

Semantics for Living Labs *

29-03-2022

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Co-financed by the Connecting Europe
Facility of the European Union

*) or: How to bluff your way to being an expert in semantics



Expectations



Let's talk about language, ontologies, semantics and data



Why semantics, can't we just send data over API's?

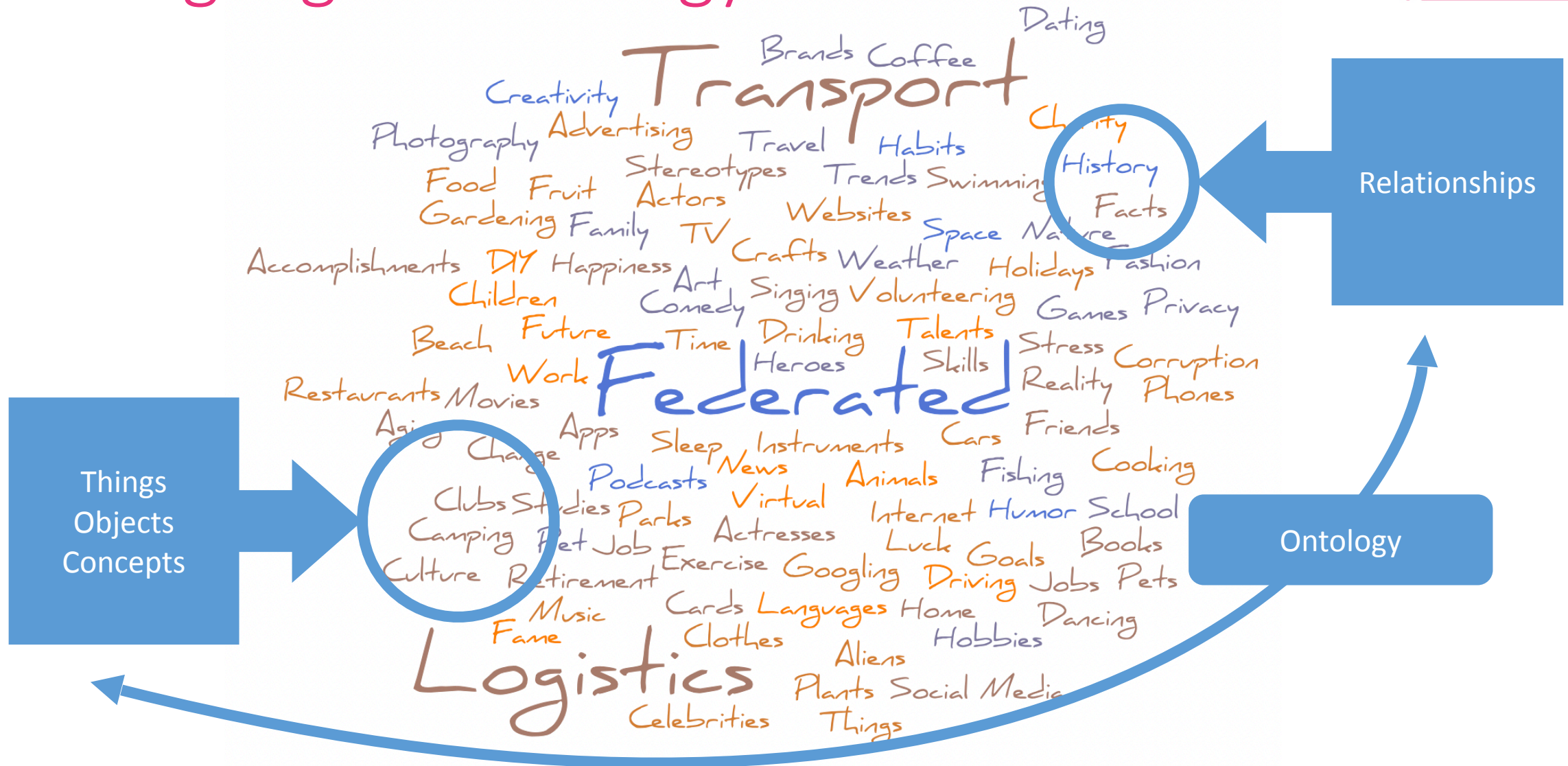


What does semantic data look like and



How can we implement this without tears?
Will I get this "It's so simple, wish I had known this before" feeling

