VSS or Ontology?
Use Cases and differences.

Daniel Wilms, BMW Technology Office Israel
Adnan Bekan, BMW Research

VEHICLE SIGNAL SPECIFICATION (VSS)

TAXONOMY
FOR
ATTRIBUTES,
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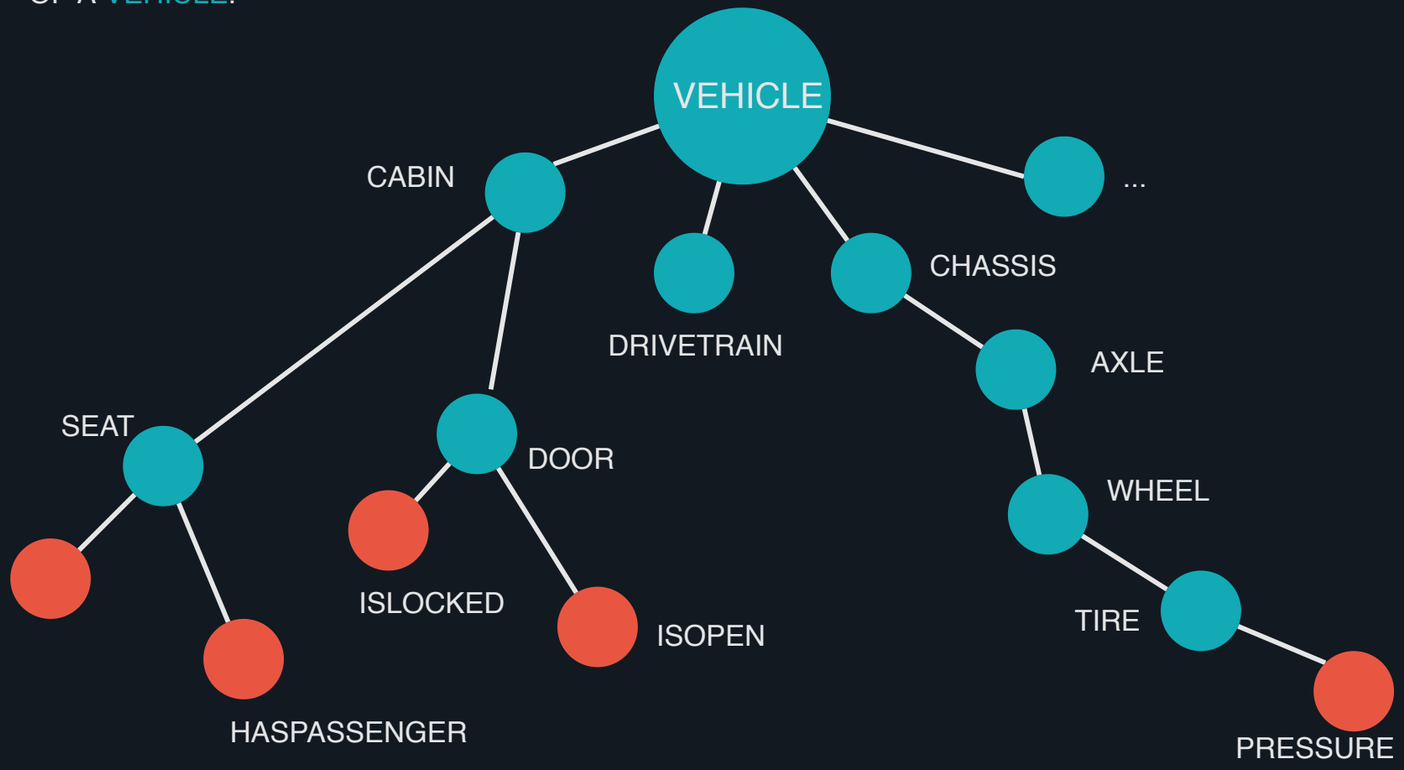
OF A VEHICLE.



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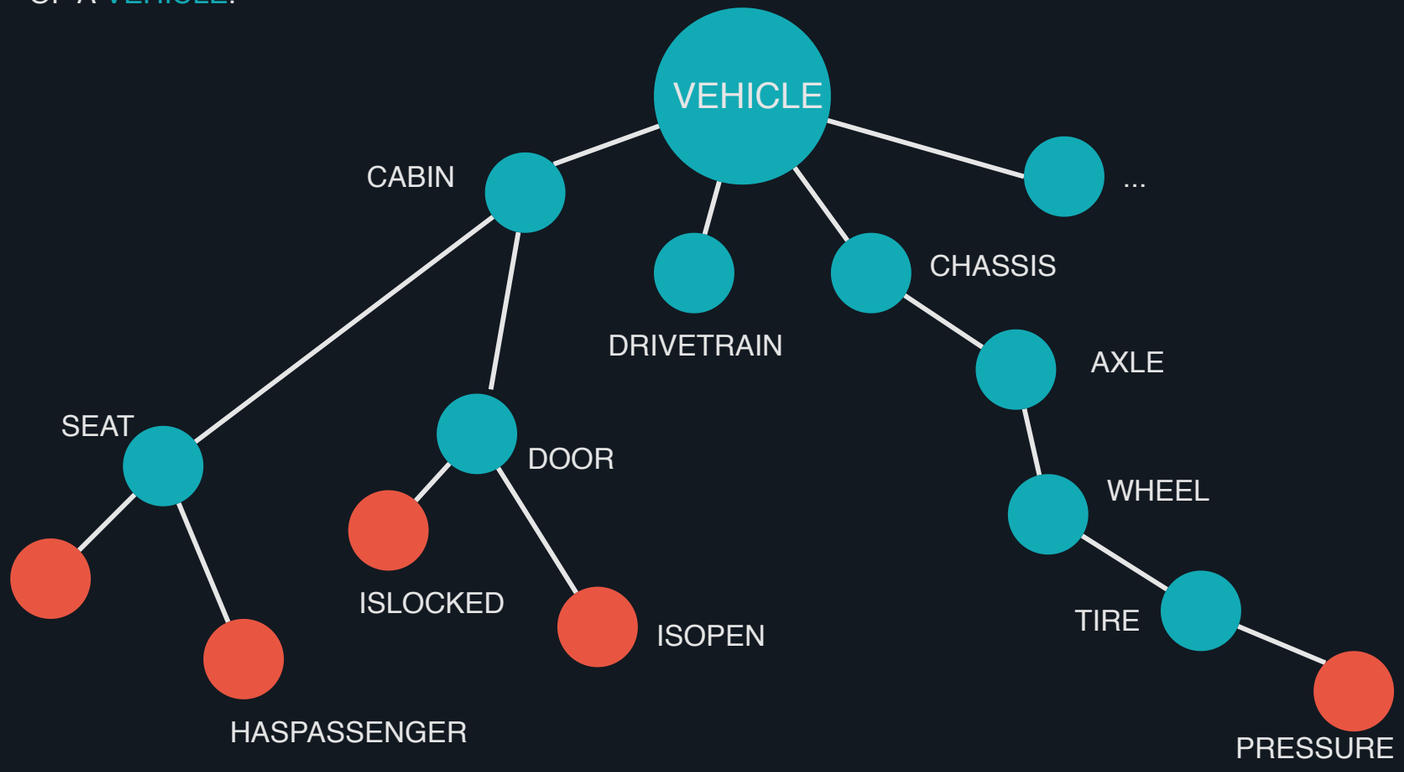

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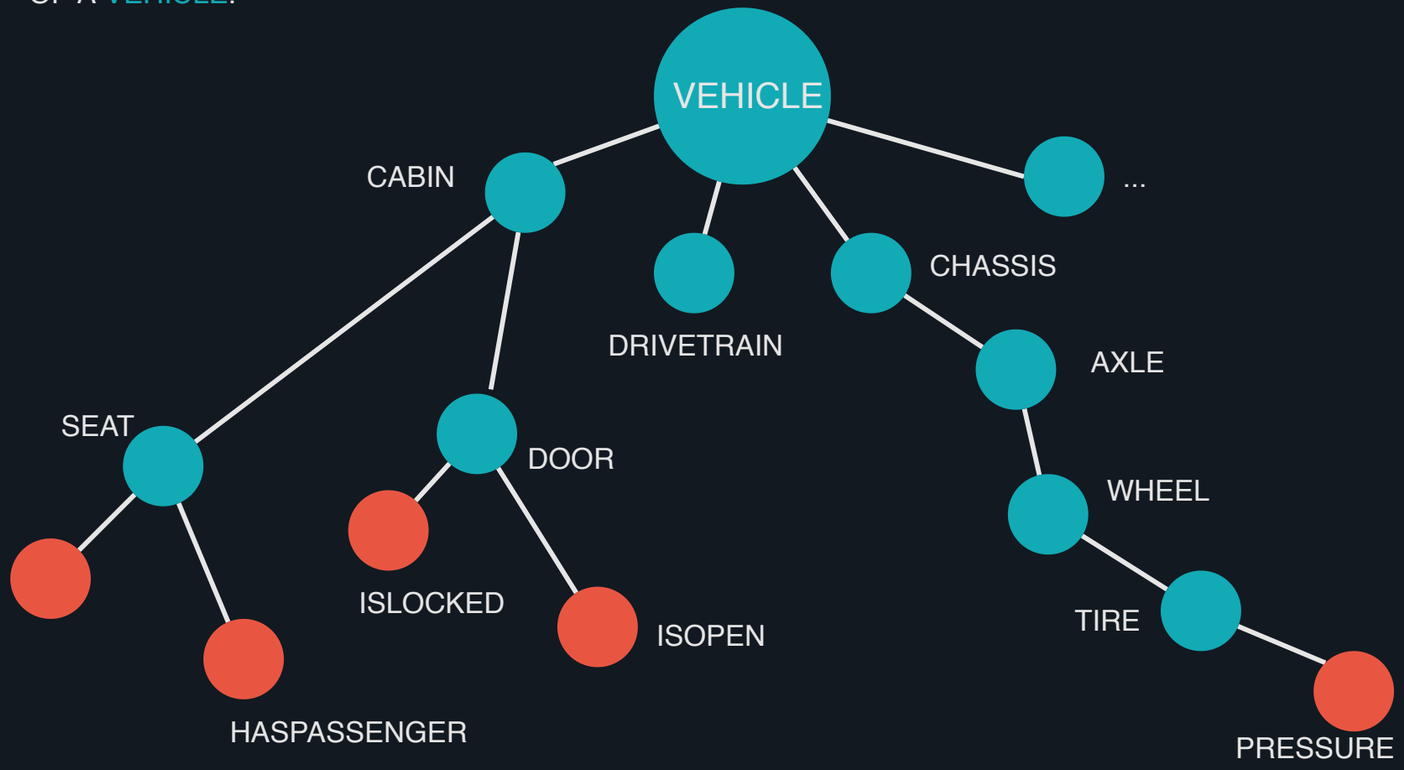

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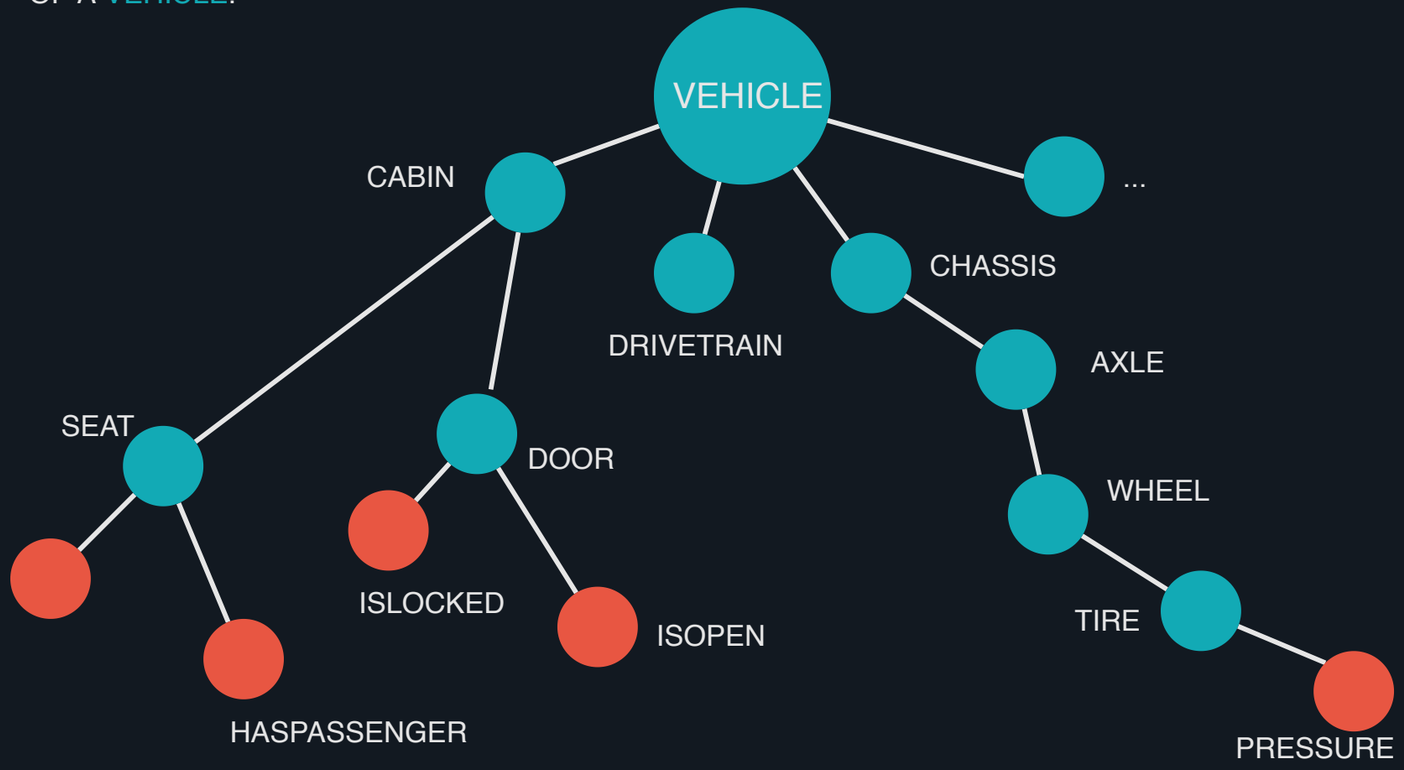

