Data for AGI

What, how and where?

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*THE REAL SCIENCE

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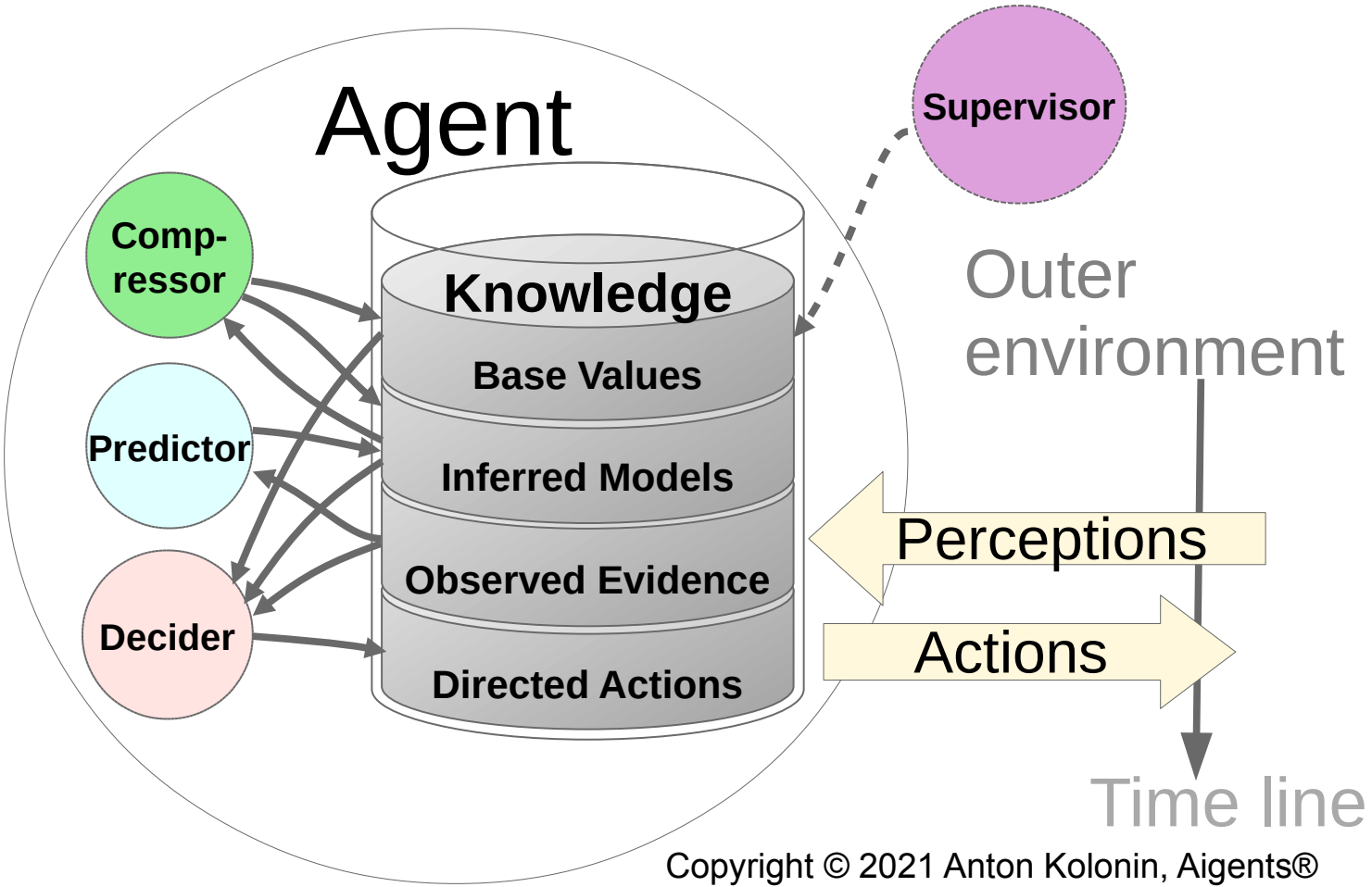
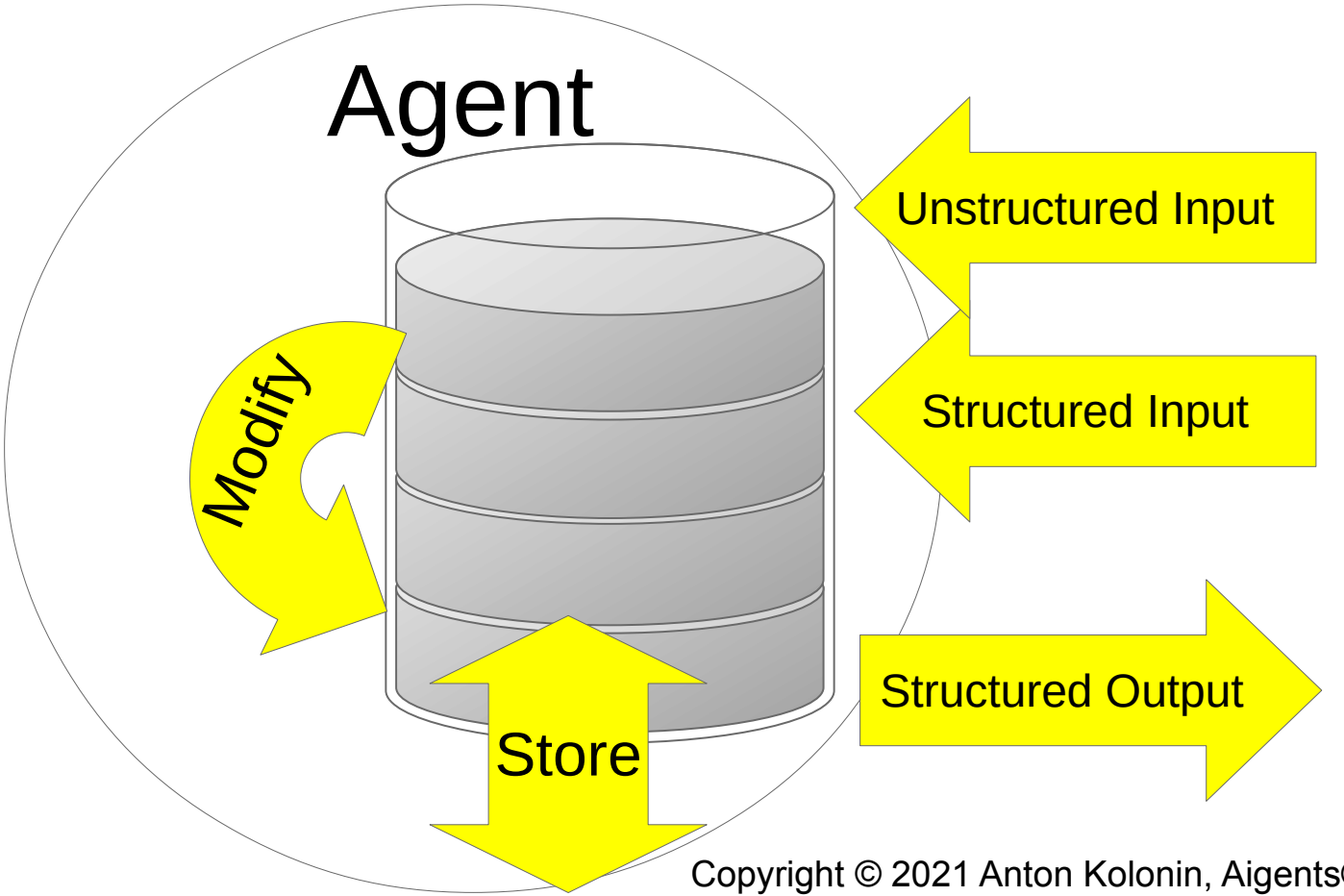
The Agent and its Data