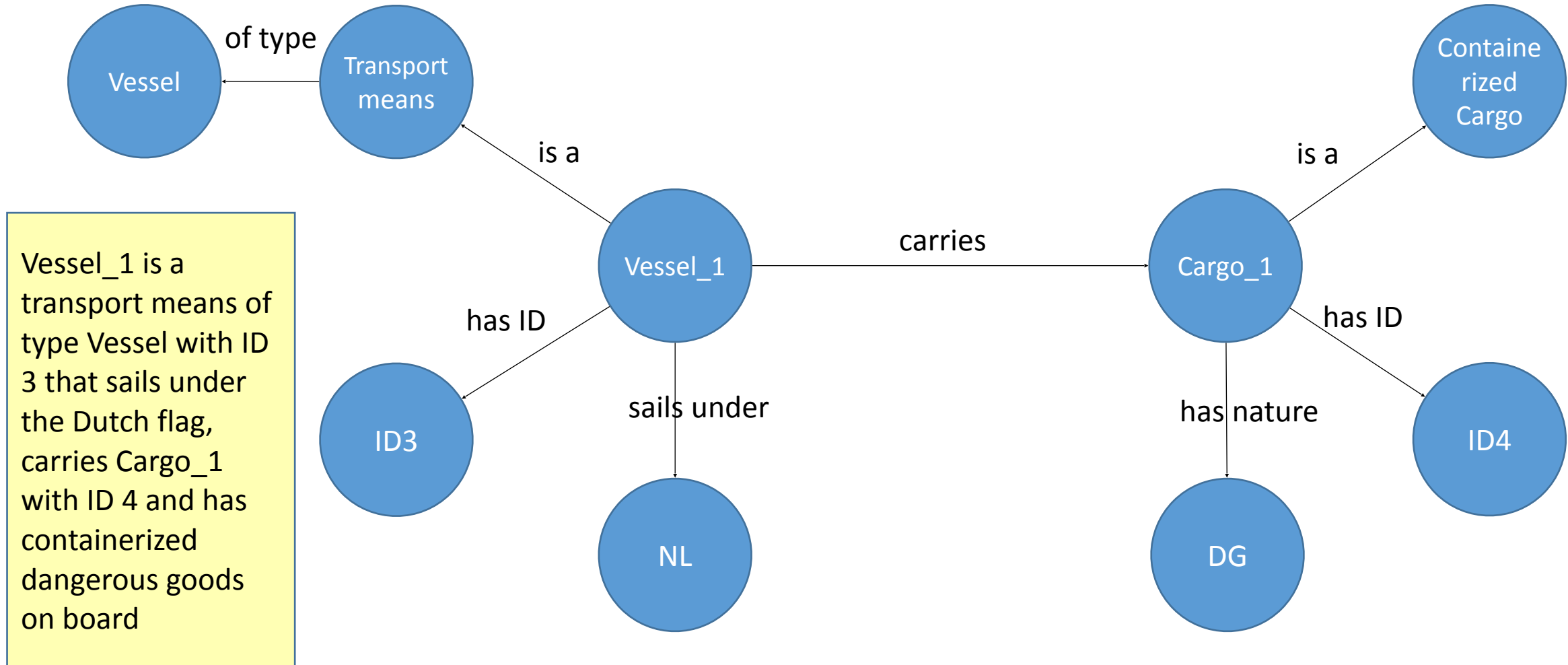
Language & ontology



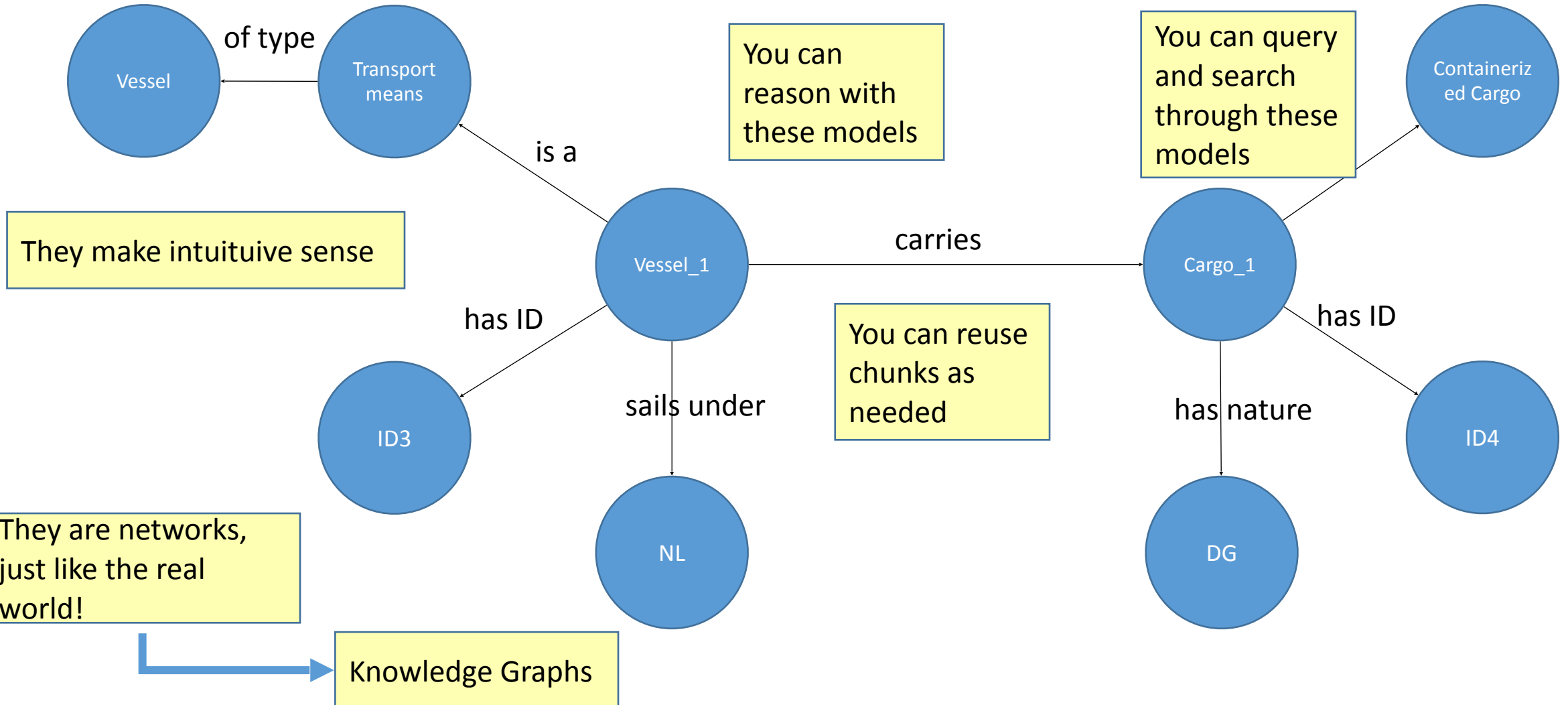
Semantics