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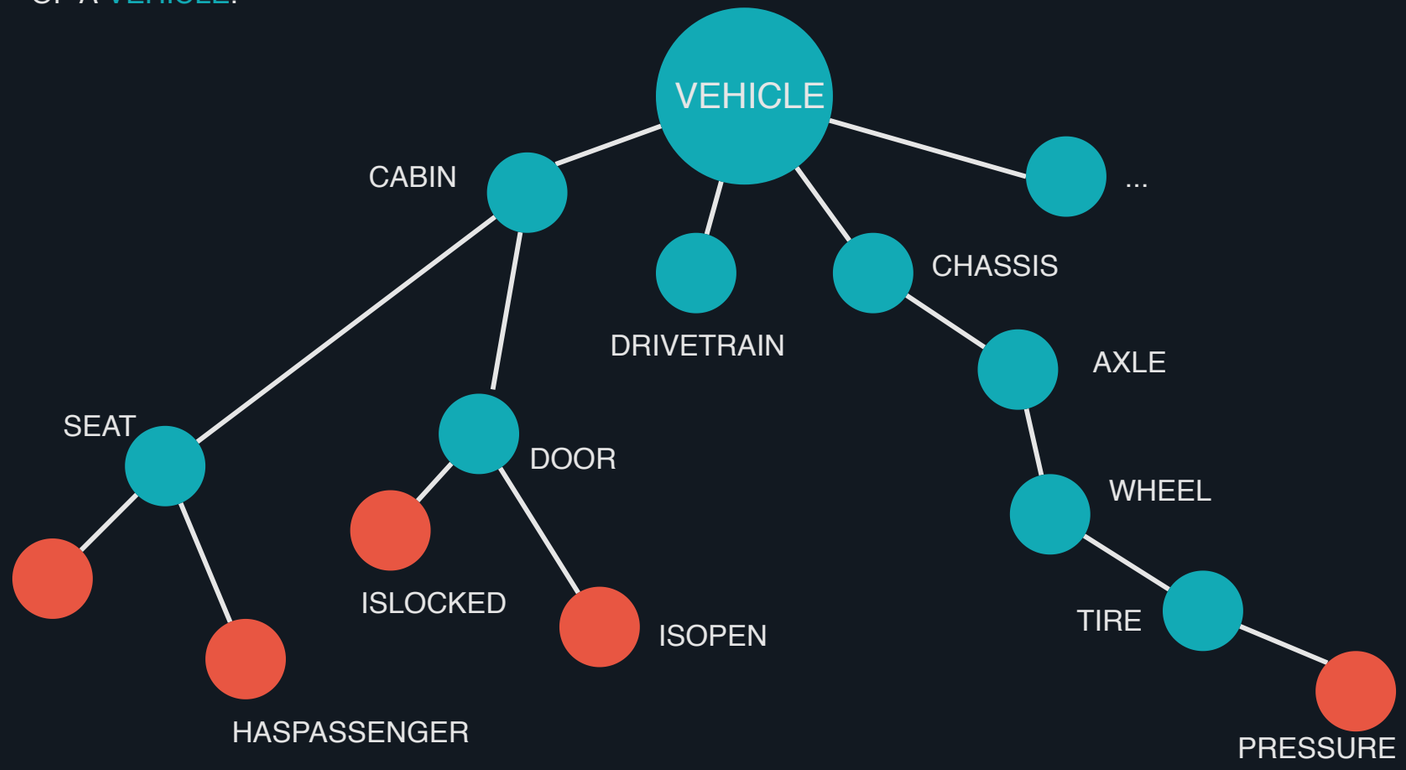

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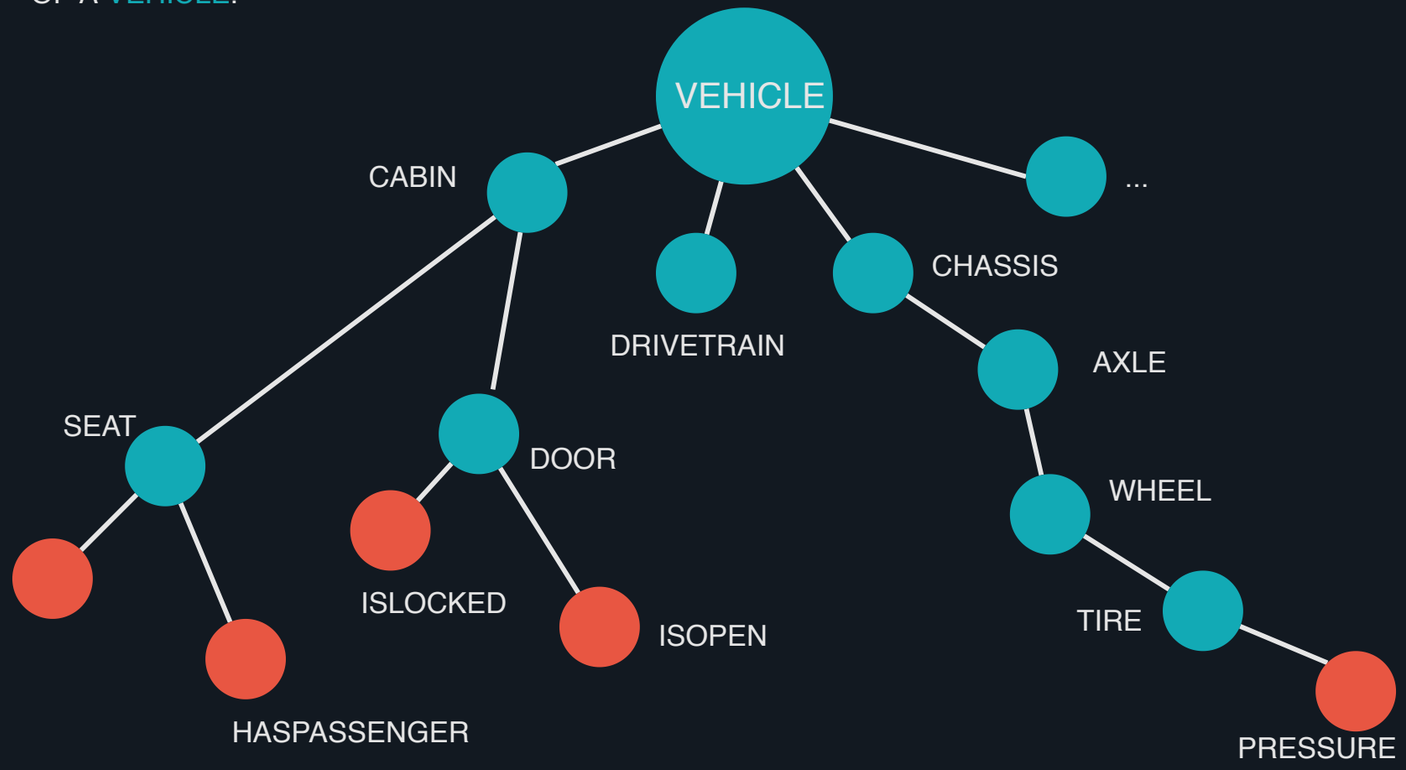

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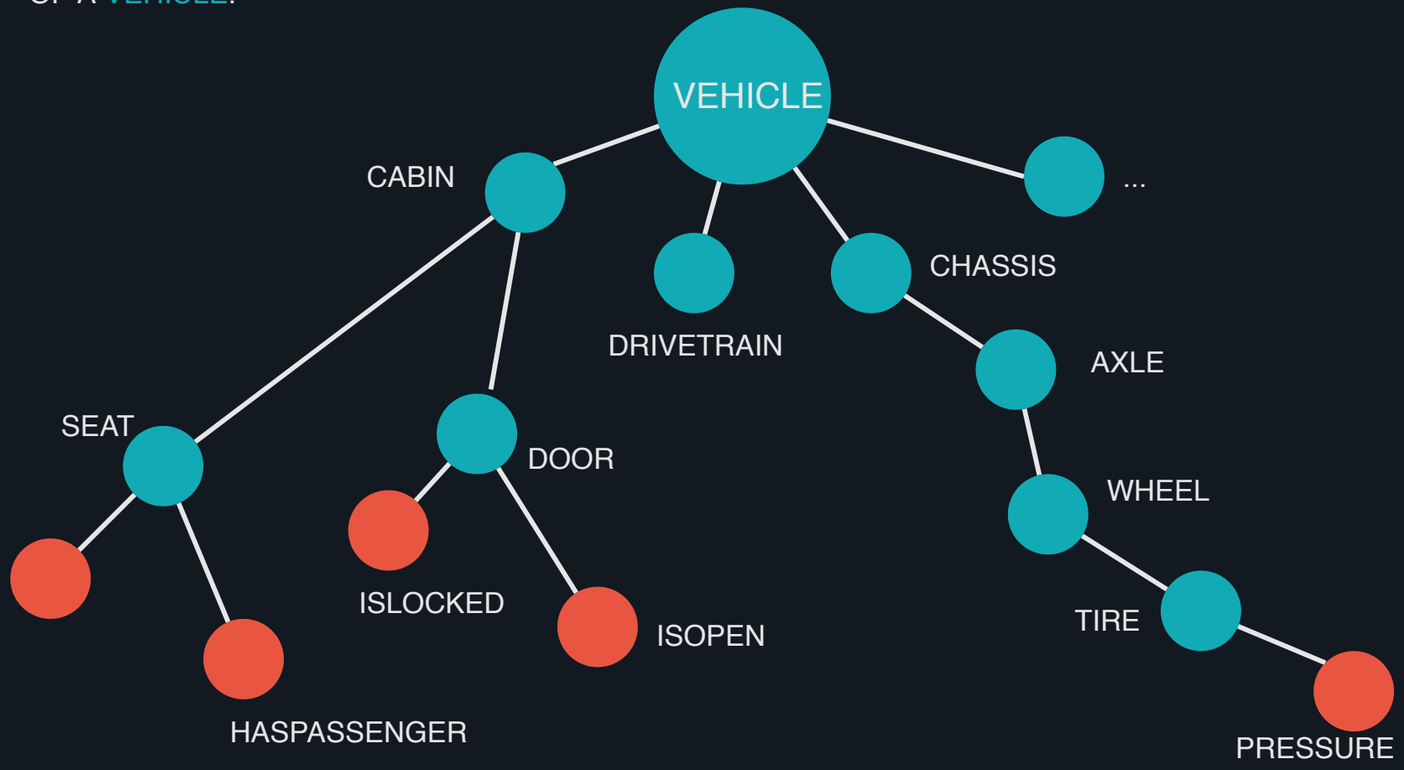

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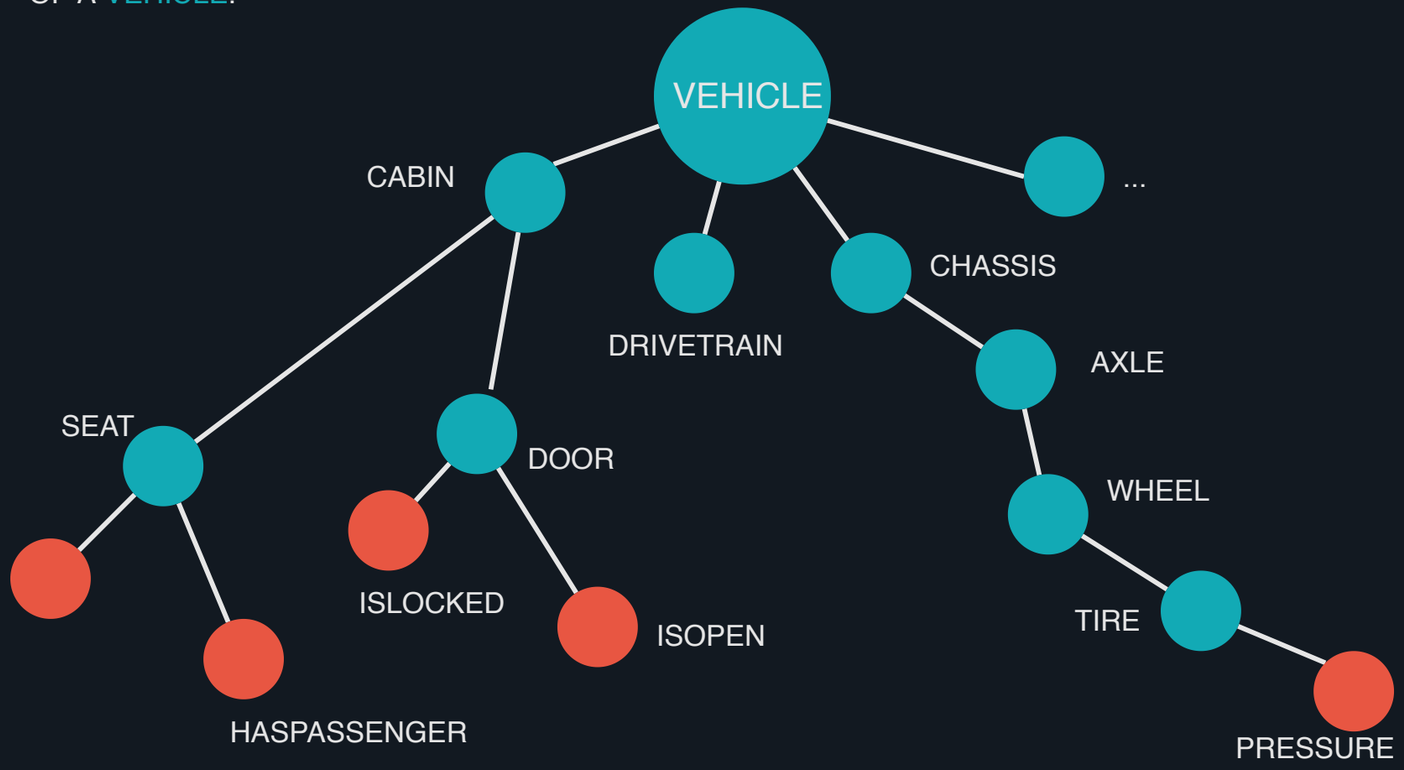

