

PP20 Understanding the Power of Information Modeling for Efficient and Effective Visualization

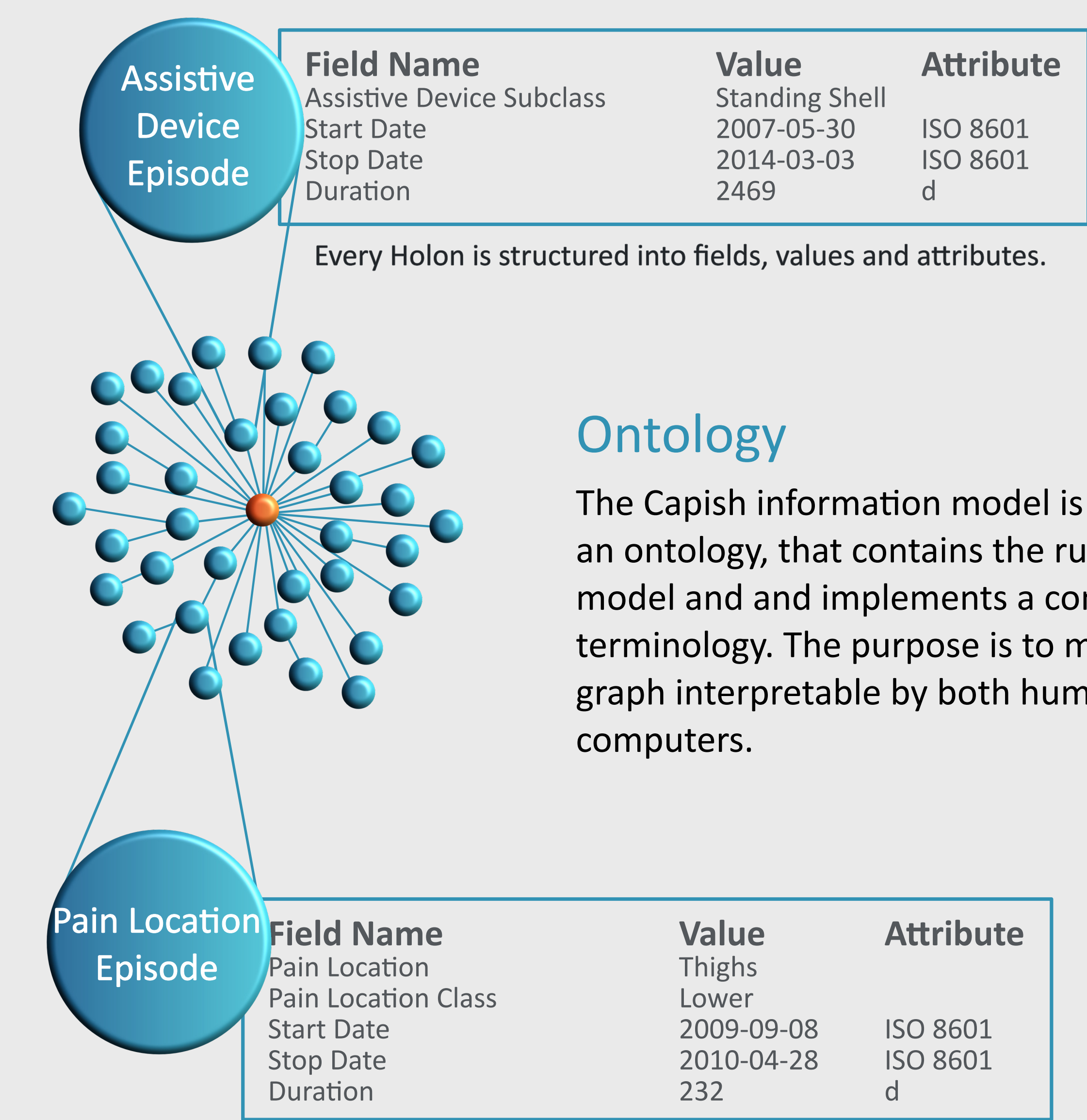
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Information Modeling

Information Model

Capish has coined the term "Holon" for a node, in a graph, that collects data corresponding to a common concept. Both data and metadata coexist in a Holon. Capish has developed an information model that is constituted of Holons, which are linked together through relations as a graph. In this model the focus is on the content of the Holons and not the relationships.