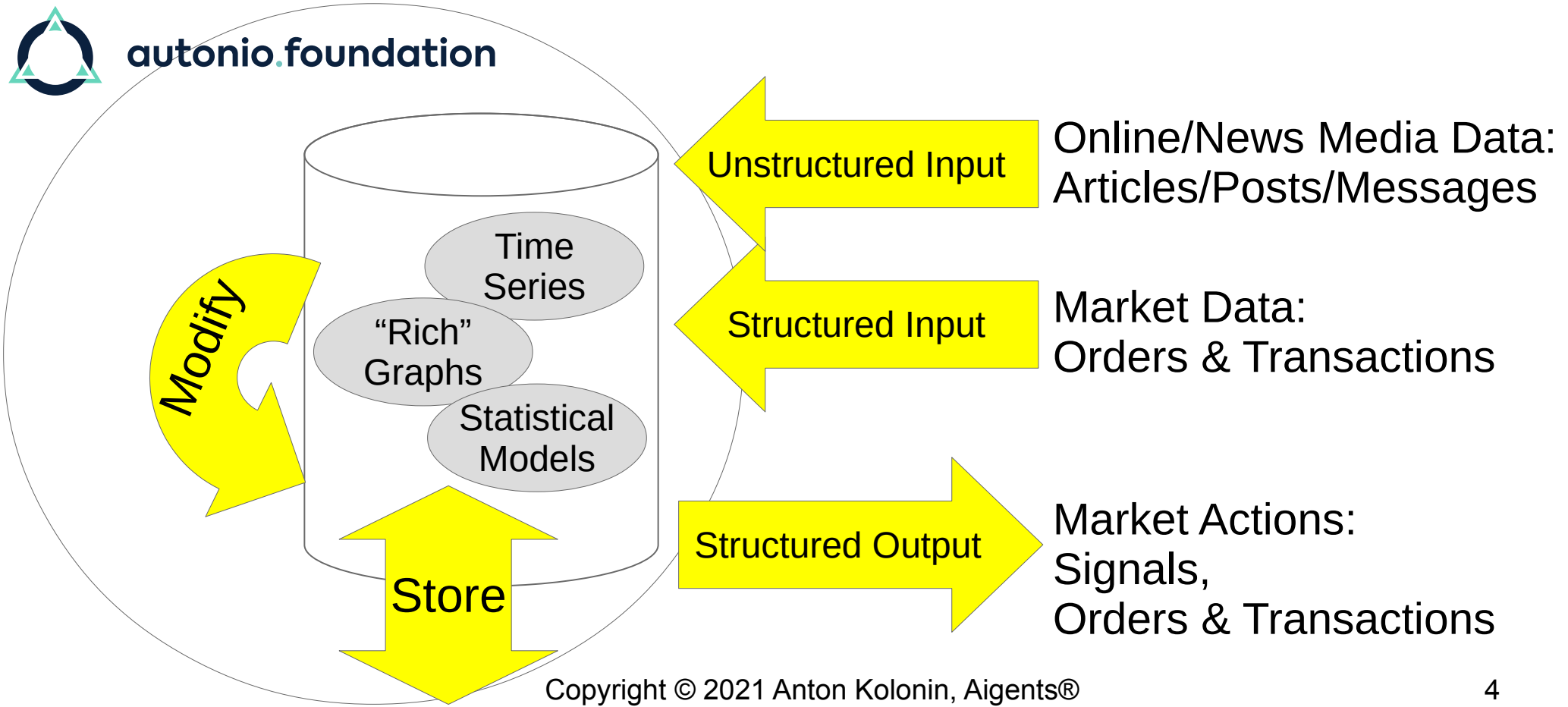
Evgenii E. Vityaev Purposefulness as a Principle of Brain Activity // Anticipation: Learning from the Past, (ed.) M. Nadin. Cognitive Systems Monographs, V.25, Chapter No.: 13. Springer, 2015, pp. 231-254.