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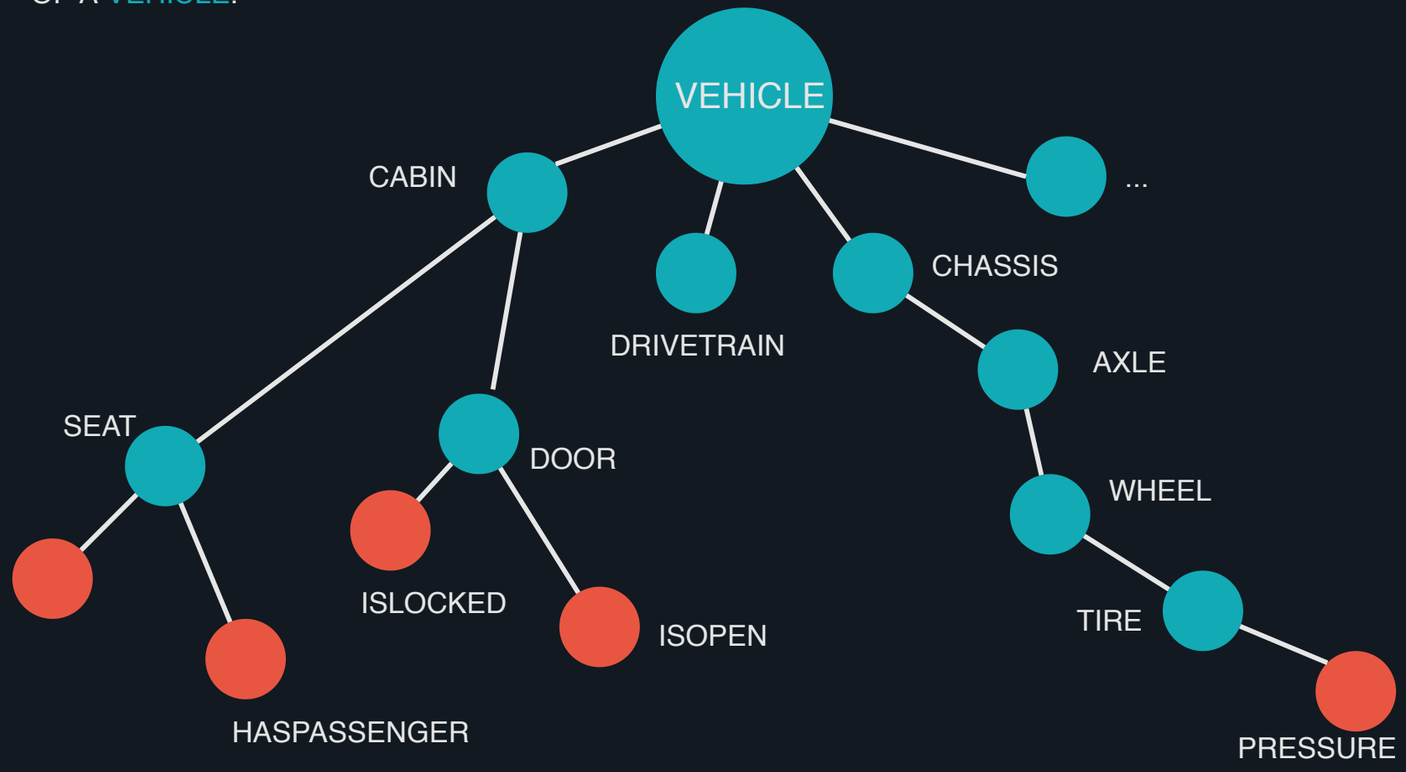

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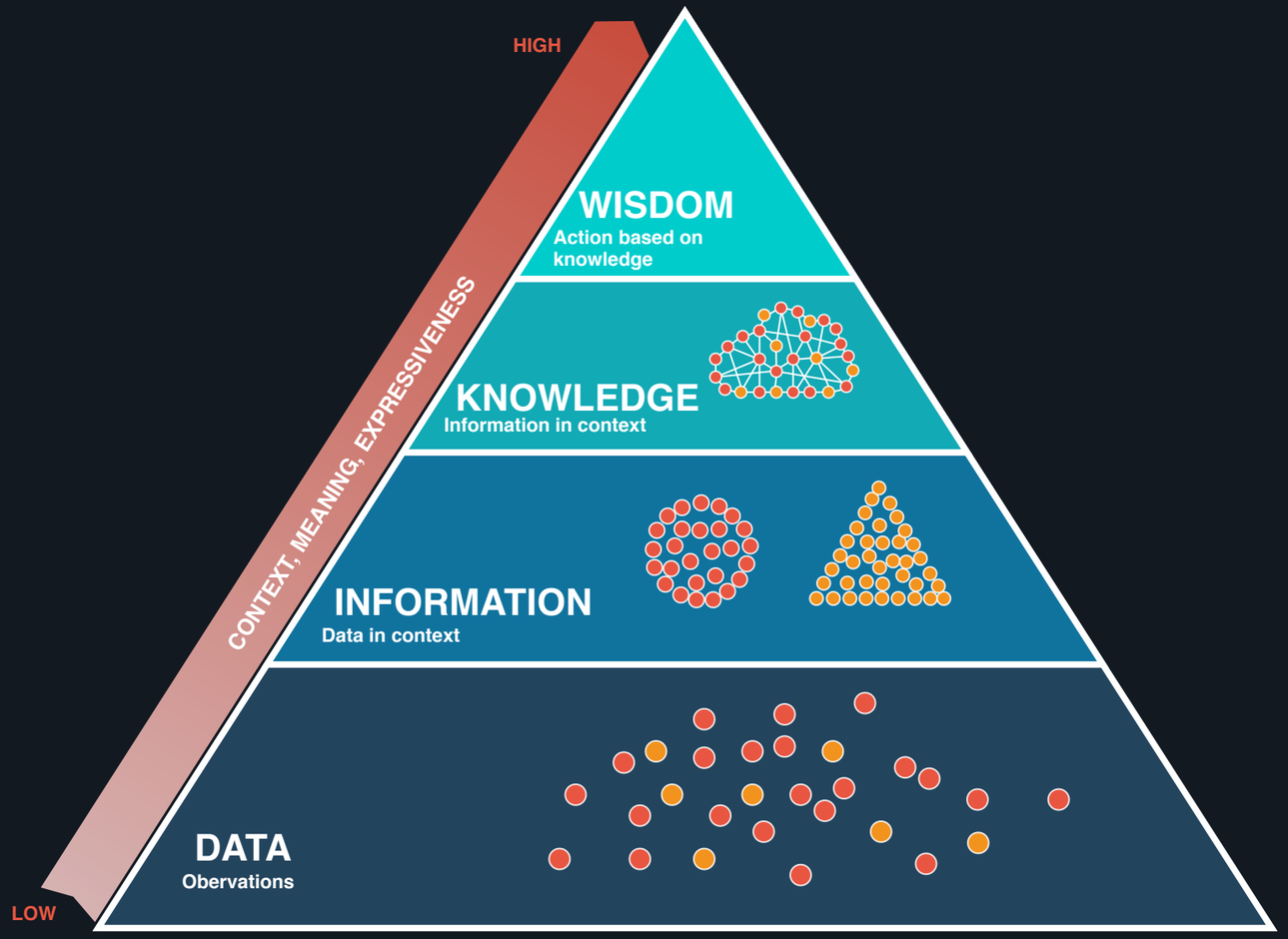
YAML SPECIFICATION PROs & CONS

- \+ Easy to read, parse and understand.
- \+ Tooling available and useable beyond vehicle signals.
- \+ Only text, well maintainable in common development tools and version management.
- \- But, limited modelling capabilities with regard to relationships.
- \- Hard to refer from one domain to another.

PRACTICAL ISSUES USING YAML IN MULTI-DOMAIN SCENARIOS.



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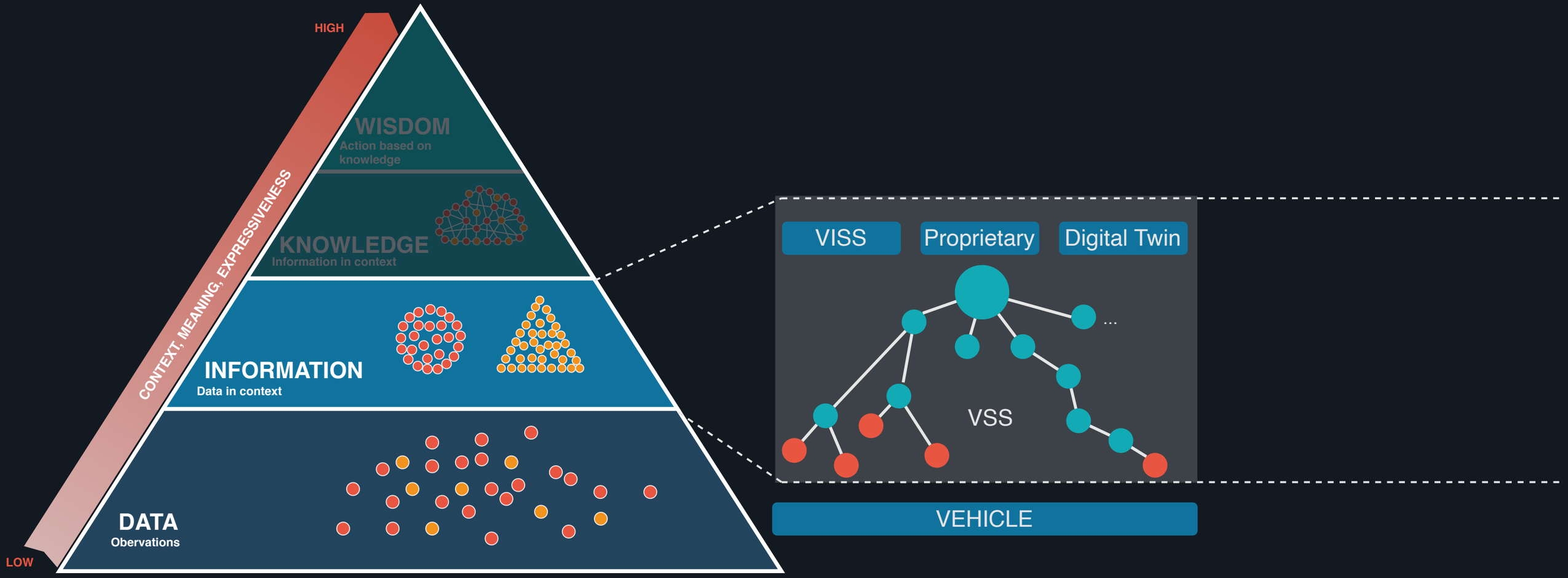

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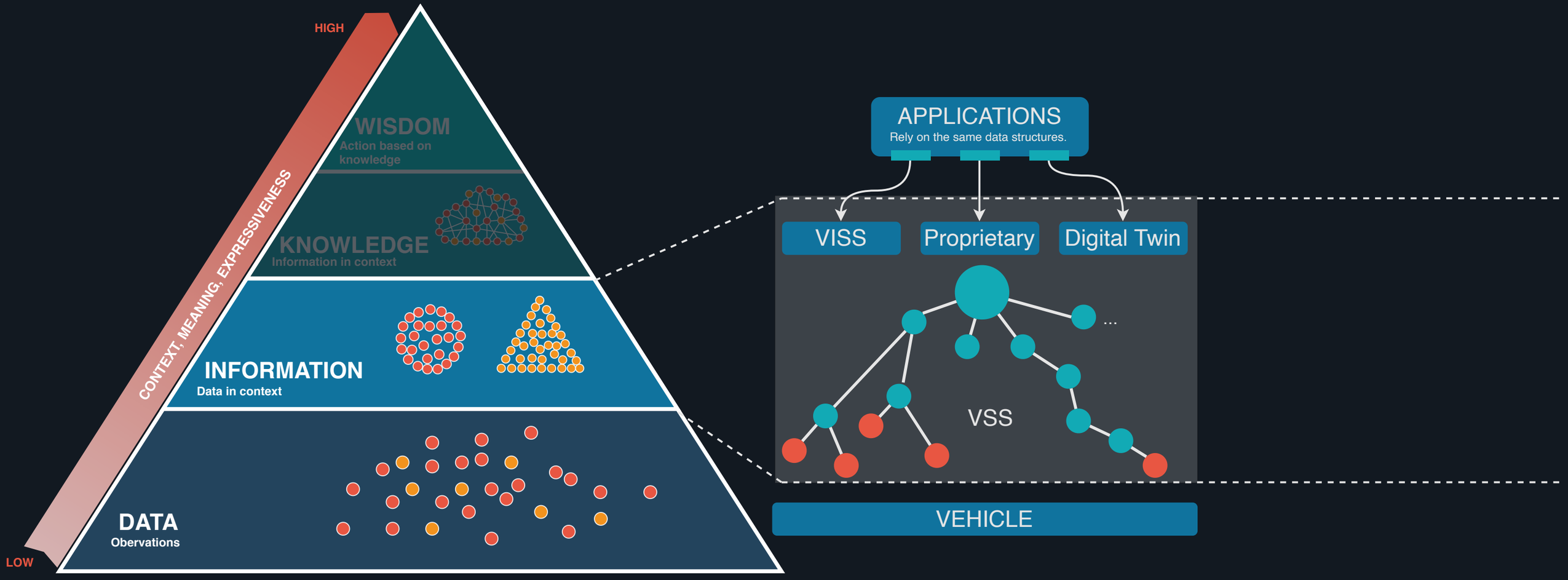