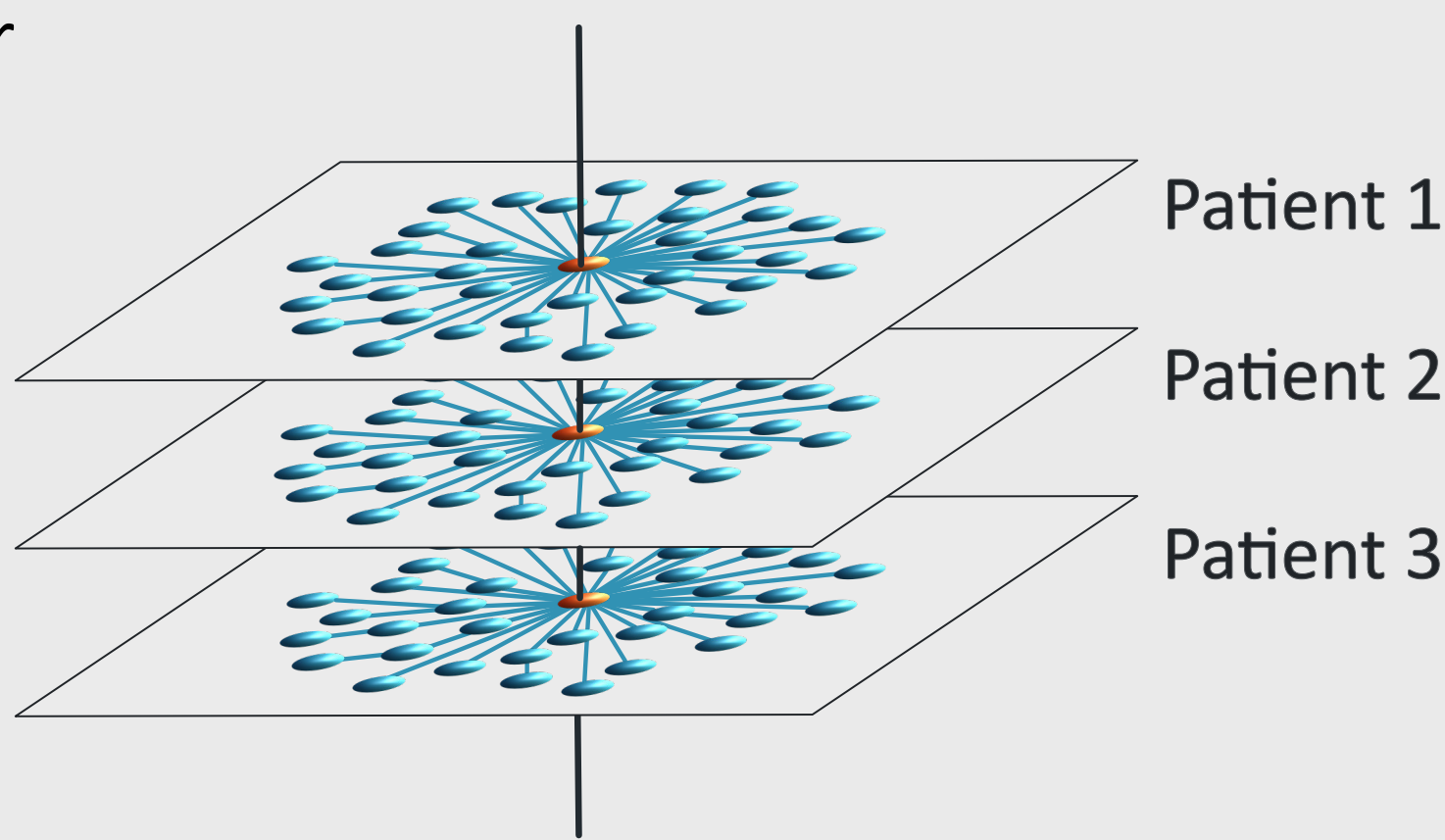


Ontology

The Capish information model is based on an ontology, that contains the rules for the model and implements a common terminology. The purpose is to make the graph interpretable by both humans and computers.