Anton Kolonin: Neuro-symbolic architecture for experiential learning in discrete and functional environments // AGI-2021 Conference Proceedings, 2021

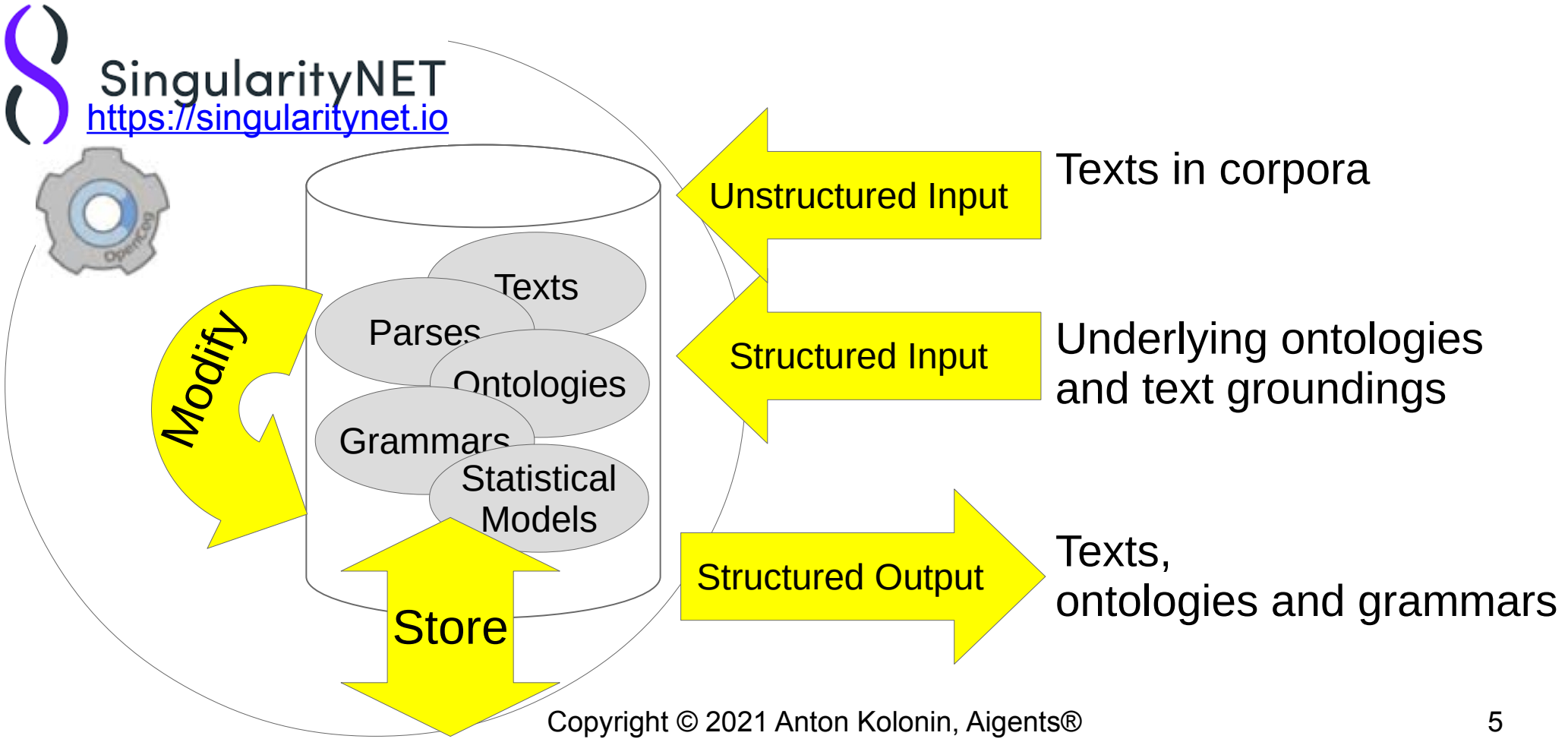
What can be done with the Data



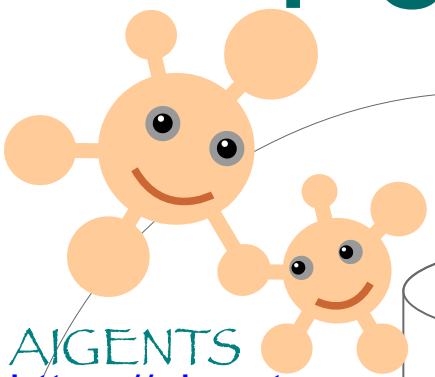
Active Portfolio Management Agent



Unsupervised Language Learner