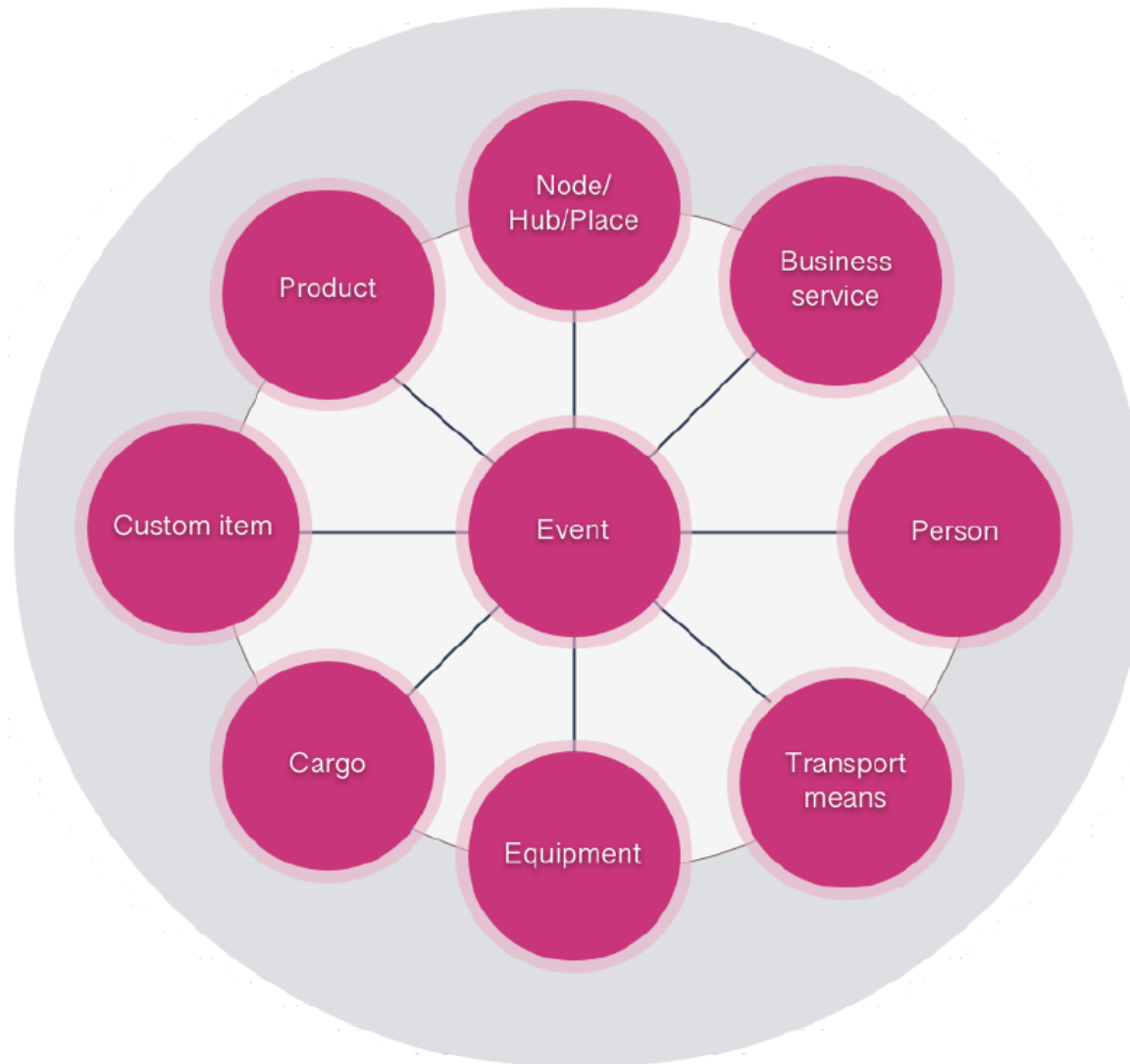
Semantic Data Model



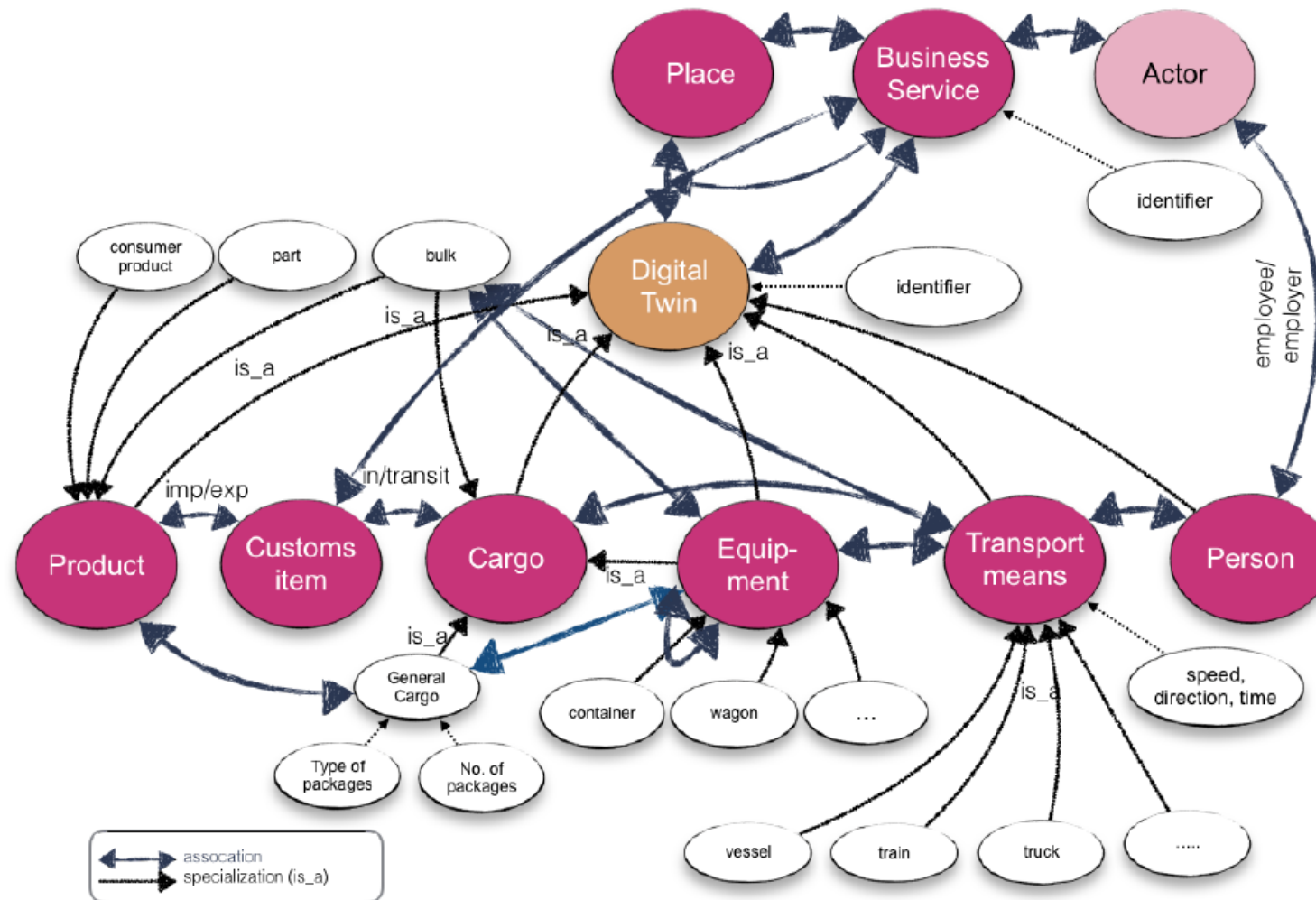
Why use semantic models?