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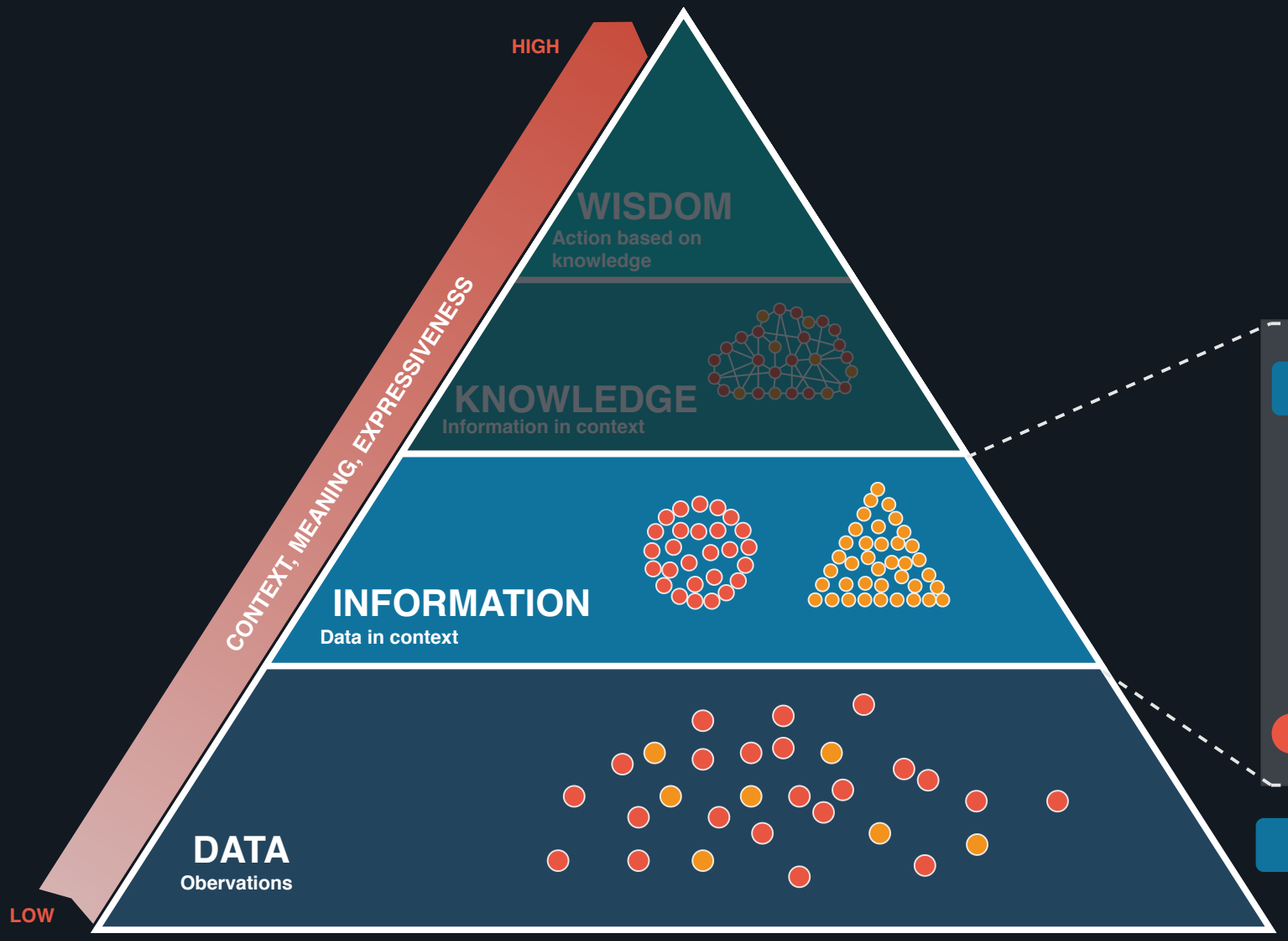

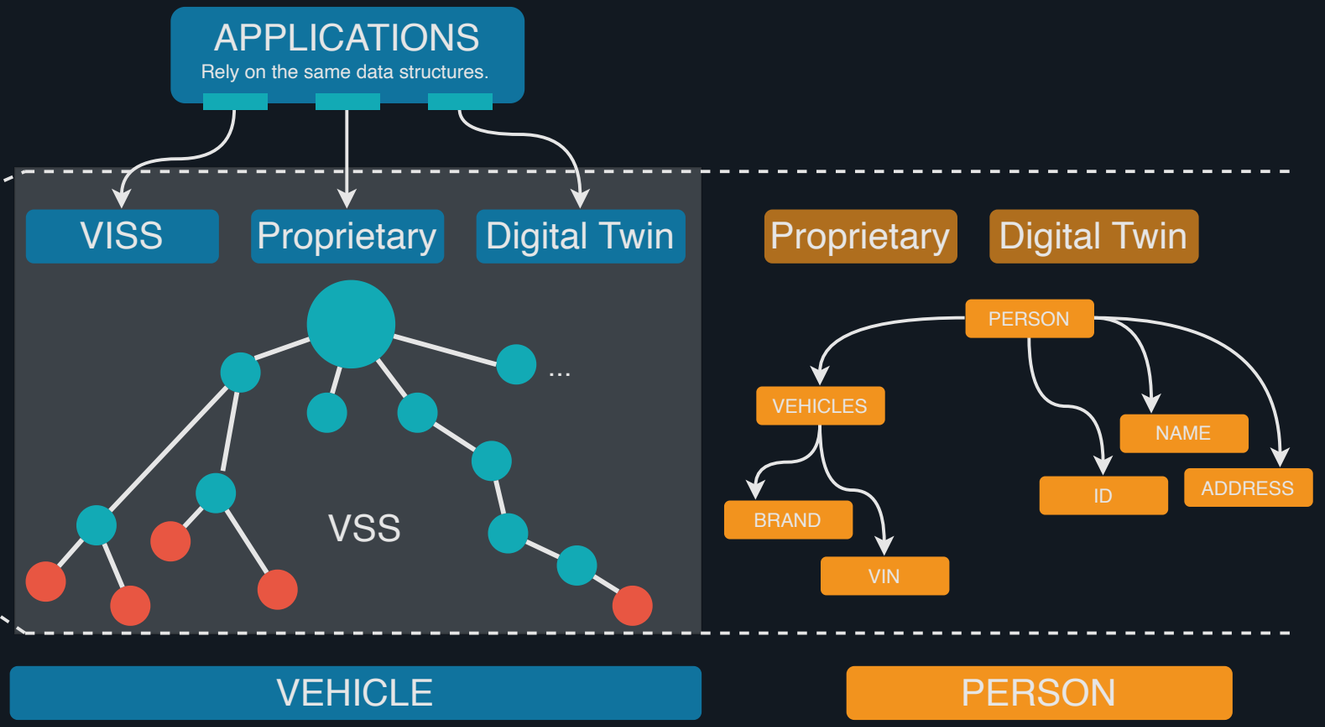

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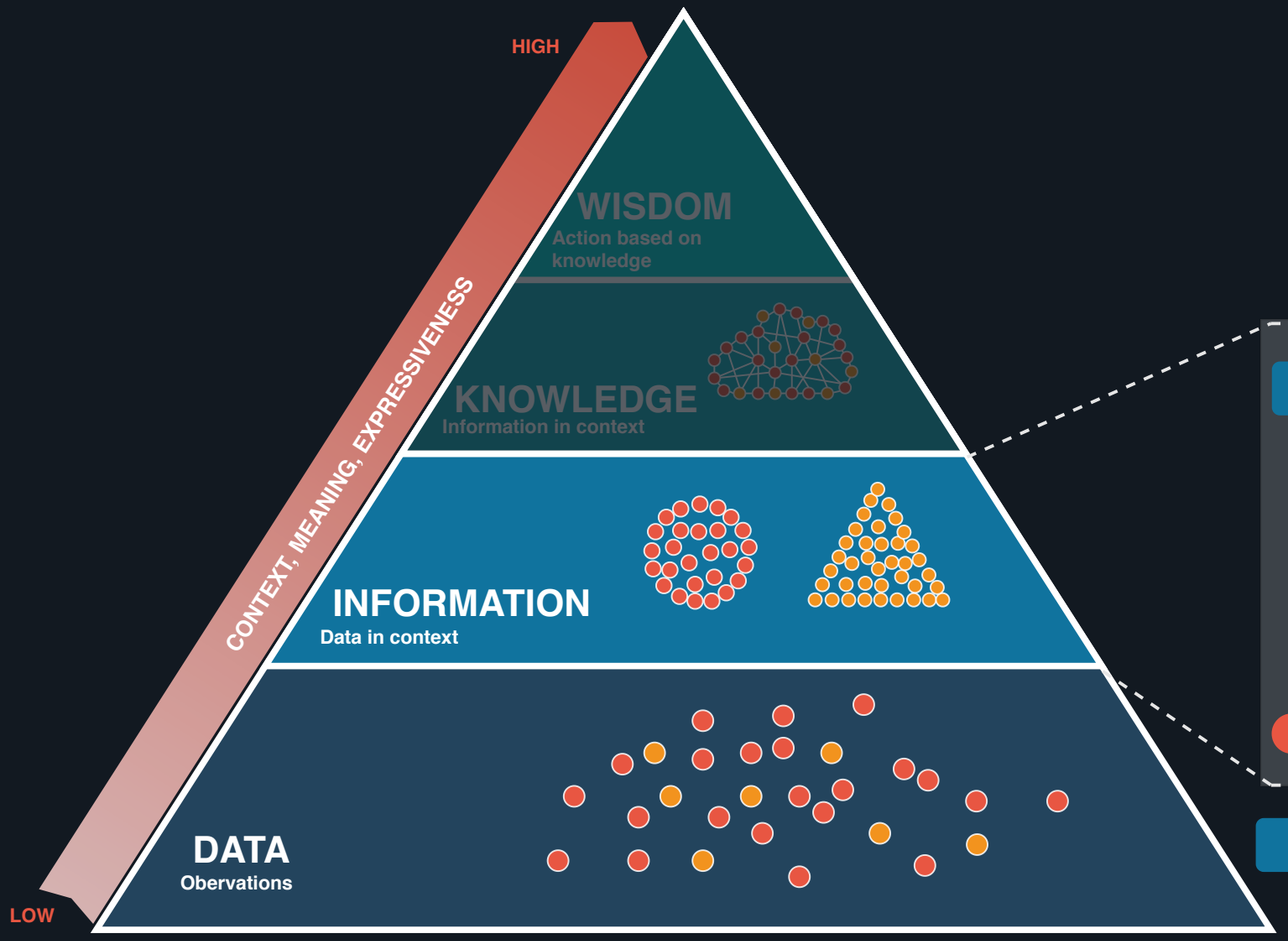