Flexible and Scalable Model

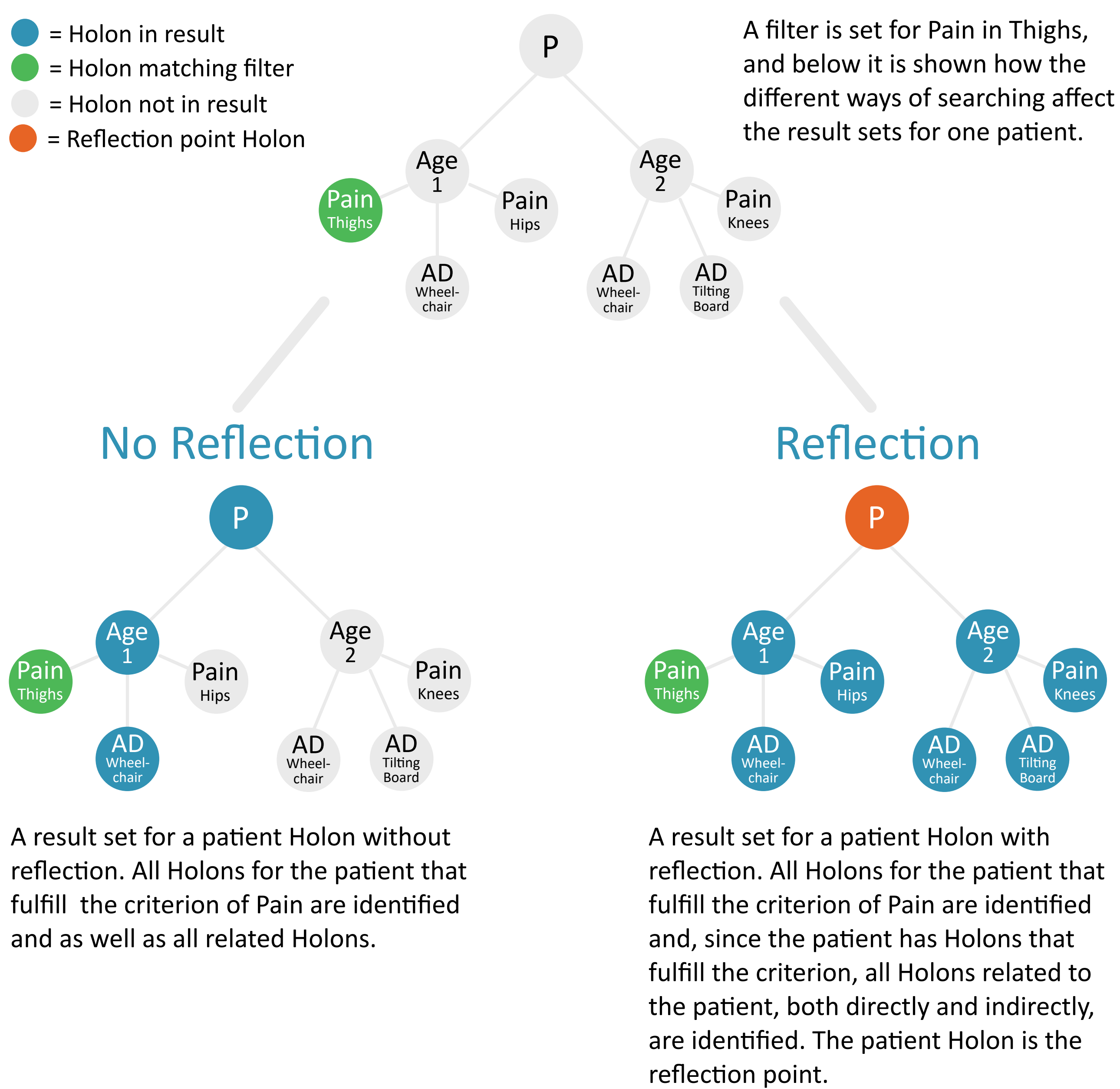
New Holons and relationships can easily be incorporated without disturbing the existing graph. Data can be exported as xml-files, e.g. one file per patient or concept.