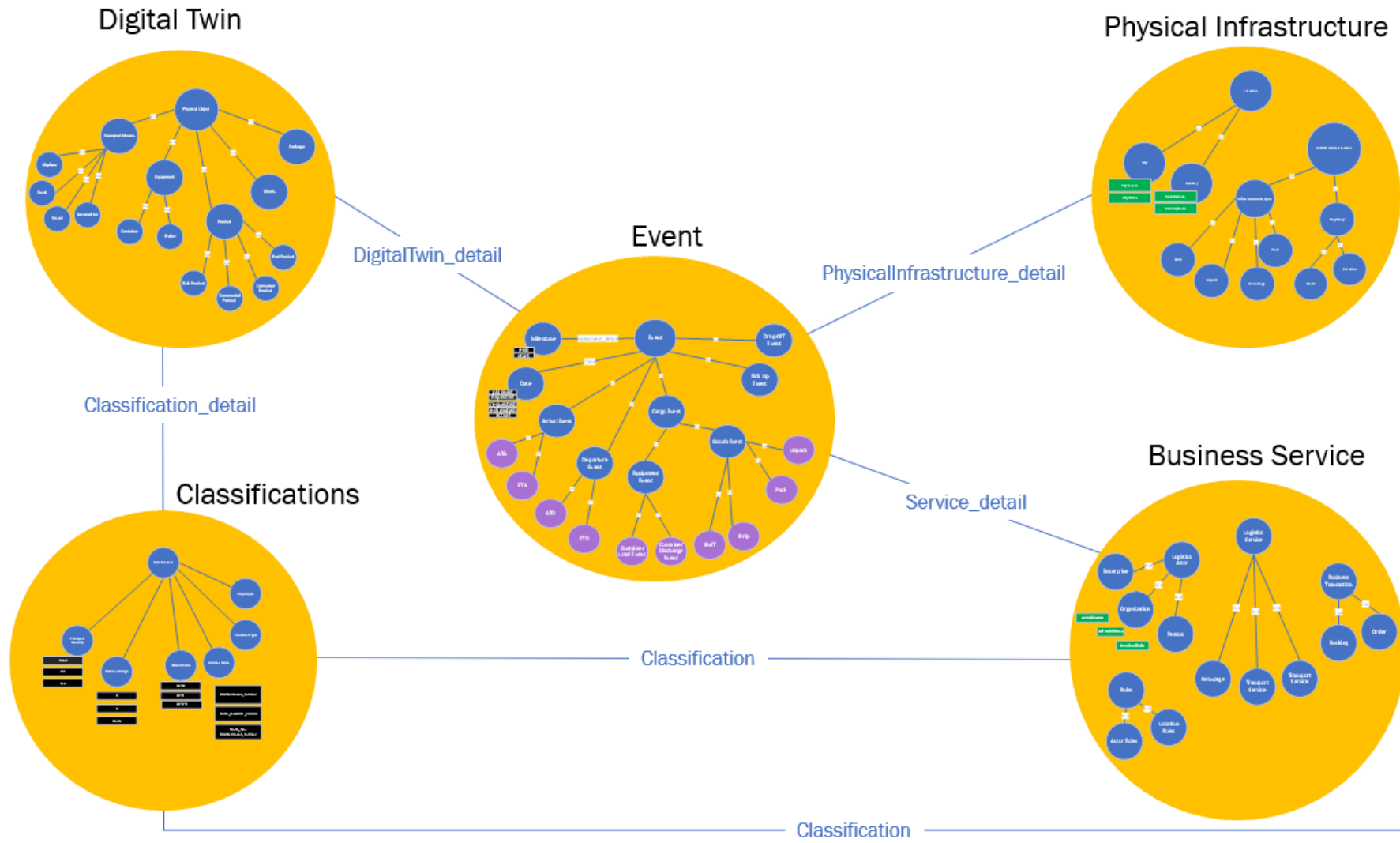
Semantic Model refresher



Semantic Model refresher



Semantic Model refresher



About events

Abstract concepts

Event
EventAtomic
EventComplex

Events as we know them

EventArrival
Event
ATAEvent
ETAEvent
CargoEvent
BulkTransport
EventDischarge
EventGoods

DischargeEvent
EquipmentTransportEvent
ContainerDischargeEvent
EquipmentLoadEvent
ContainerLoadEvent
PushBargeLoadEvent
RailwayWagonLoadEvent
GoodsEquipmentEvent
StripEvent
StuffEvent
GoodsTransportEvent
LoadEvent
BulkLoadEvent
GoodsLoadEvent

DepartureEvent
ATDEvent
ETDEvent
DropOffEvent
DropOffTime
WindowEvent
GoodsStructuringEvent
MergeEventPackaging
EventSplitEvent
UnpackEvent
PickupEvent
PickupTimeWindowEvent
ComplexEvent
CallEvent



A group of colorful wooden human figures standing in a line, with the text "Do you speak FEDeRATED?" overlaid. The figures are in various colors including blue, yellow, red, green, and brown. The text is in a white, sans-serif font, with "Do you speak" on the top line and "FEDeRATED?" on the bottom line. A vertical white line is positioned to the left of the text.

Do you speak
FEDeRATED?

The future of data systems...



Any data you need, from any company, any government, any platform:

just browse the graph

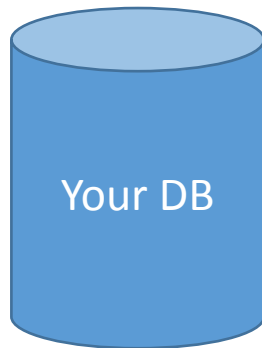


One last ad: Linked Data is the secret



Traditional platforms:

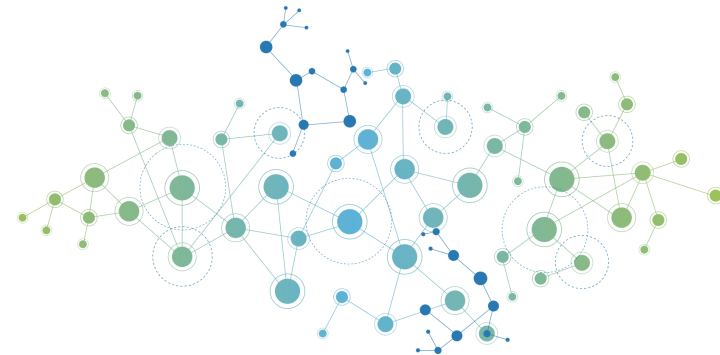
- Only access data that is within the database of your system and any data you can access via an API.



Locked Data

Linked Data platforms

Access any data anywhere in the world that represented in the RDF format.



Linked Data



Time to get

Case A

Your IT platform probably

- has an ontology
- uses semantic tech
- has graph query capabilities
- uses linked data



Don't worry
be happy!!!