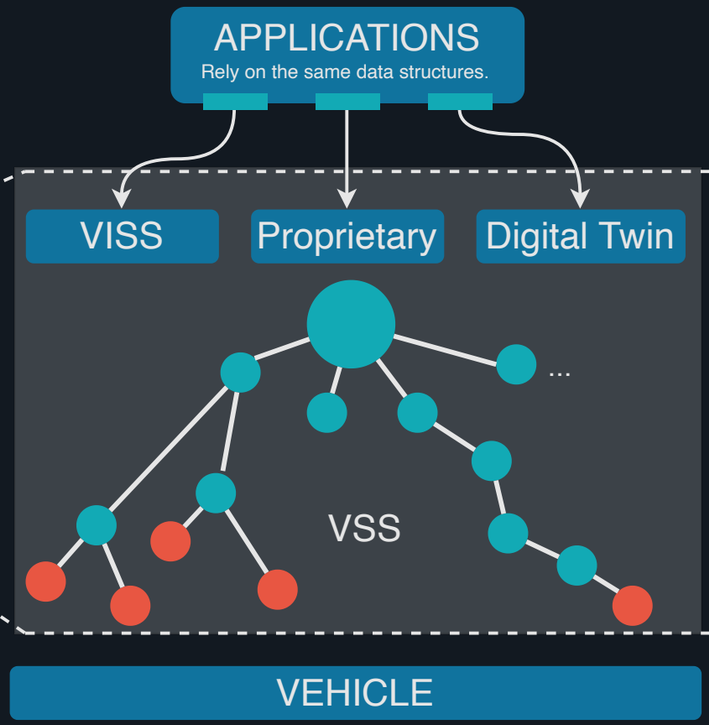

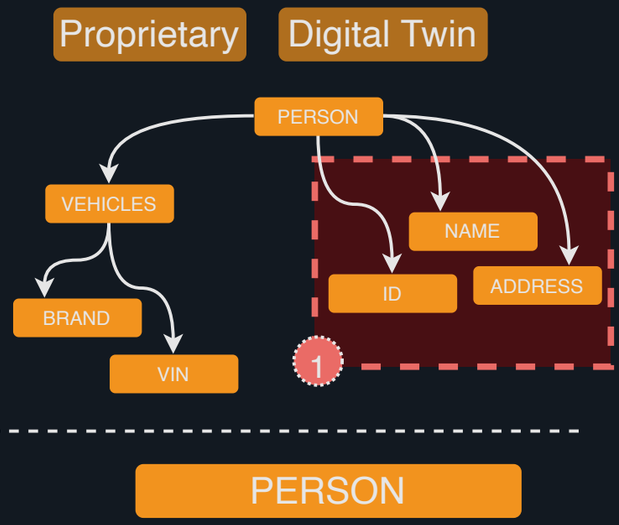

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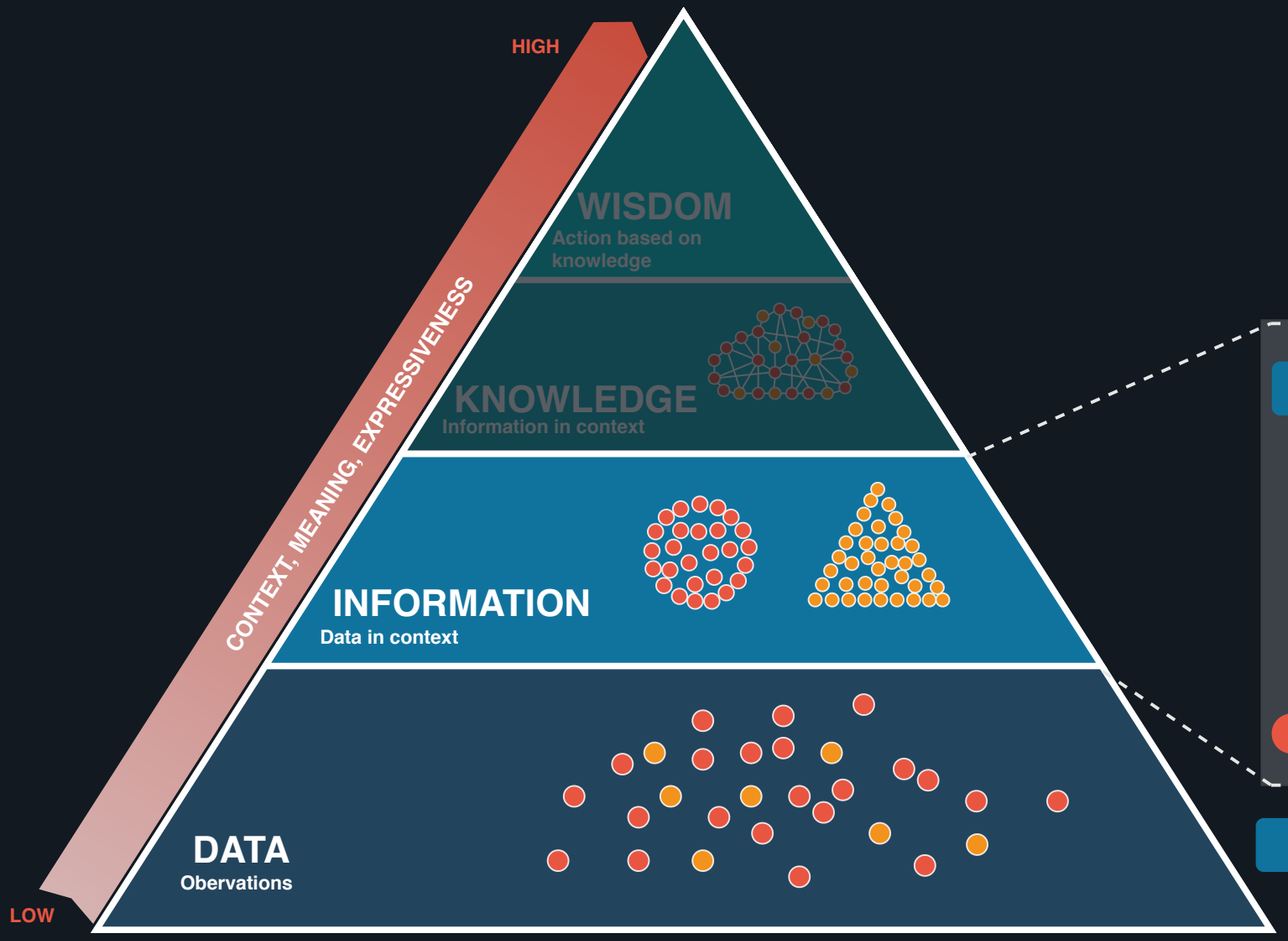

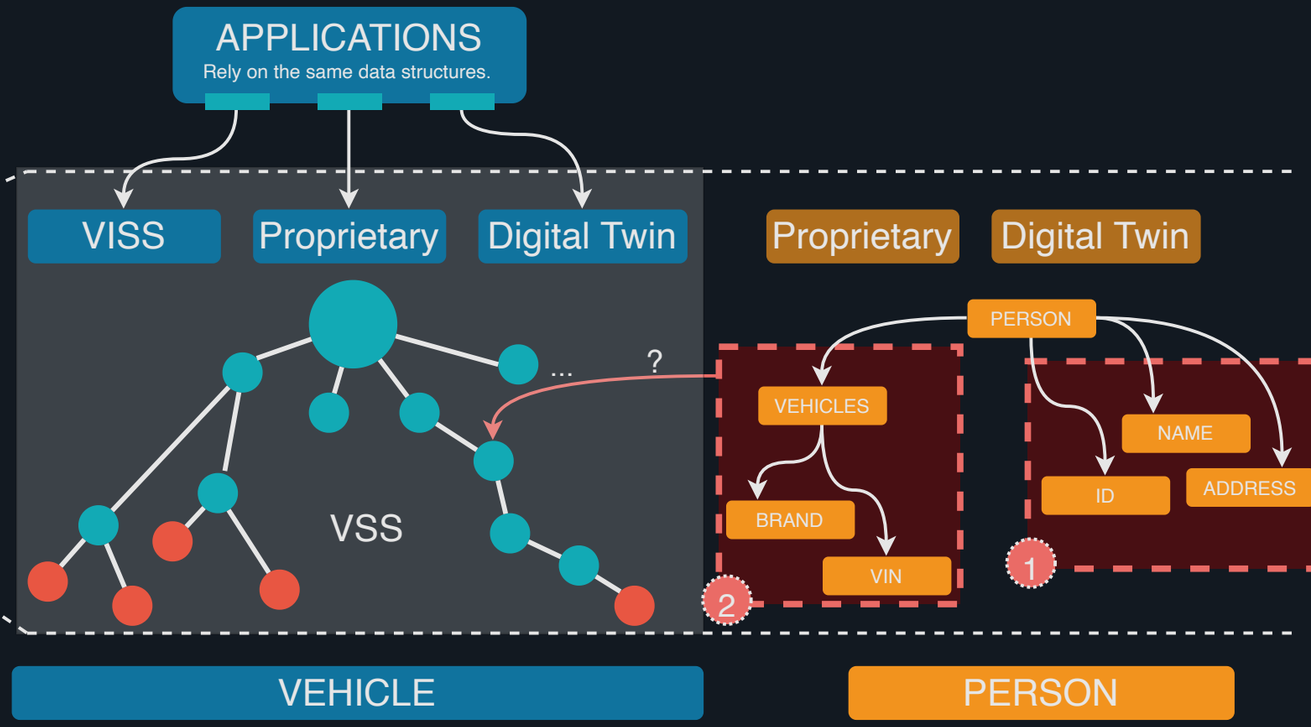

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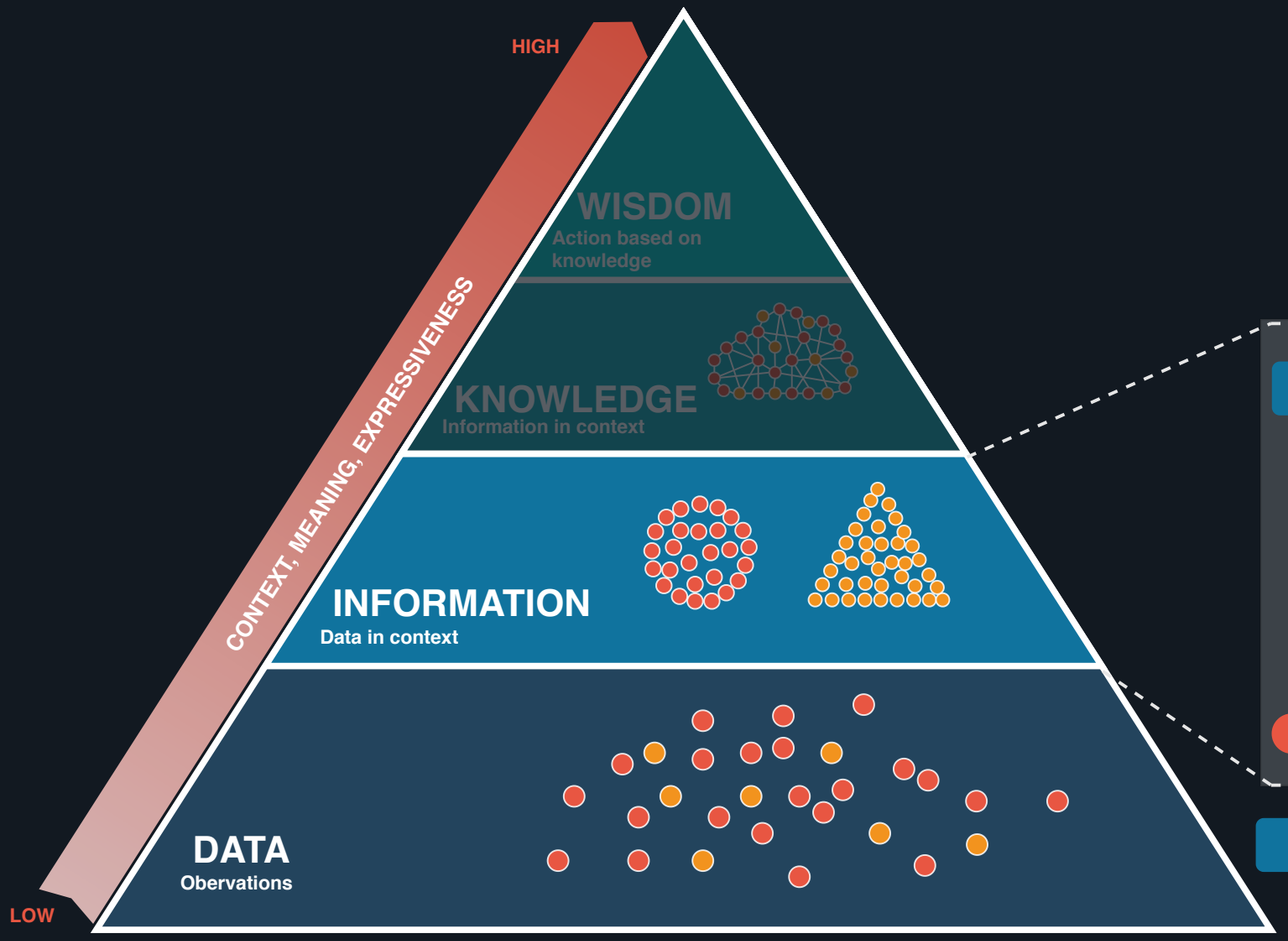