New Technology

Traversal through Indirect Relationships

By utilizing the power of the ontology-based information model, the resulting graph database can be searched in different ways. One approach uses indirect relationships which can be used for simple filtering but also for sophisticated searches returning so called reflected dataset. The illustration below shows the difference between searching with and without reflection. Depending on how the data is modeled different results can be obtained.



Indexing nodes and relationships

The outcome above is made possible by utilizing different index structures. Working with node identity indexes, node type identity indexes, relation indexes and property value indexes creates new opportunities.

In particular, the implementation of a relation index in conjunction with the other indexes allows to answer complex questions and retrieve a broader result set. The advantage of this graph retrieval approach grows with the complexity of a query.

Reflection Point

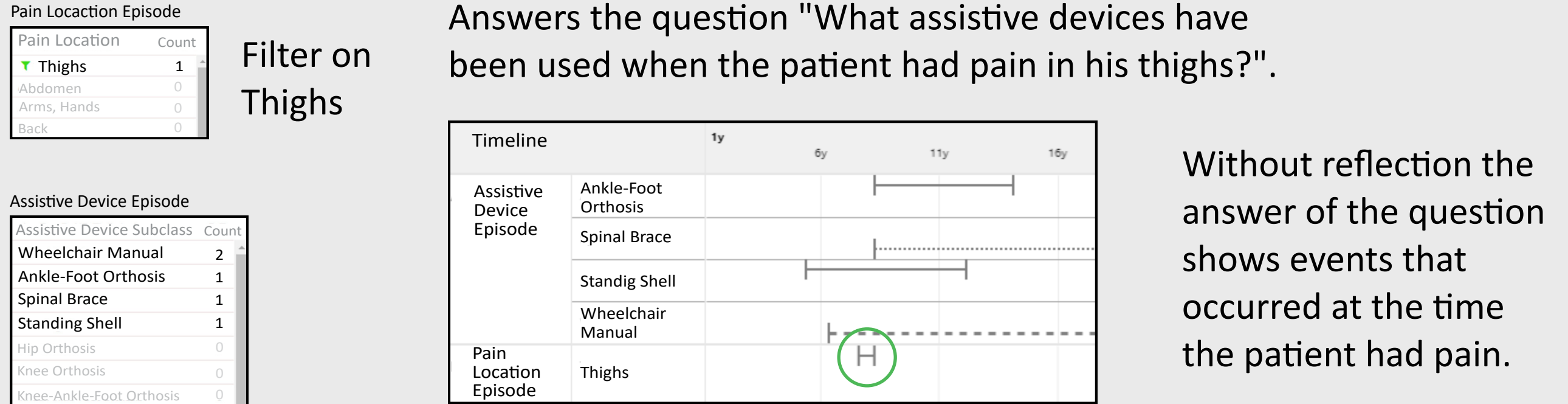
In the second example above, the patient Holon is used as reflection point which means that data is shown from a patient perspective. Other reflection points e.g. the study or site could also be of interest in an analysis of a clinical study. This possibility to change the reflection point adds flexibility and value.

