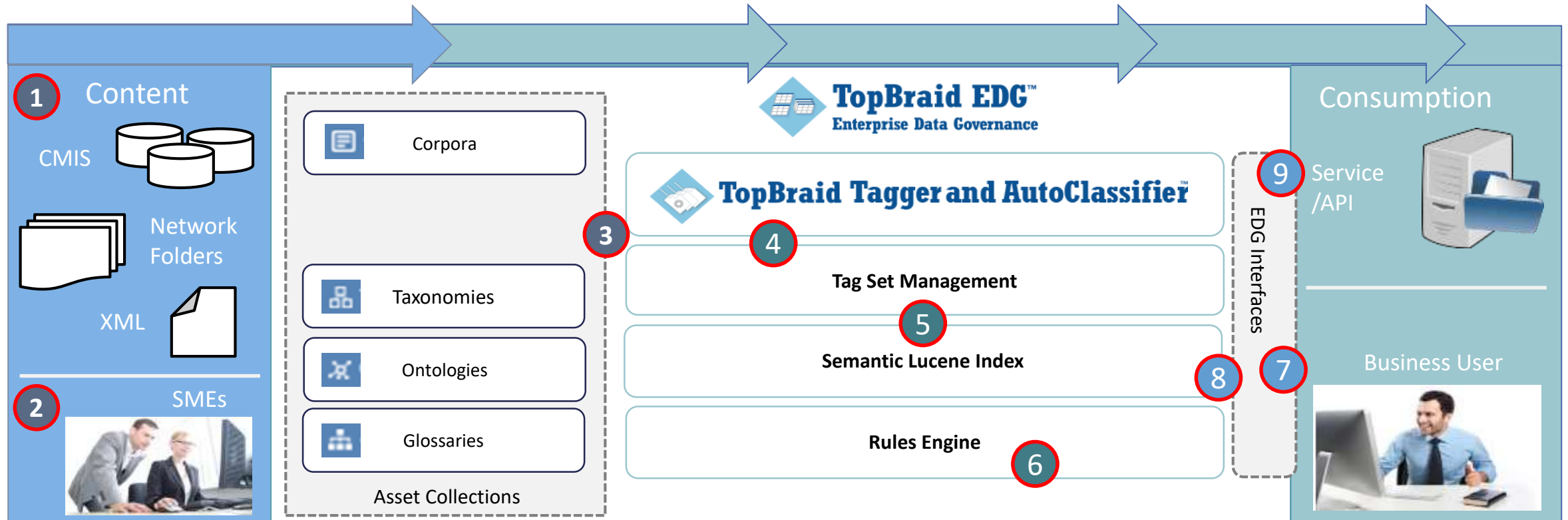
Free CARFAX 1-Owner Report

BMW of Darien (866) 583-4470
★★★★☆ 4.6 (429 reviews) | 15 mi. from 10543 | Authorized BMW Dealer
Certified Pre-Owned

Check Availability

The individual car with a VIN#.

TopBraid EDG: Search Enrichment



- 1** Content is retrieved/received over many connectors. SMEs of all sorts develop/integrate vocabularies. As needed, they also review and curate auto-classification results providing input that improves results accuracy over time.
- 2** As needed, they also review and curate auto-classification results providing input that improves results accuracy over time.
- 3** Vocabularies and curation feedback are leveraged by AutoClassifier to extract information from unstructured content inside Asset Collections.

- 4** AutoClassifier uses machine learning to populate maintainable Tag Sets (relationships between 'Content' and 'Concepts').
- 5** Text, Tags, and other relevant characteristics of Assets are indexed for optimized search and discovery.
- 6** Semantic models and business rules can be used to further post process and extend results

- 7** Search user submits a request and the interface sends the request on to the query engine.
- 8** The query is interpreted and semantic search is executed. Results include relevant metadata for customized user experience.
- 9** Similar to the search user, applications submit requests to an EDG interface. Determined by the interface (Web Service, Saved Search, SPARQL endpoint), results are prepared and sent in appropriate format.