Case B

Your IT platform probably

- has a database
- has a data model
- can be queried by SQL
- has an API



Strategy to get from Case B to Case A

- 1) Do a PoC
- 2) Limit the scope
- 3) Wrap it up
- 4) ...
- 5) ..
- 9) ...
- 10) Upgrade your platform



LL implementing semantic strategies



Do a PoC

Do a parallel
proof of concept

Limit scope

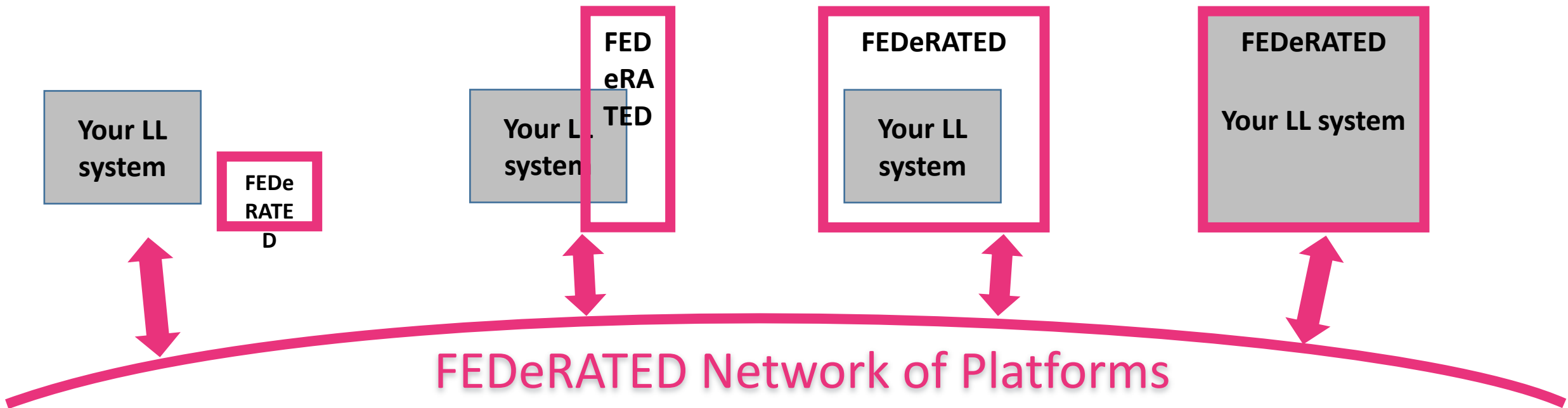
Implement a
limited scope

Wrap it up

Put a wrapper
around your LL

Upgrade your LL

Develop a full
semantic
implementation





Semantic
technology
the easy way



For example: LogisticsService



From the FEDeRATED Semantic Model
(<http://www.federatedplatforms.eu/index.php/developer-portal>)

LogisticsService

Any service that is provided to a customer by a logistics or transport service provider.

Property	Description
usedTransportEquipment	Transport equipment involved with the logistics service
serviceName	Each type of logistics service can be described using a name.
usedGoods	Goods that are part of the logistics service
usedPackagedProducts	Packaged products that are part of the logistics service
usedPackage	Package that is part of the logistics service
usedTransportMeans	Transports means involved with the logistics service
hasLocation	Location of the logistics service



Example: KLM ExpressPlus! service*



In JSON-LD format, i.e. JSON with extra bits

<pre>{ "@id": "https://www.livinglabserver.nl/federated/klm/services/expressplus",</pre>	URI
<pre> "@context": { "bs": "https://ontology.tno.nl/logistics/federated/BusinessService#", "dt": "https://ontology.tno.nl/logistics/federated/DigitalTwin#", "pi": "https://ontology.tno.nl/logistics/federated/PhysicalInfrastructure#" },</pre>	Prefixes (shortcuts)
<pre> "@type": "bs:LogisticsService", "bs:usedTransportEquipment": "dt:ULD", "bs:serviceName": "KLM ExpressPlus", "bs:usedTransportMeans": "dt:Airplane", "bs:hasLocation": "pi:city#AMS"</pre>	The data
<pre>}</pre>	

* Example only, this service doesn't exist



Same example in “Turtle”



i.e. TTL, i.e. Terse RDF Triple Language (Turtle)

```
@prefix bs: <https://ontology.tno.nl/logistics/federated/BusinessService#>.
```

```
@prefix dt: <https://ontology.tno.nl/logistics/federated/ DigitalTwin #>.
```

```
@prefix pi: <https://ontology.tno.nl/logistics/federated/ PhysicalInfrastructure #>.
```

```
<https://www.livinglabserver.nl/federated/klm/services/expressplus> a bs:LogisticsService ;
```


```
bs:serviceName "KLM ExpressPlus" ;
```

```
bs:usedTransportEquipment "dt:ULD" ;
```

```
bs:usedTransportMeans "dt:Airplane" ;
```

```
bs:hasLocation": "pi:city#AMS"
```

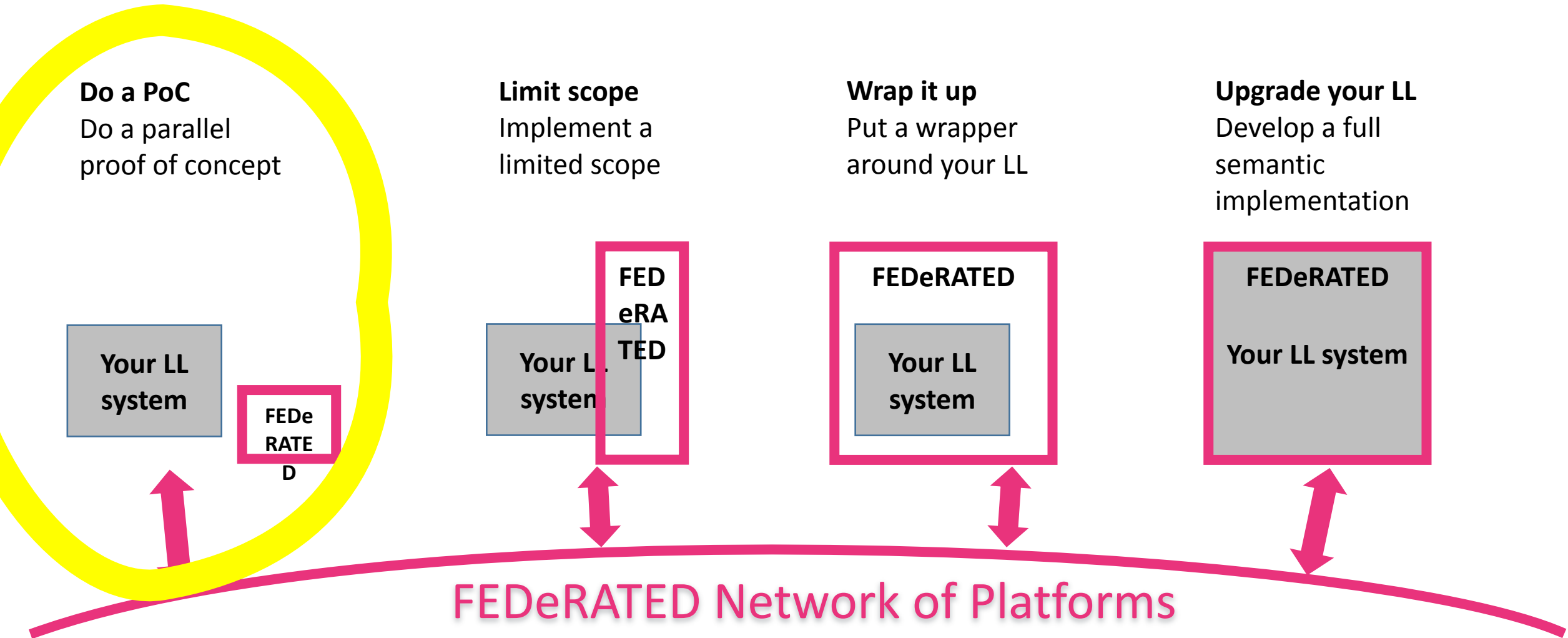
```
.
```

A blue, multi-lobed cloud shape with a thin black outline.