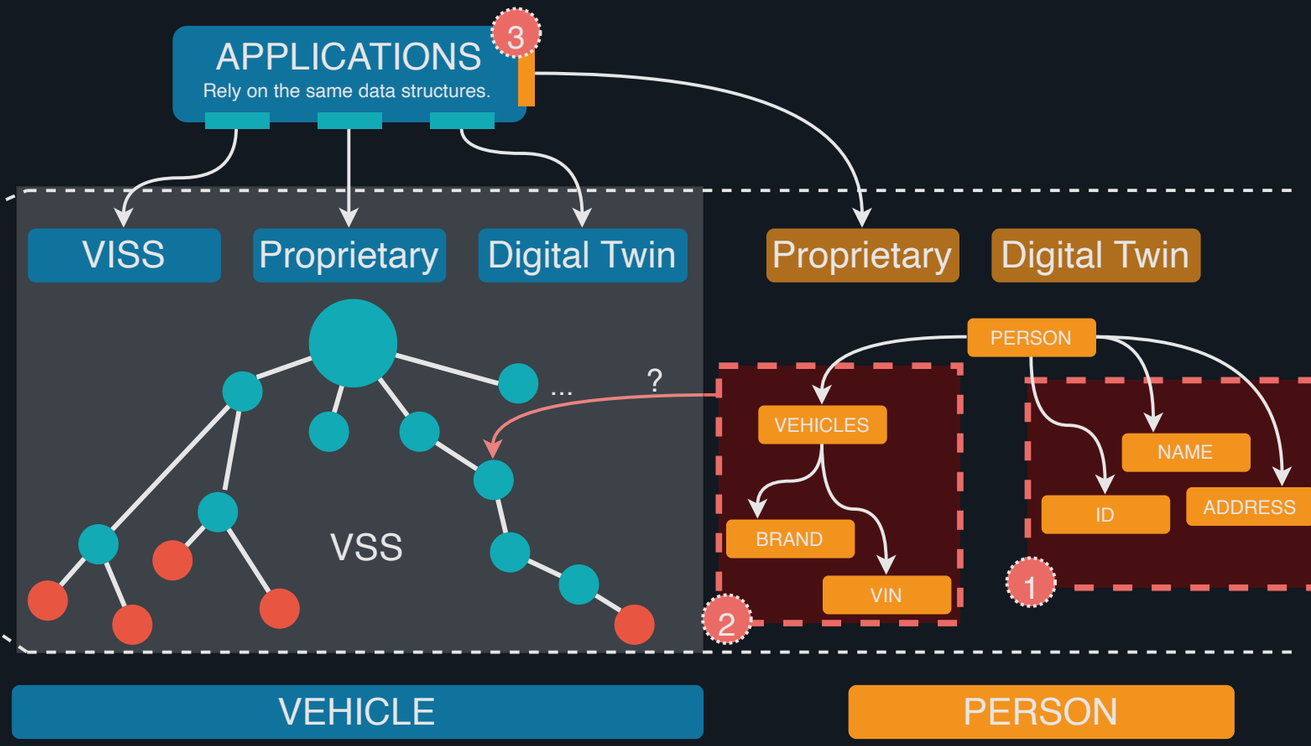

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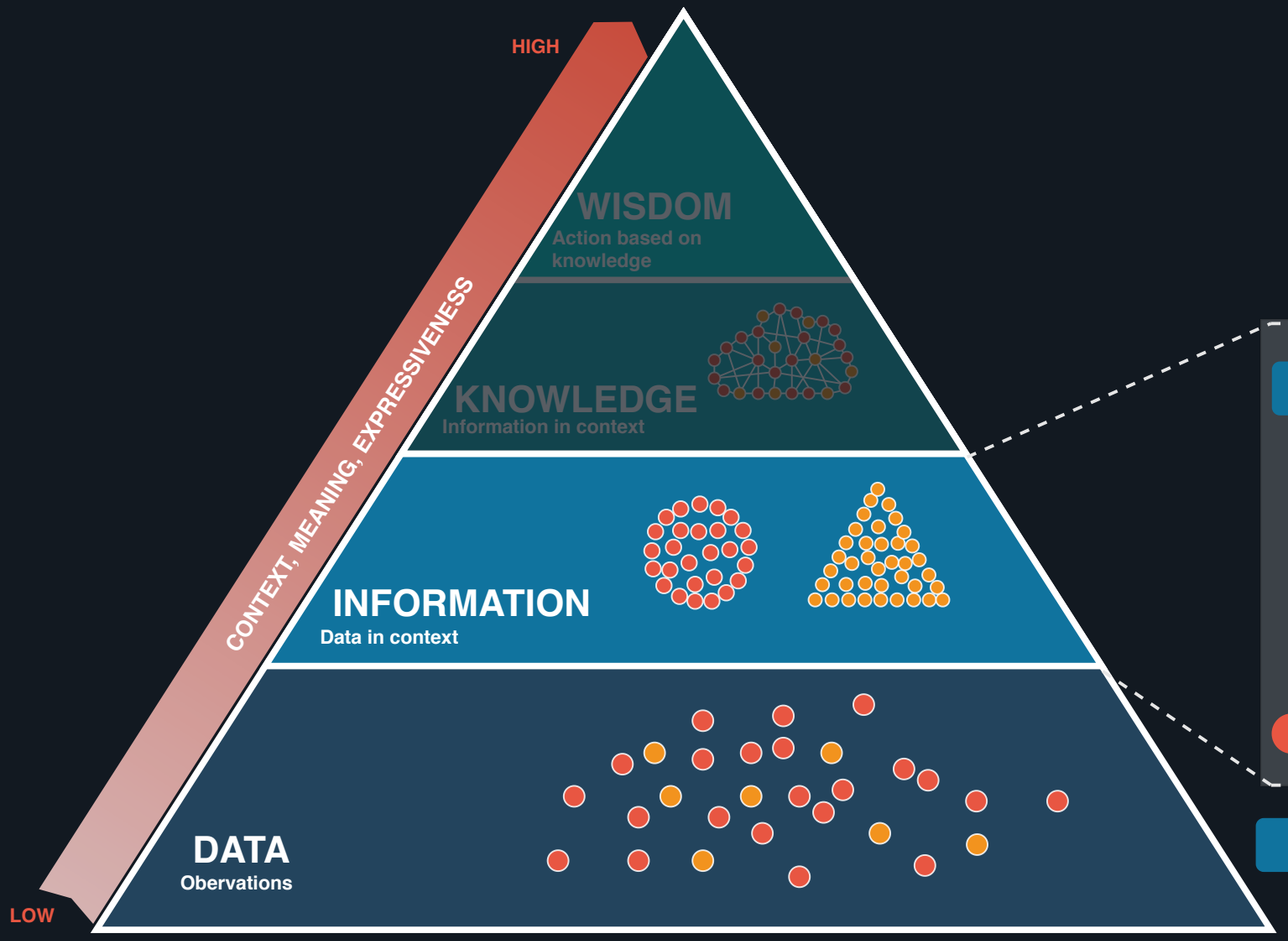

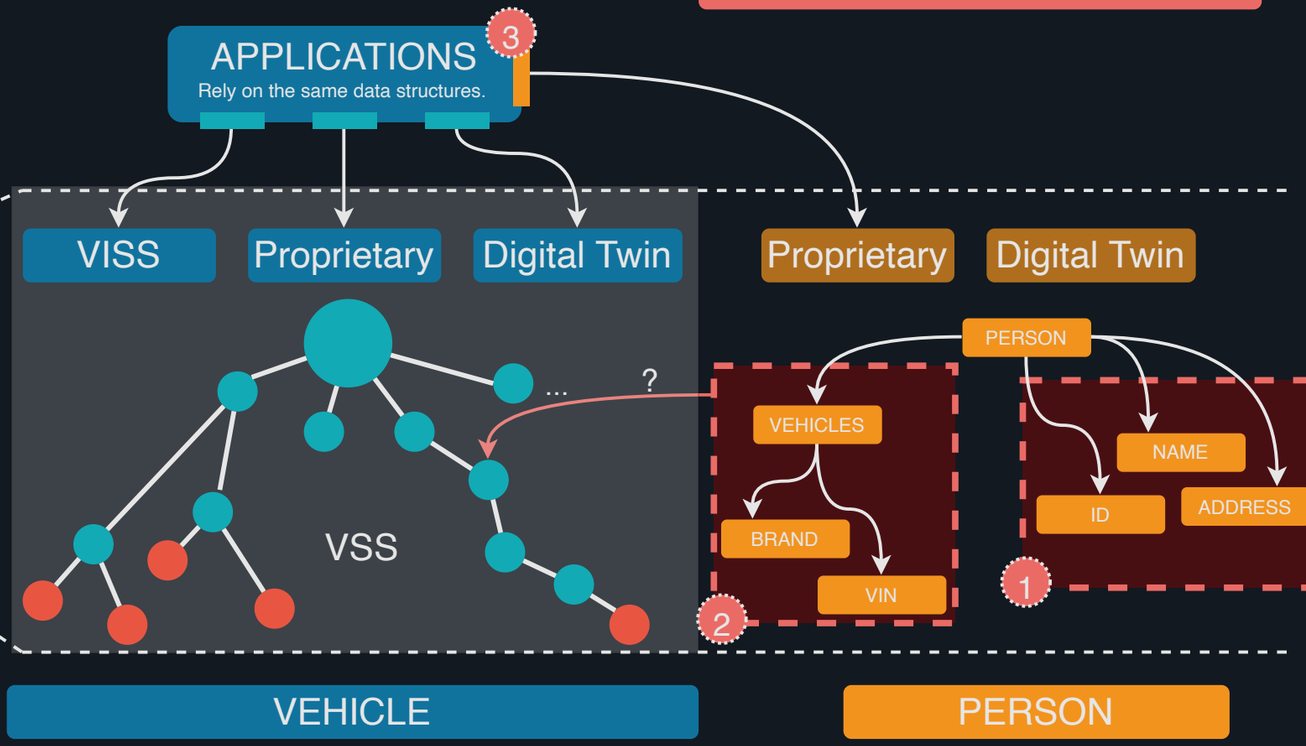

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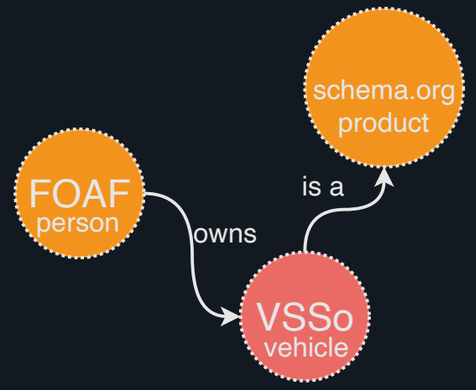