Efficient and Effective Visualization

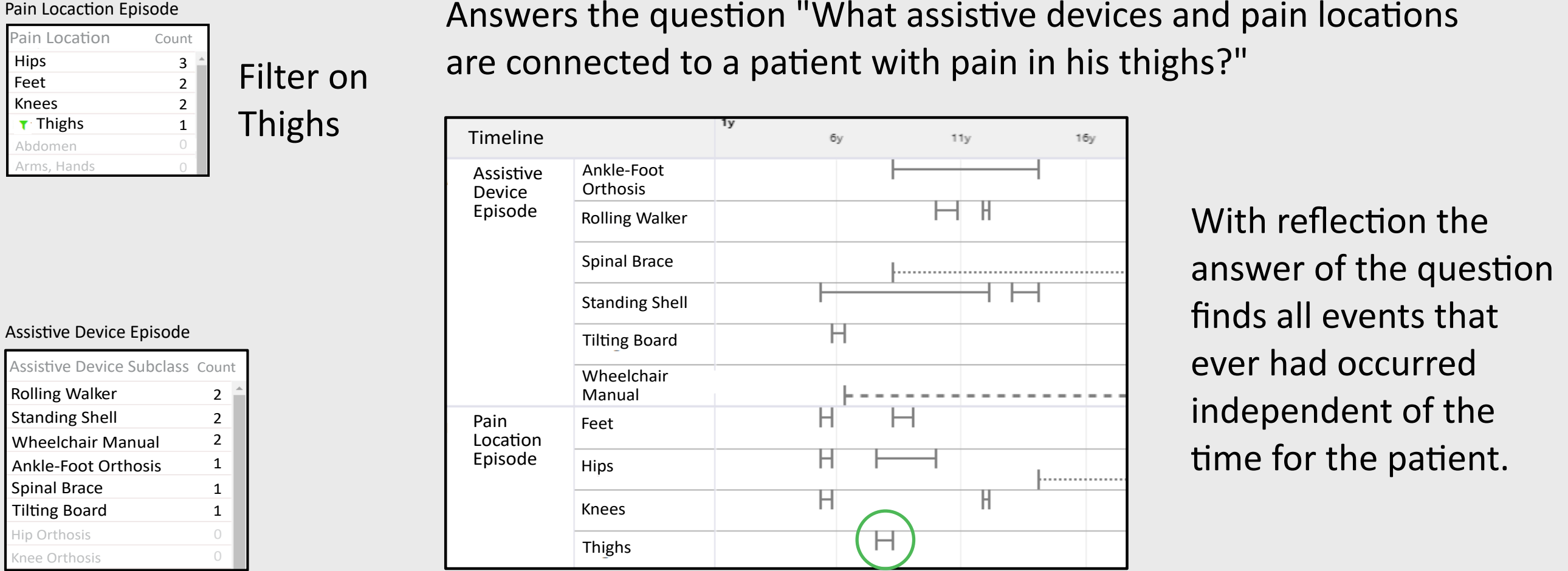
Access the Data

Being able to answer questions raised from different perspectives in the same solution, with the same data structure, increases the ability to explore the data in a wider context. Depending on the question at hand, either way of presenting the data is valuable. The figures below show how reflection behaves in a visualization tool that uses this technology and the type of question it can answer.

No Reflection



Reflection



The figure to the left shows a configured summary of data details and the figure to the right shows a complete view of the database content for a specific patient.

CONCLUSION

Developing a new ontology-based information model opens up new possibilities to explore and visualize data. A model constituted of Holons, linked together with relations, directly or indirectly as a graph, can together with an advanced index structure enable end users to answer complex questions and retrieve a broader result set.

Reflect is a tool that is able to show both reflected and unreflected data at the same time and thereby gives the end user extended possibilities, for example exploration of safety signals, drill-downs from aggregated data to patient profile and vice versa, free-text search, creation of subgroups and sharing findings with others.