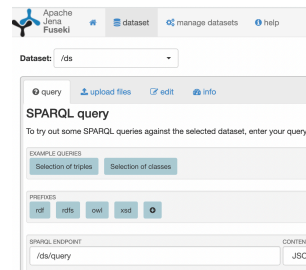
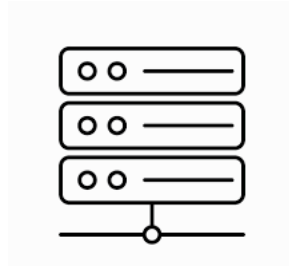
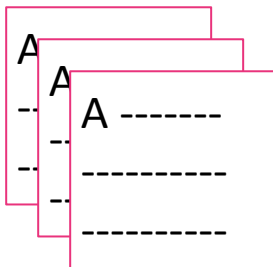
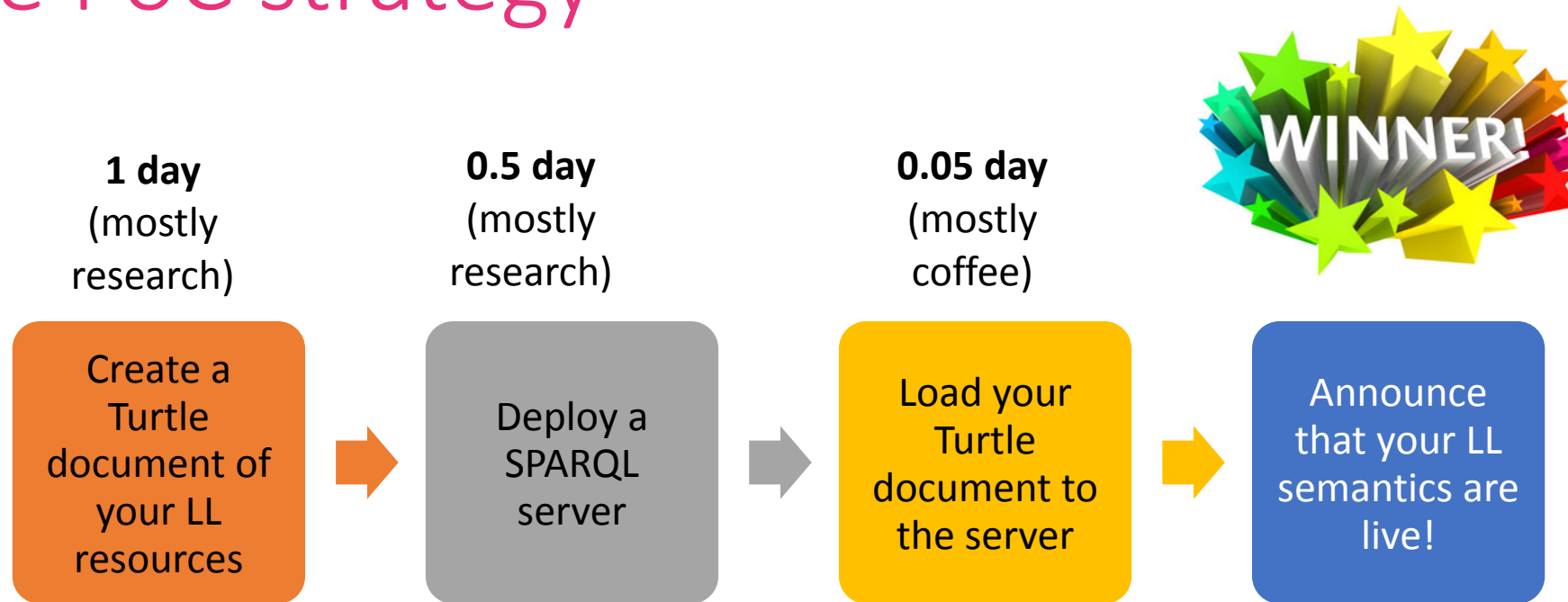
We need RDF for
SPARQL queries



LL implementing semantic strategies



The PoC strategy”



e.g. Apache Jena Fuseki



About SDA RDI

```
1 PREFIX bs:<https://ontology.tno.nl/logistics/federated/BusinessService#>
2 SELECT ?service ?predicate ?object
3 WHERE {
4     ?service bs:serviceName ?object.
5 }
6 LIMIT 10
```



QUERY RESULTS

Table [Raw Response](#)

Showing 1 to 2 of 2 entries

Search: Show entries

service	predicate	object
http://www.skystrategy.com/federated/express		"Express"
http://www.skystrategy.com/federated/expressplus		"ExpressPlus"