Personal Internet Agent



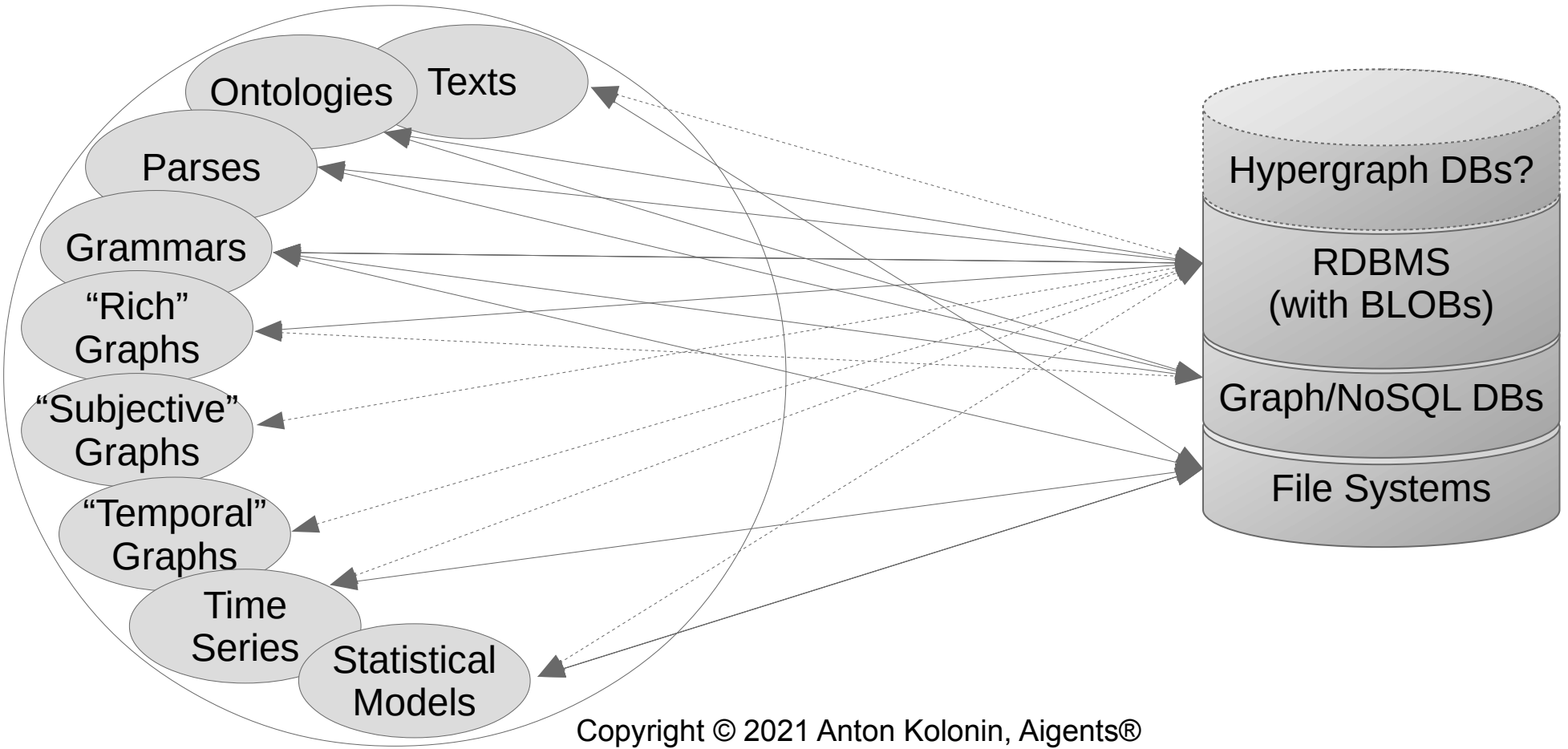
https://aigents.com

Texts in online and social media

Interactions in online and social media

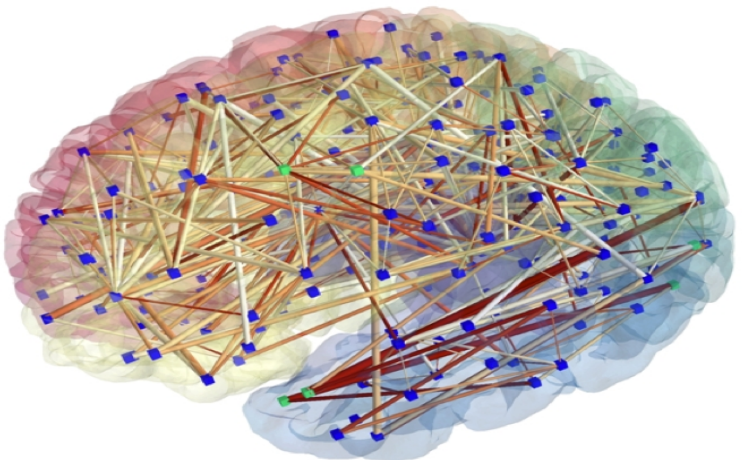
Texts and recommendations

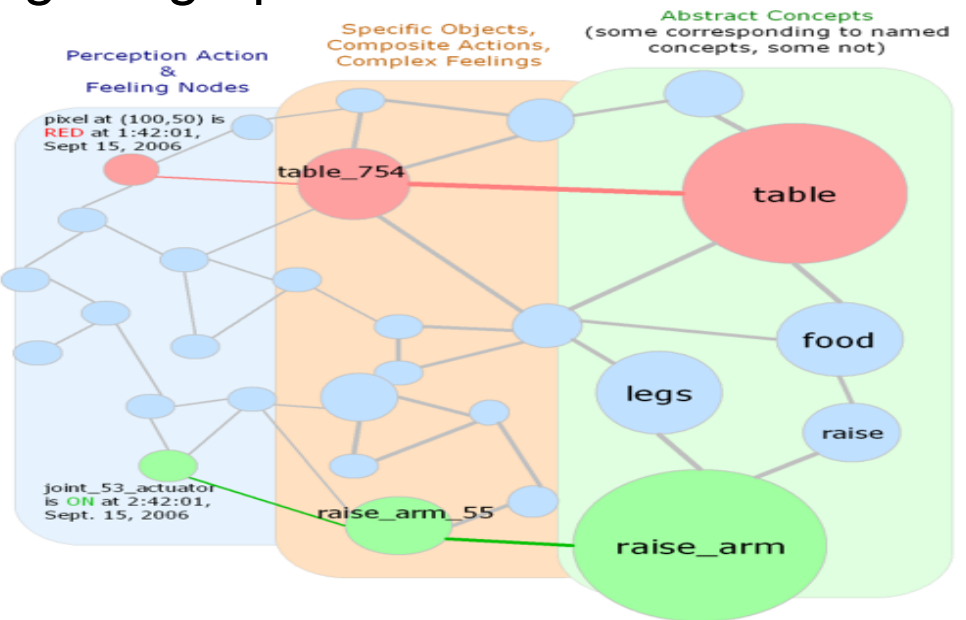
Where to store the Agent's Data



OpenCog's "AtomSpace"