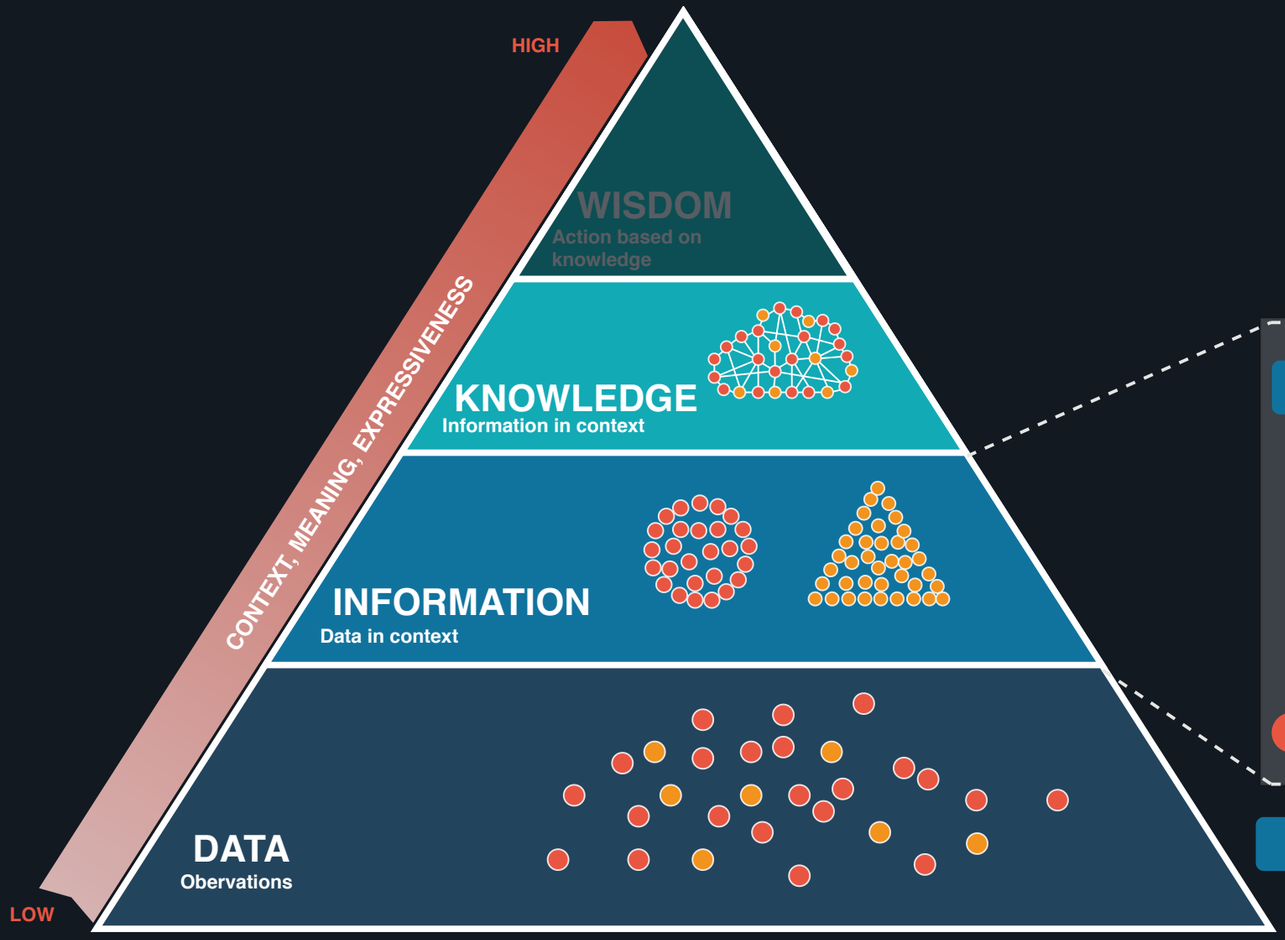

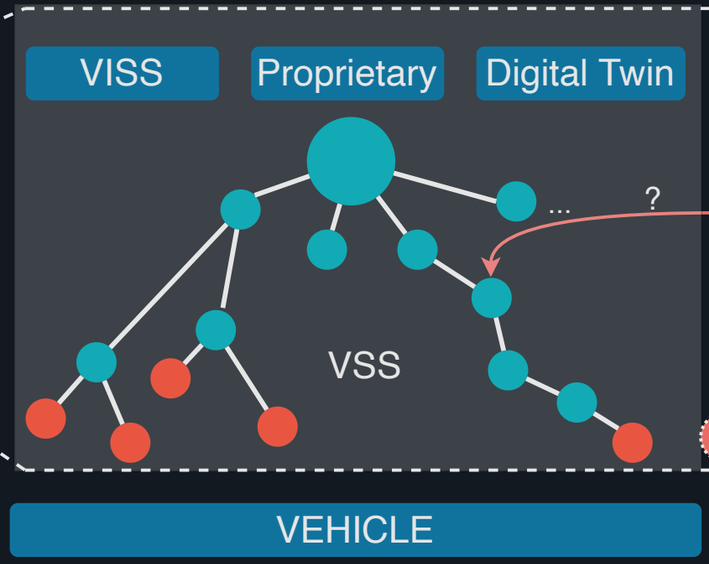

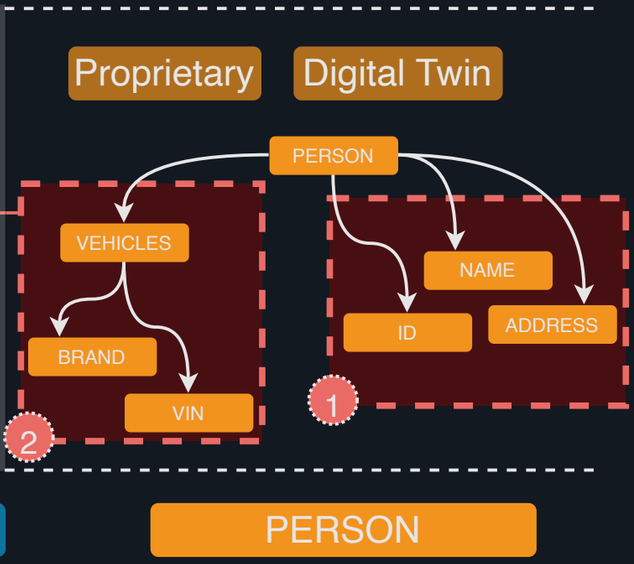

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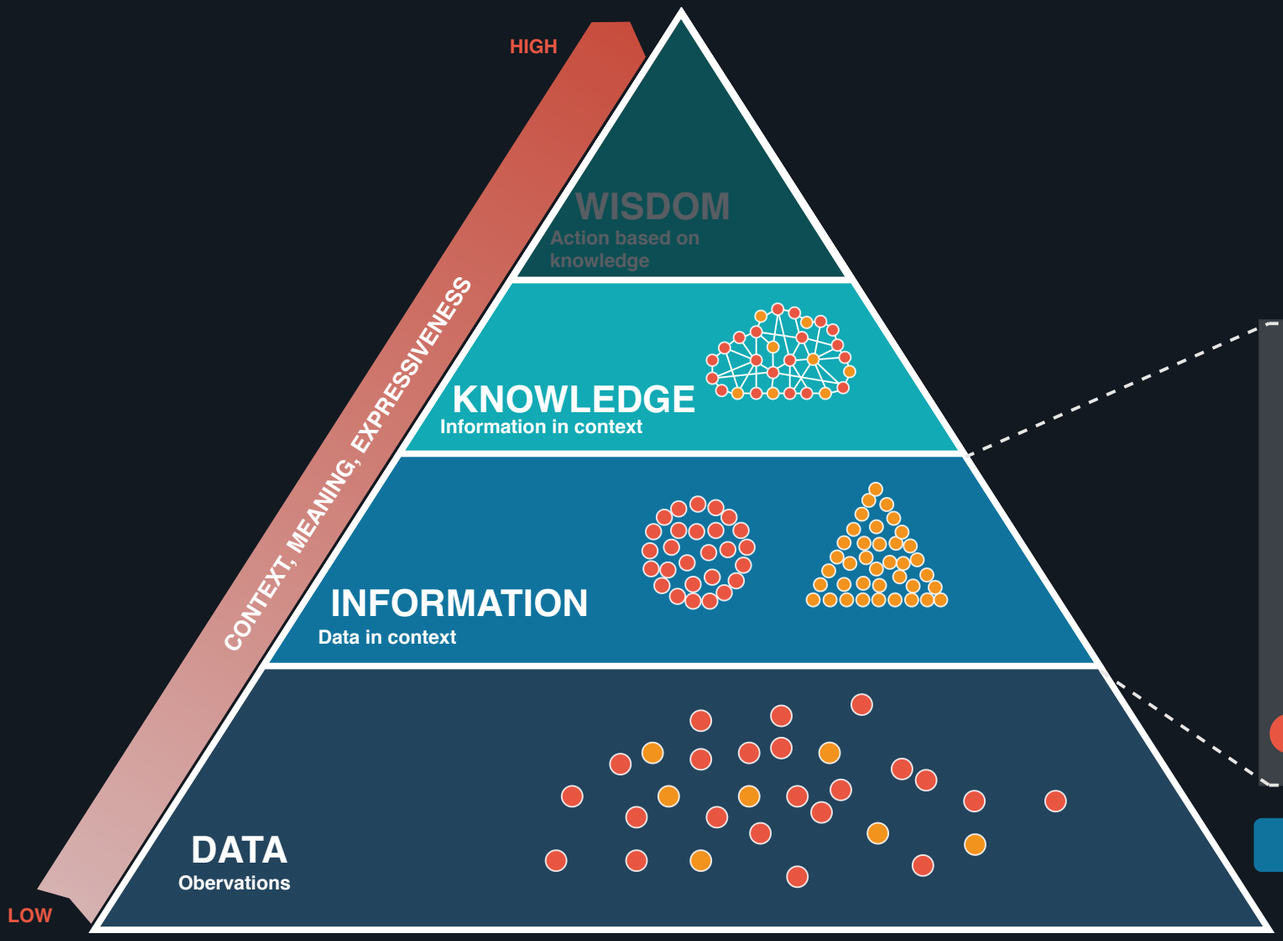
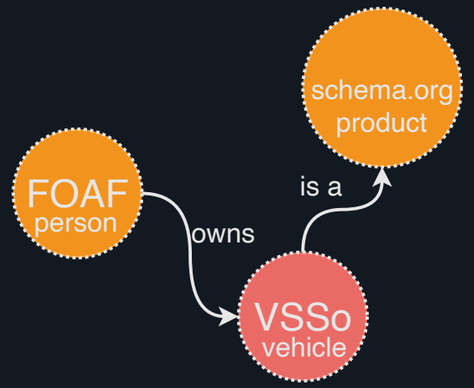
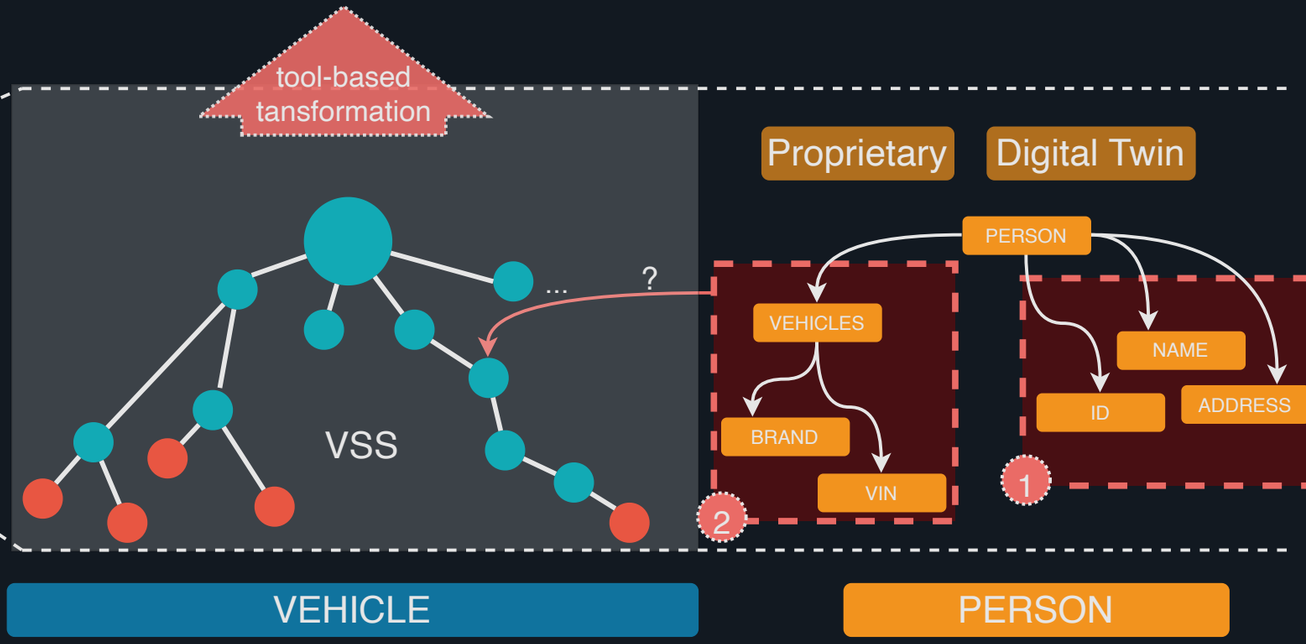


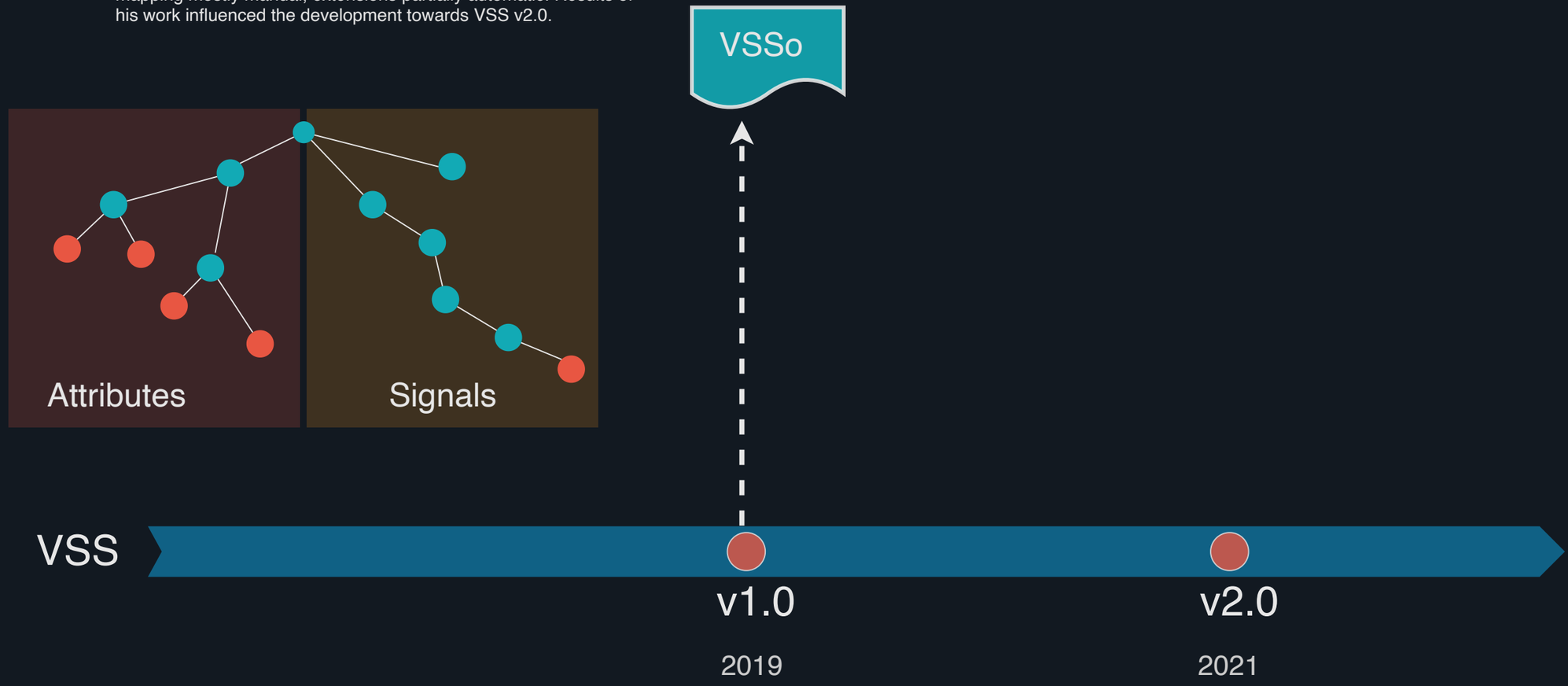




VEHICLE SIGNAL SPECIFICATION ONTOLOGY (VSSo)

Initial VSSo Development

Based on VSS v1.0 Benjamin Klotz created within his PhD the first version of VSSo backed by Eurecom and BMW. Creation and mapping mostly manual, extensions partially automatic. Results of his work influenced the development towards VSS v2.0.



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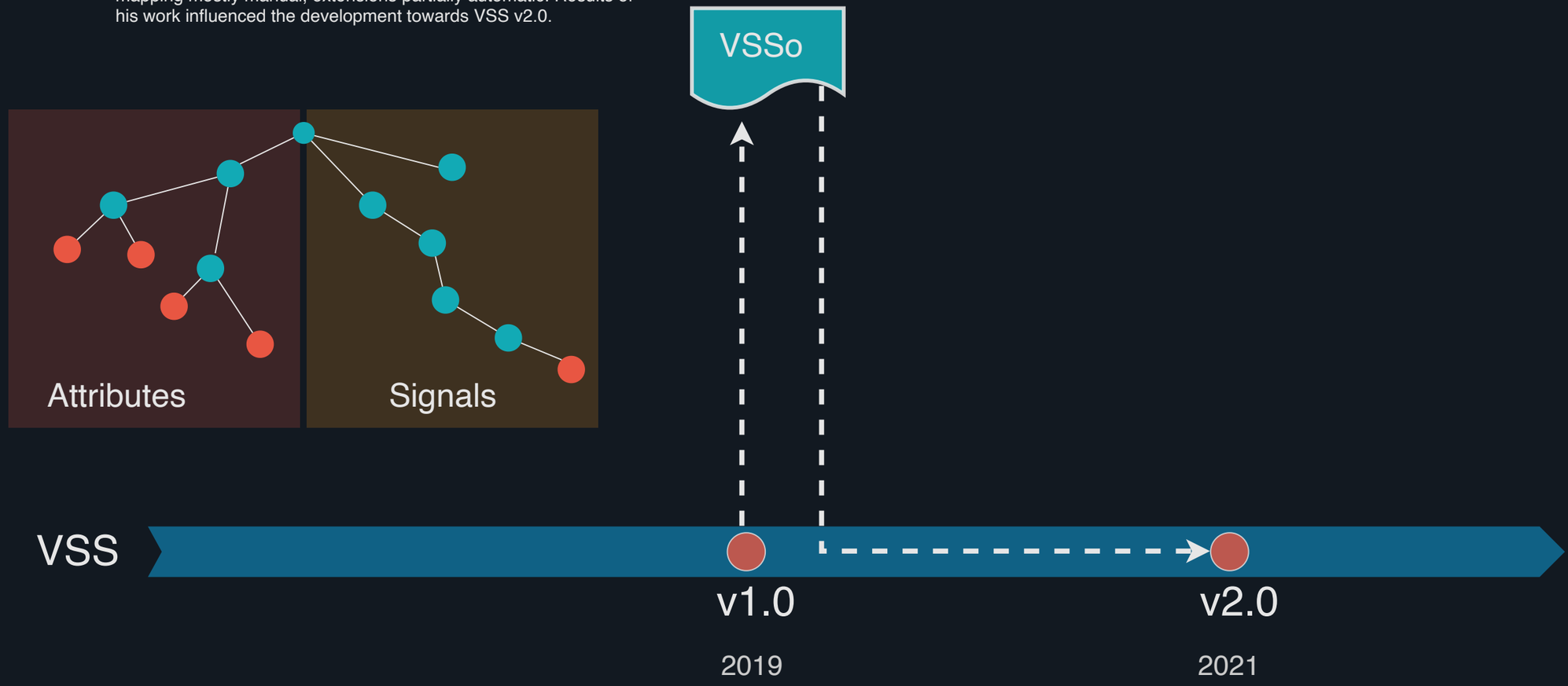

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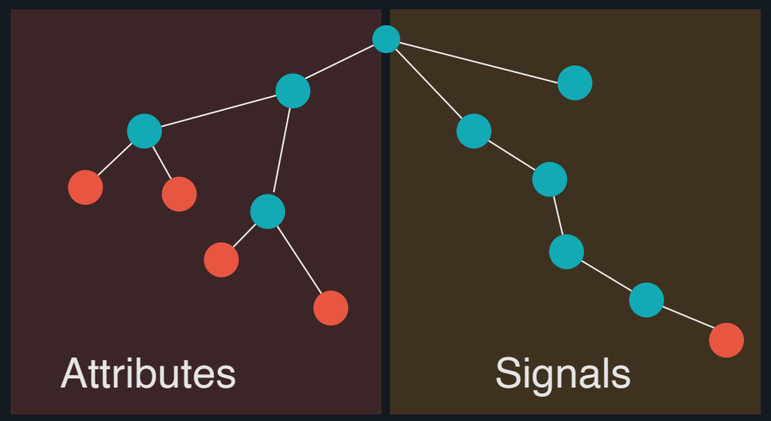
The W3C Automotive and Transportation Business Group has begun working on it.