LL implementing semantic strategies



Do a PoC

Do a parallel
proof of concept

Limit scope

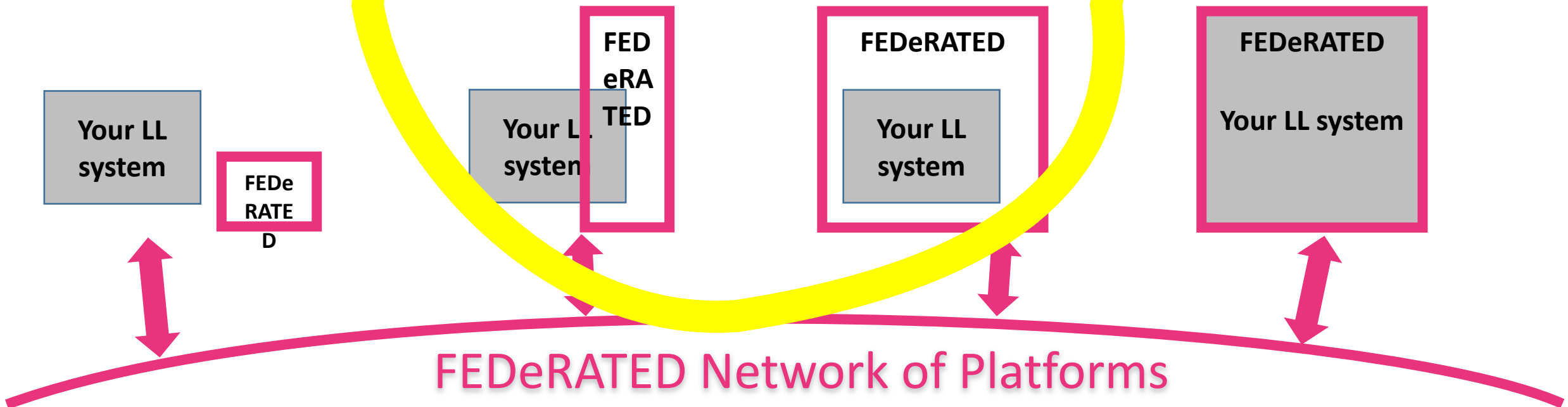
Implement a
limited scope

Wrap it up

Put a wrapper
around your LL

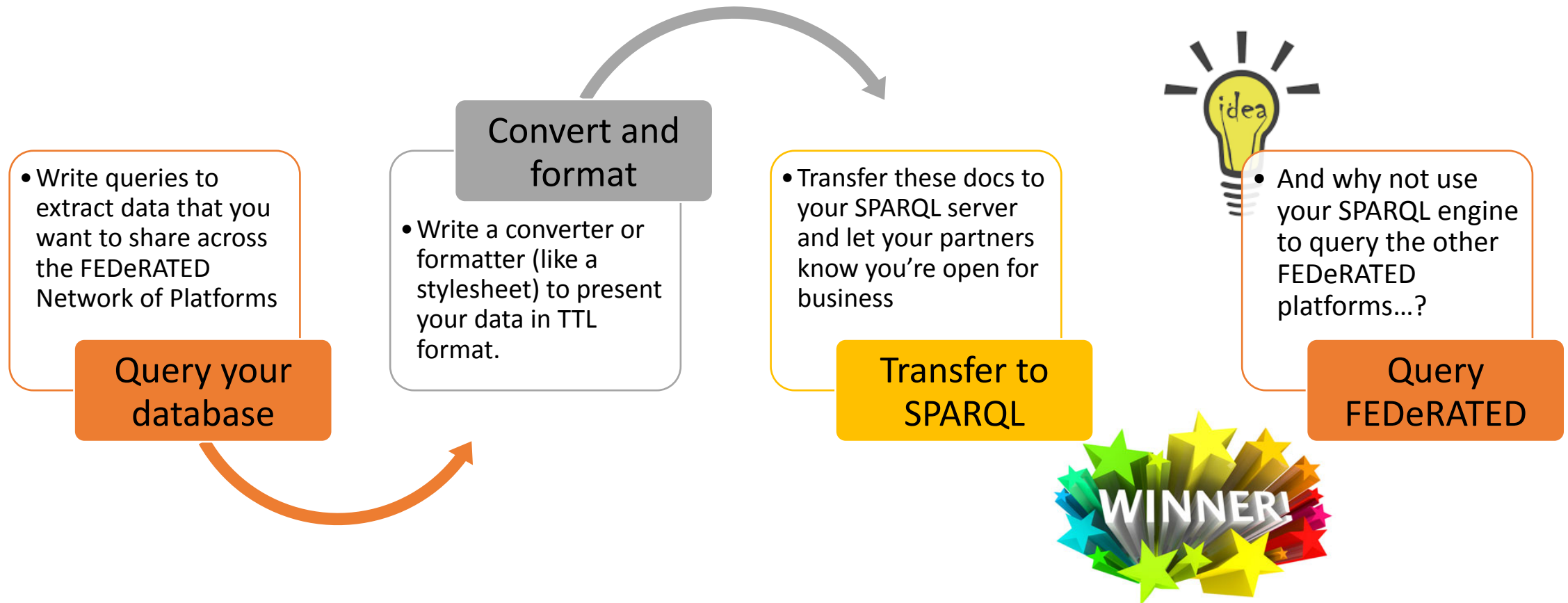
Upgrade your LL

Develop a full
semantic
implementation



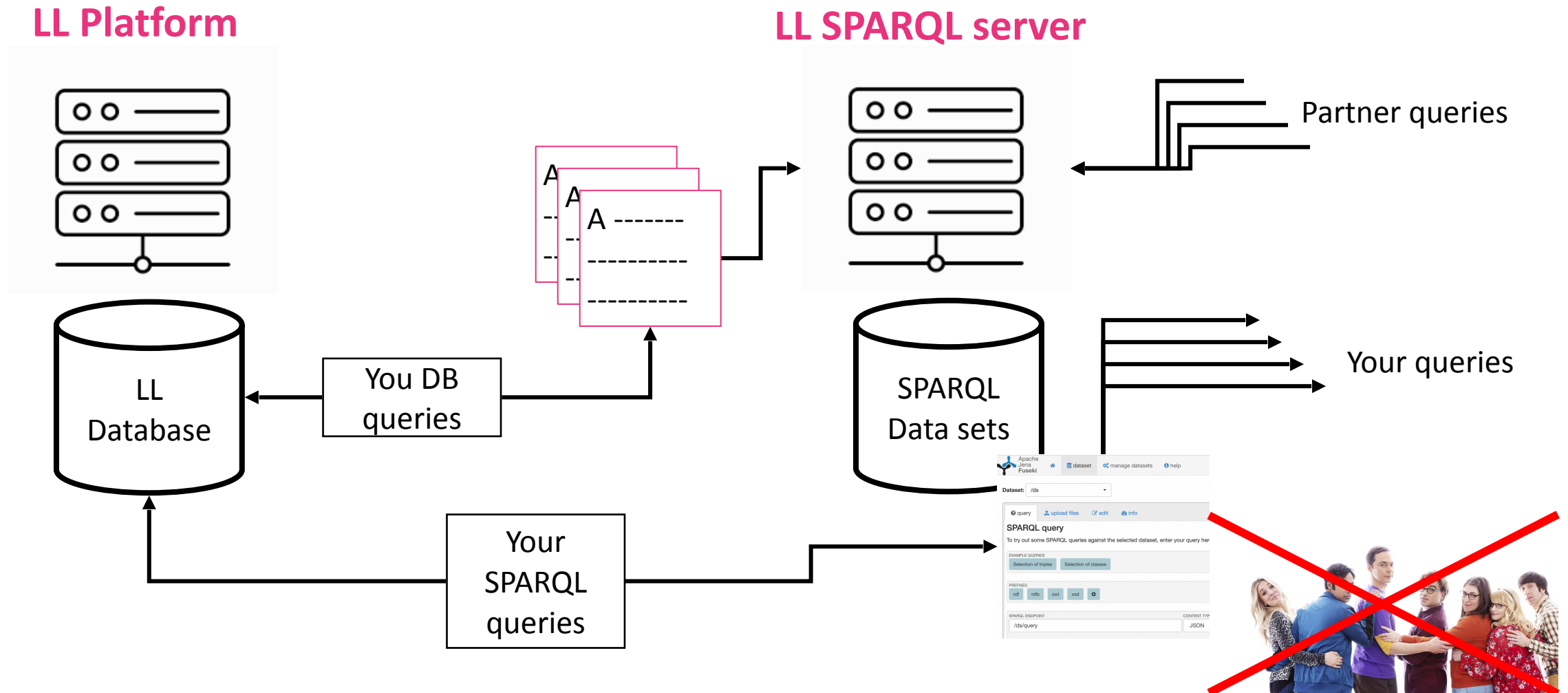
Time to upgrade

What if we generate TTL files automatically and upload them to our SPARQL server?