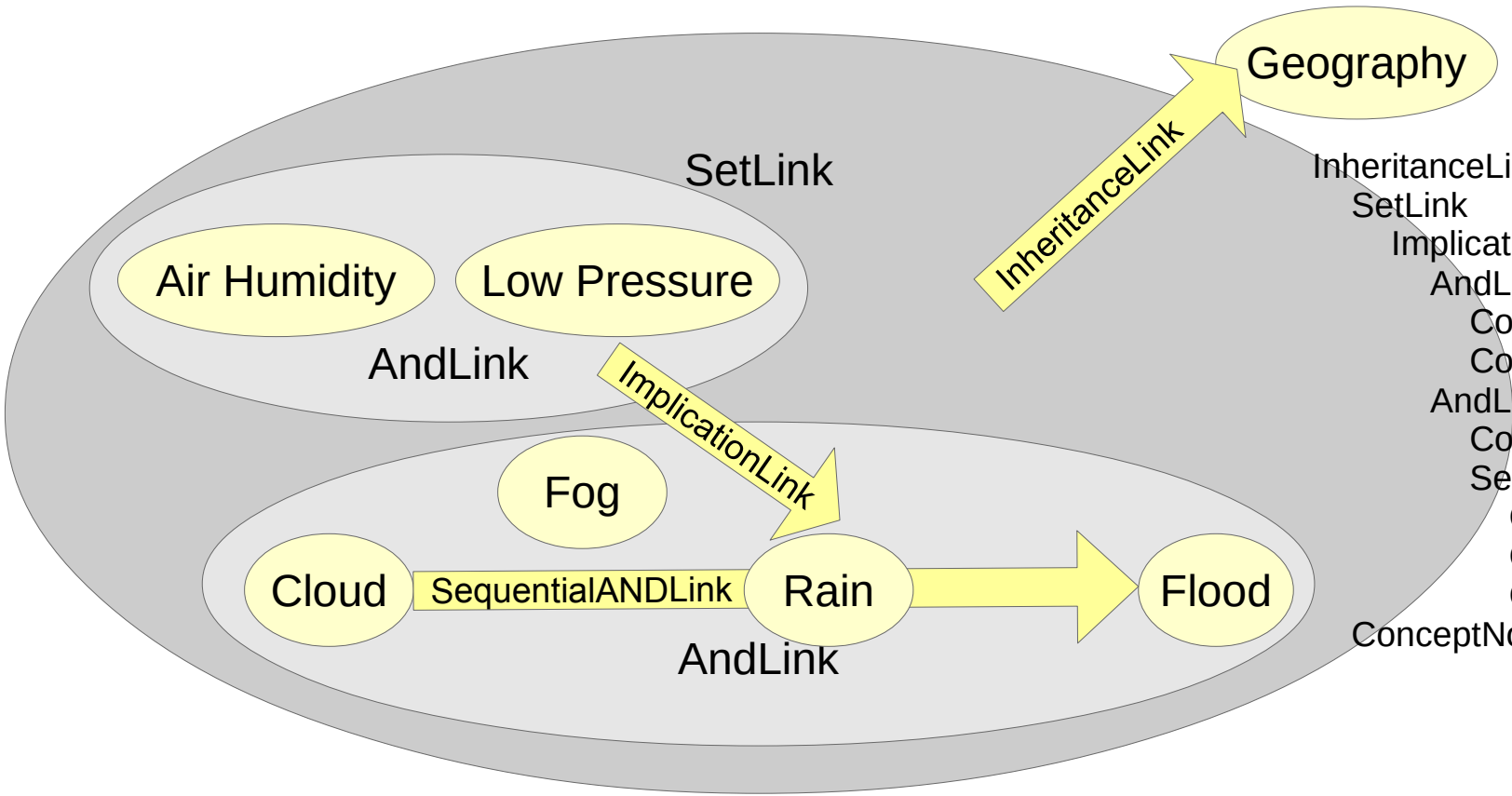
Implements Generalized Hyper-graph and Meta-graph, so each directed/undirected link may link together any number of atoms, where atom could be either node (arity = 0) or any other link with any arity, including unordered N-ary links representing subgraphs as their elements.





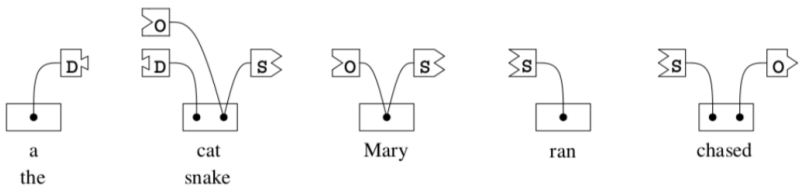
https://github.com/opencog/atomspace
https://github.com/opencog/atomspace/blob/master/opencog/atoms/atom_types/atom_types.script

AtomSpace - Generalized (Link-as-Node) Hyper-Graph is a Meta-Graph (in Atomese)




```
InheritanceLink
    SetLink
        ImplicationLink
            AndLink
                ConceptNode «Air Humidity»
                ConceptNode «Low Pressure»
            AndLink
                ConceptNode «Fog»
                SequentialAndLink
                    ConceptNode «Cloud»
                    ConceptNode «Rain»
                    ConceptNode «Flood»
ConceptNode «Georgraphy»
```

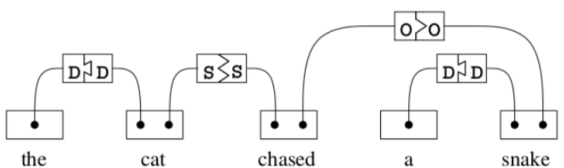
Encoding Link Grammar and NLP Parses in AtomSpace – like you would do in RDBMS