VSSo

VSSo was received as a member submission end of 2020.

VSS

v1.0

2019

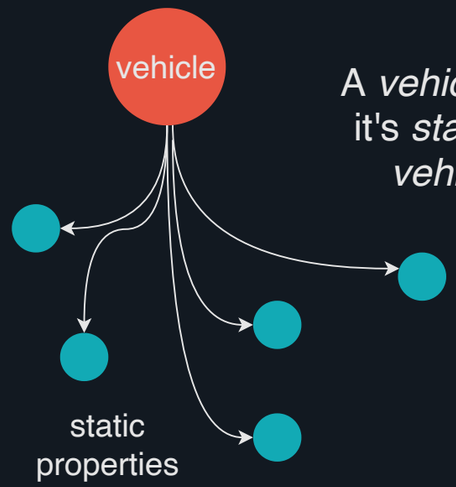
v2.0

2021

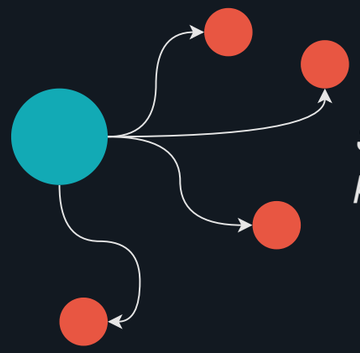
ANALYTICS

Current Vehicle Data

Find out what state a specific vehicle is in and how values of static and dynamic properties define a vehicle fleet.



A *vehicle* **is defined by** it's *static and dynamic vehicle properties*

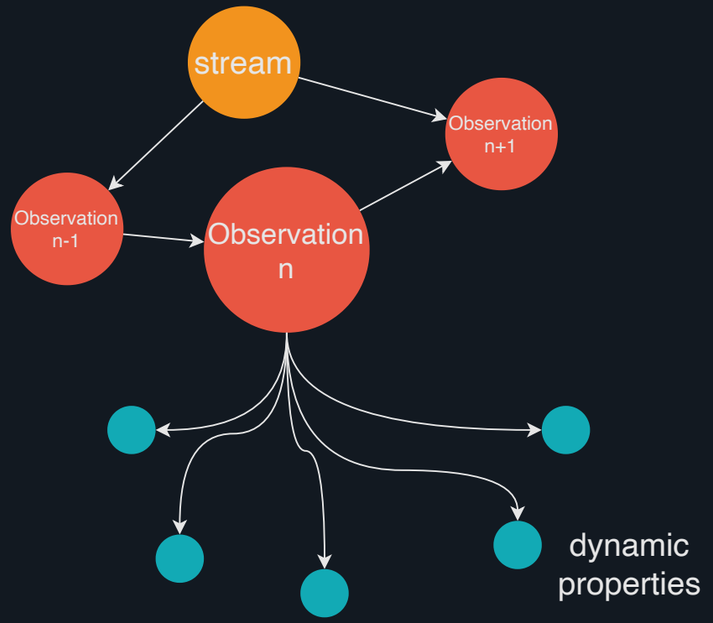


Static and *dynamic properties* **define** a set of *vehicles*.

VSSo

Dynamic Vehicle Data over Time

Which observations have been made at which point of time? How a data stream develops over time? Can I act on it?



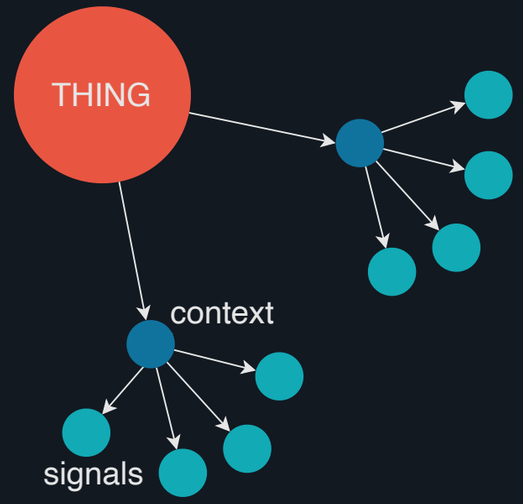
An *observation* **is defined by** the *signals* occuring at a certain *time*.

SSN/SOSA + VSSo

SERVICES

Interaction with Vehicle Data

Get specific values using a specific protocol of a specific data provider. Agreement on data exchange with unit type, etc.



A *requestor* **needs** the *contexts,* their properties and information how to interact with them.

WoT + VSSo

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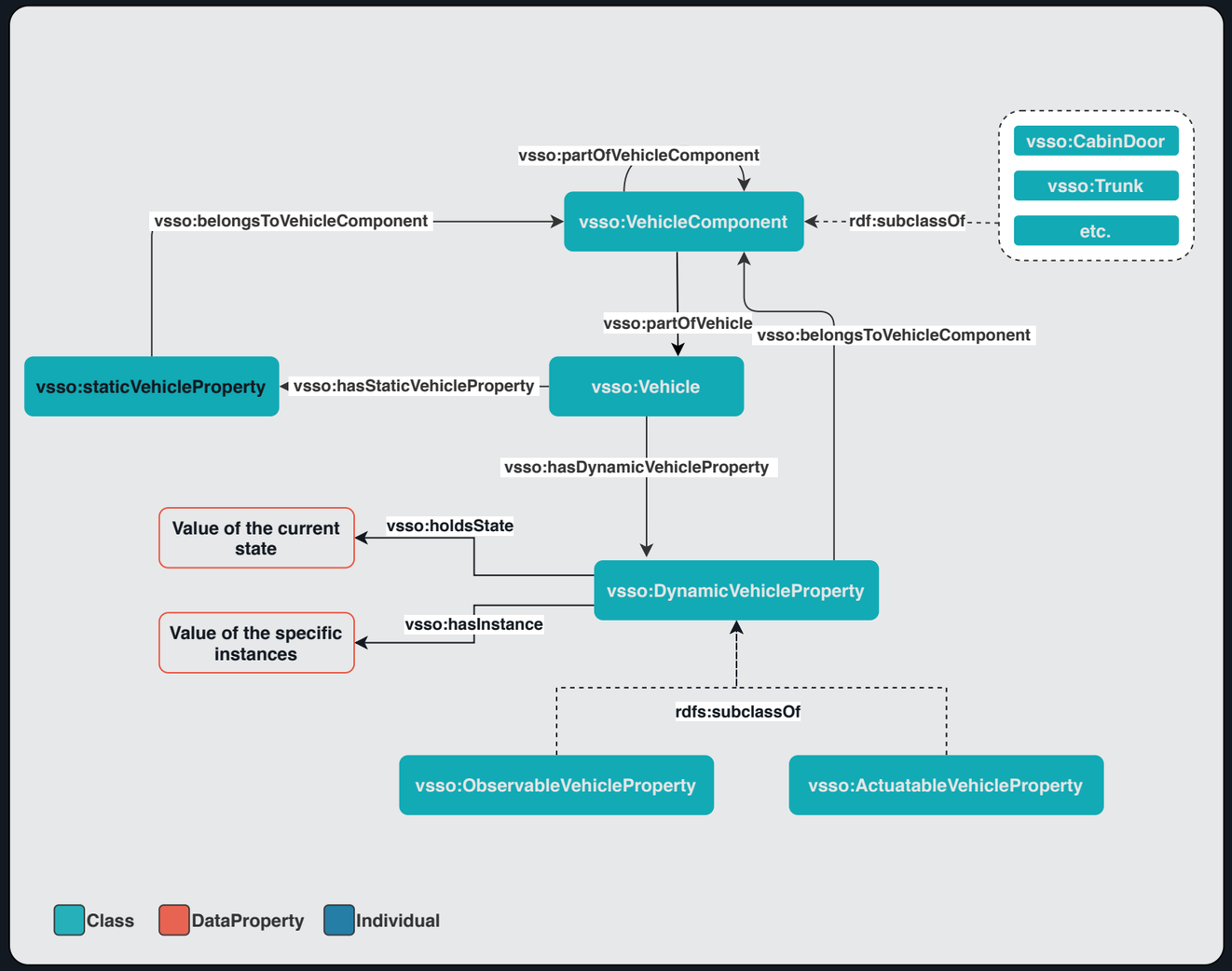
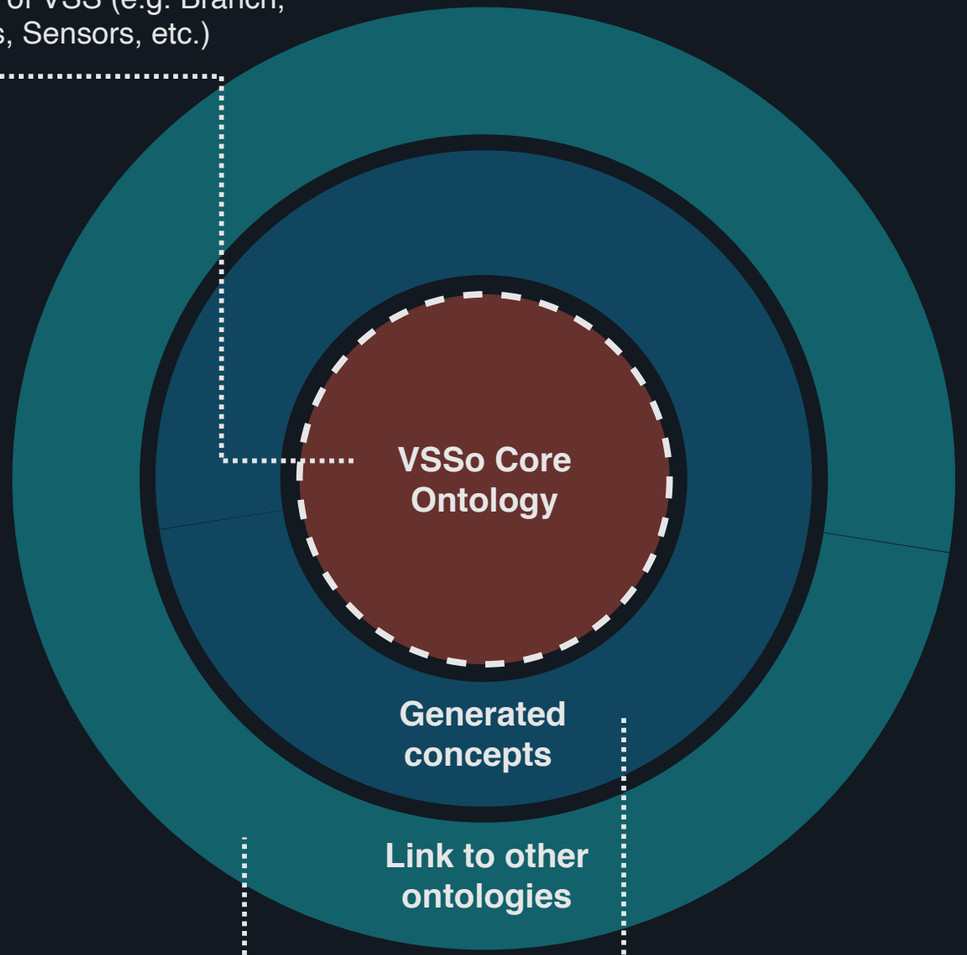


Define the core **structural** concepts of VSS (e.g. Branch, Attributes, Sensors, etc.)



Use VSSo as domain ontology for other, widely adopted standards (SSN/SOSA).

Generate the data definitions from VSS based on the core ontology.

LINKS & FURTHER INFORMATION

VSSo: A Vehicle Signal and Attribute Ontology [LINK]

October 2018
Conference: 9th International Semantic Sensor Networks Workshop
At: Monterey, CA, USA

An Evolving Ontology for Vehicle Signals [LINK]

April 2021
Conference: 2021 IEEE 93rd Vehicular Technology Conference (VTC2021-Spring)

https://github.com/w3c/vsso

https://github.com/GENIVI/vehicle_signal_specification

https://github.com/danielwilms/vsso-demo

https://github.com/danielwilms/vsso-tools