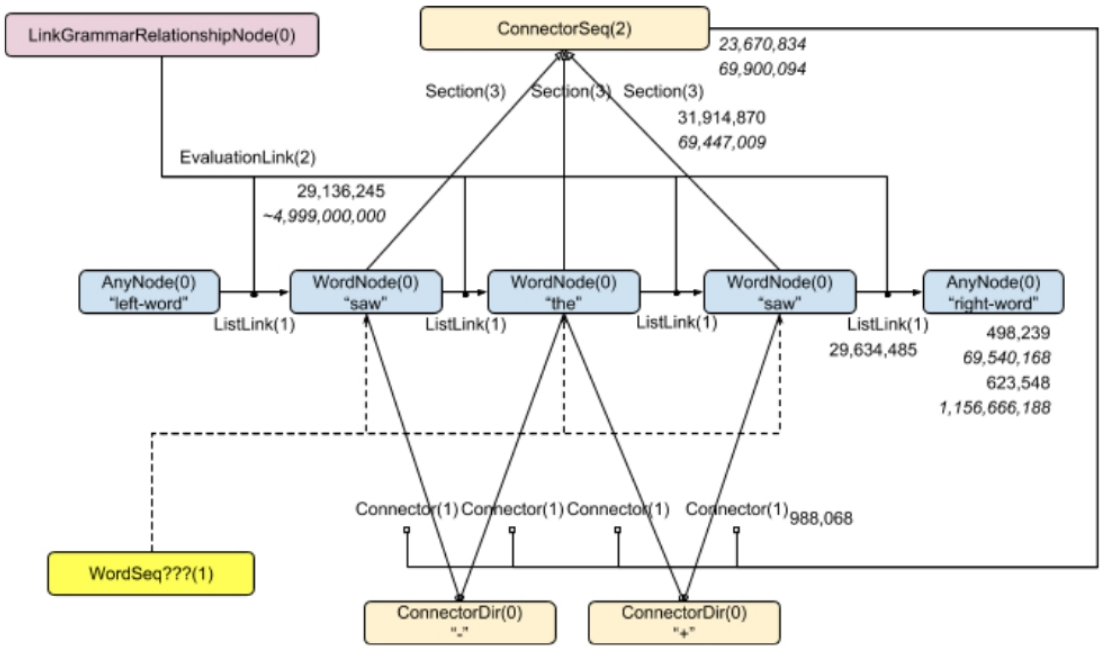


An illustration of Link Grammar connectors and disjuncts. The connectors are the jigsaw-puzzle-shape pieces; connectors are allowed to connect only when the tabs fit together. A disjunct is the entire (ordered set of connectors for a word. As lexical entries appearing in a dictionary, the above would be written as

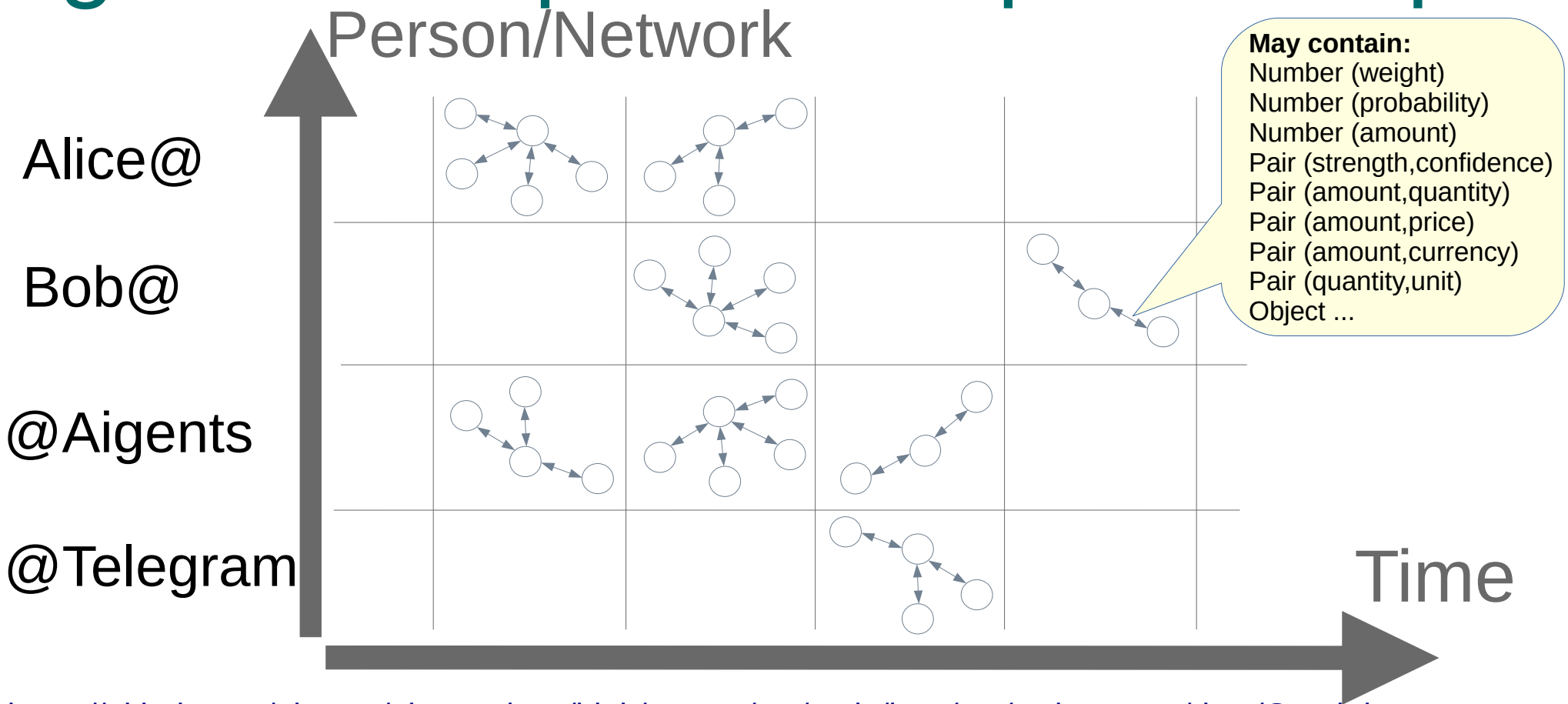
```
a the: D+;
cat snake: D- & (S+ or O-);
Mary: O- or S+;
ran: S-;
chased S- & O+;
```

Note that although the symbols ''&'' and ''or'' are used to write down disjuncts, these are ***not*** Boolea operators, and do ***not*** form a Boolean algebra. They do form a non-symmetric compact closed monoida algebra. The diagram below illustrates puzzle pieces, assembled to form a parse:





Agents® Graphs & Temporal Graphs

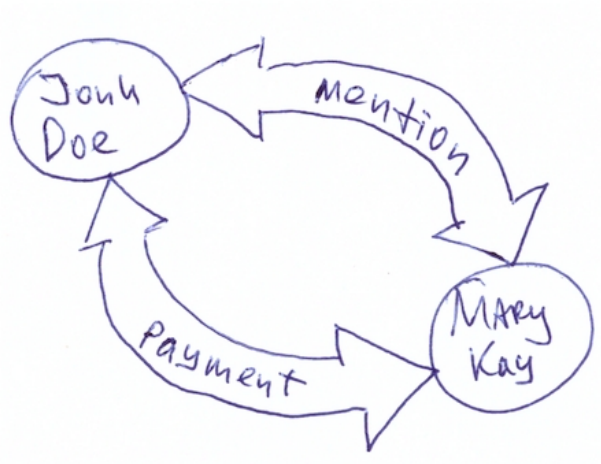


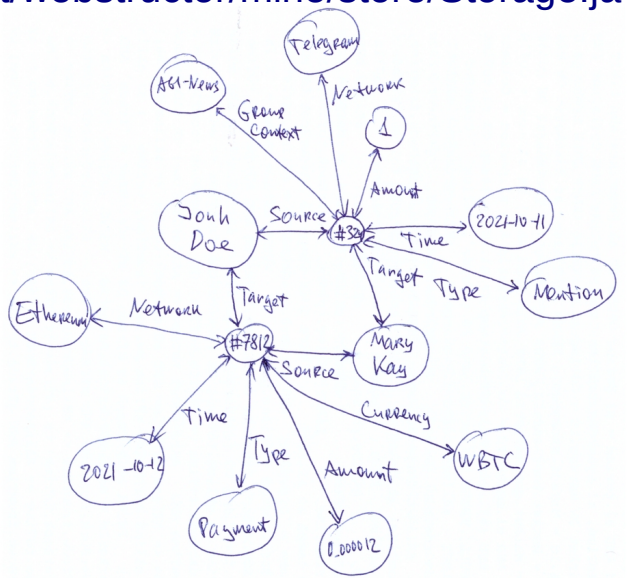
https://github.com/aigents/aigents-java/blob/master/src/main/java/net/webstructor/data/Graph.java

It all ends up with … Relational Algebra

Network	Group Context	Time	Type	Source	Target	Amount	Currency
Telegram	AGI-News	2021-10-11	Mention	John Doe	Mary Kay	1	-
Ethereum	-	2021-10-12	Payment	Mary Kay	John Doe	0.000012	WBTC

https://github.com/aigents/aigents-java/blob/master/src/main/java/net/webstructor/gram/core/MemoryStore.java
https://github.com/aigents/aigents-java/blob/master/src/main/java/net/webstructor/mine/store/Storage.java





Where to store the Agent's Data

Where to store time?
- RDBMS field indexes
- Graph typed links
- Graph link properties

Where to store probabilities?
- RDBMS field indexes
- Graph typed links
- Graph link properties

Where to subjectiveness ?
- RDBMS field indexes
- Graph typed links
- Graph link properties

How to represent process and programs?
- Declarative graphs with procedural knowledge
- Program source codes
- Compiled binary codes

Do we need graphs and meta-graphs?
- Yes, waiting for OpenCog or such
- Yes, on top of any RDBMS
- Yes, on top any Graph DB
- No, triple store is all you need

Where to store the models?
- BLOBs on file system
- BLOBs in RDBMS
- Expand/dump them to Graphs

Do we need transactions?
- No, it is ok to "just forget" some data
- Yes, we need consistency
- Make it an option

So what to do?
- Just wait for OpenCog or such
- Just use any RDMS with "dynamic ORM"
- Engineer it for any custom case