For the architects (others look away please)

FEDeRATED





And now for
real...

...but take a
break first



LL implementing semantic strategies



Do a PoC

Do a parallel
proof of concept

Limit scope

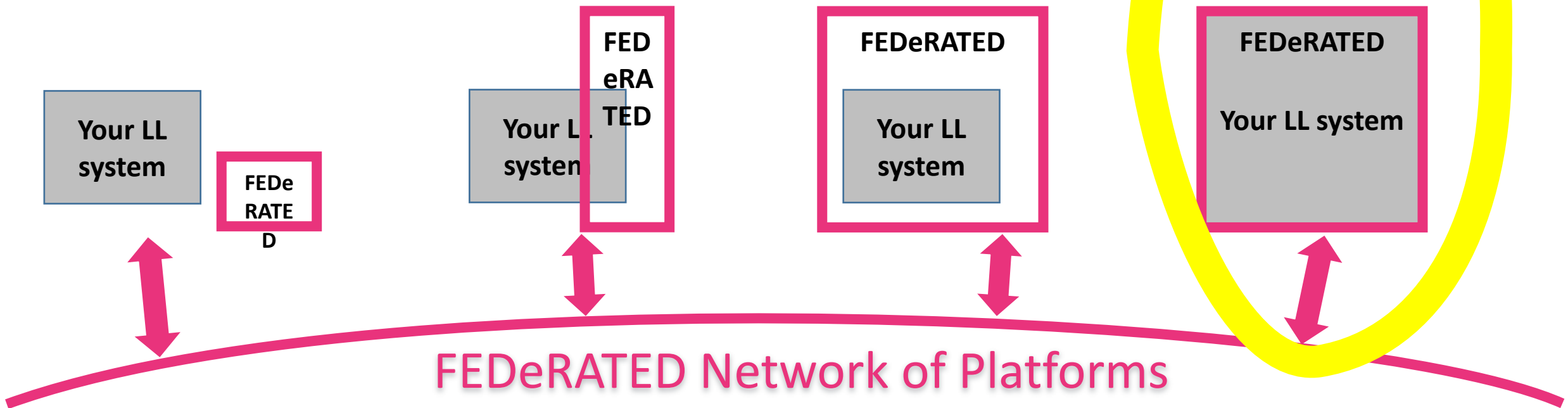
Implement a
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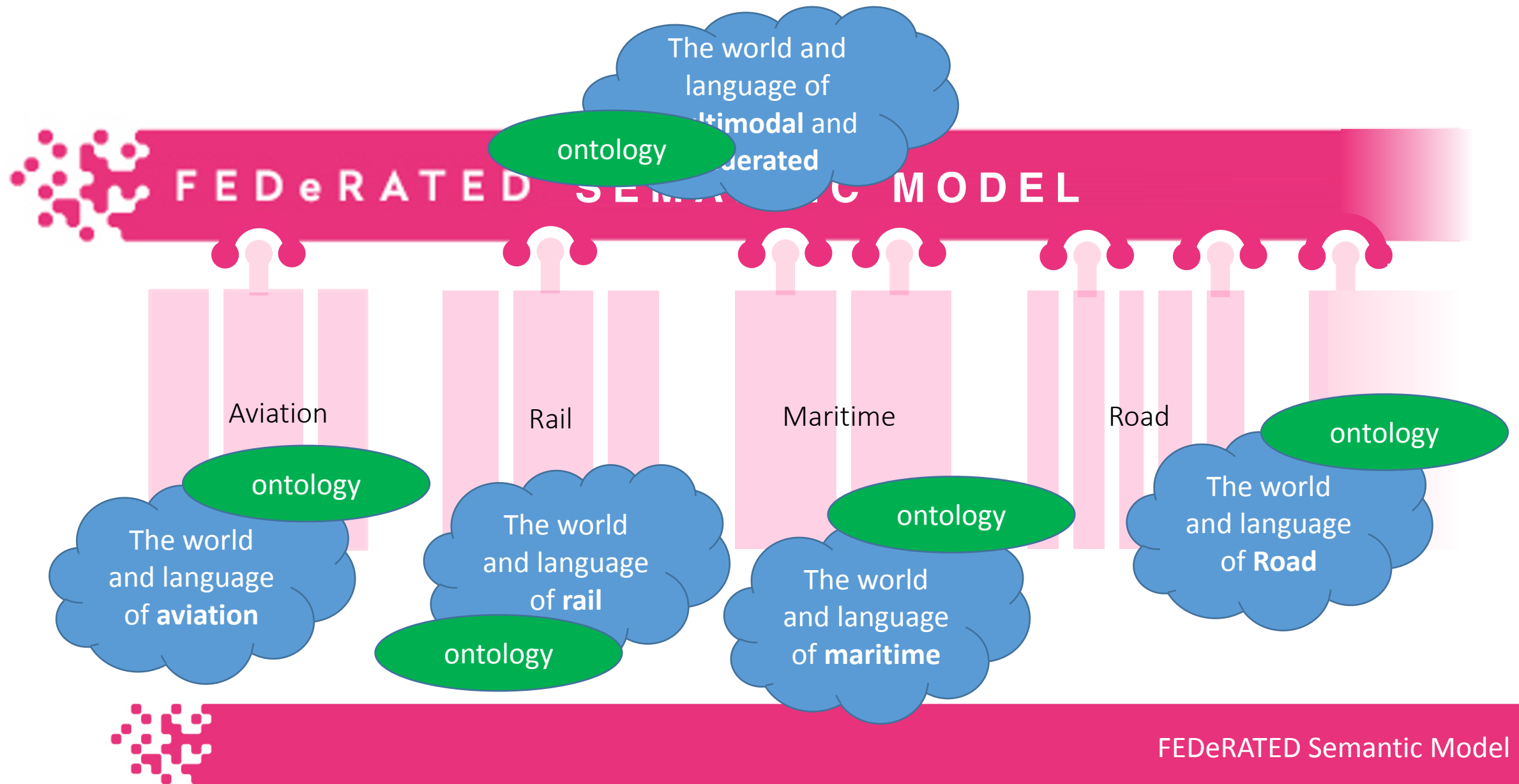
Put a wrapper
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Upgrade your LL

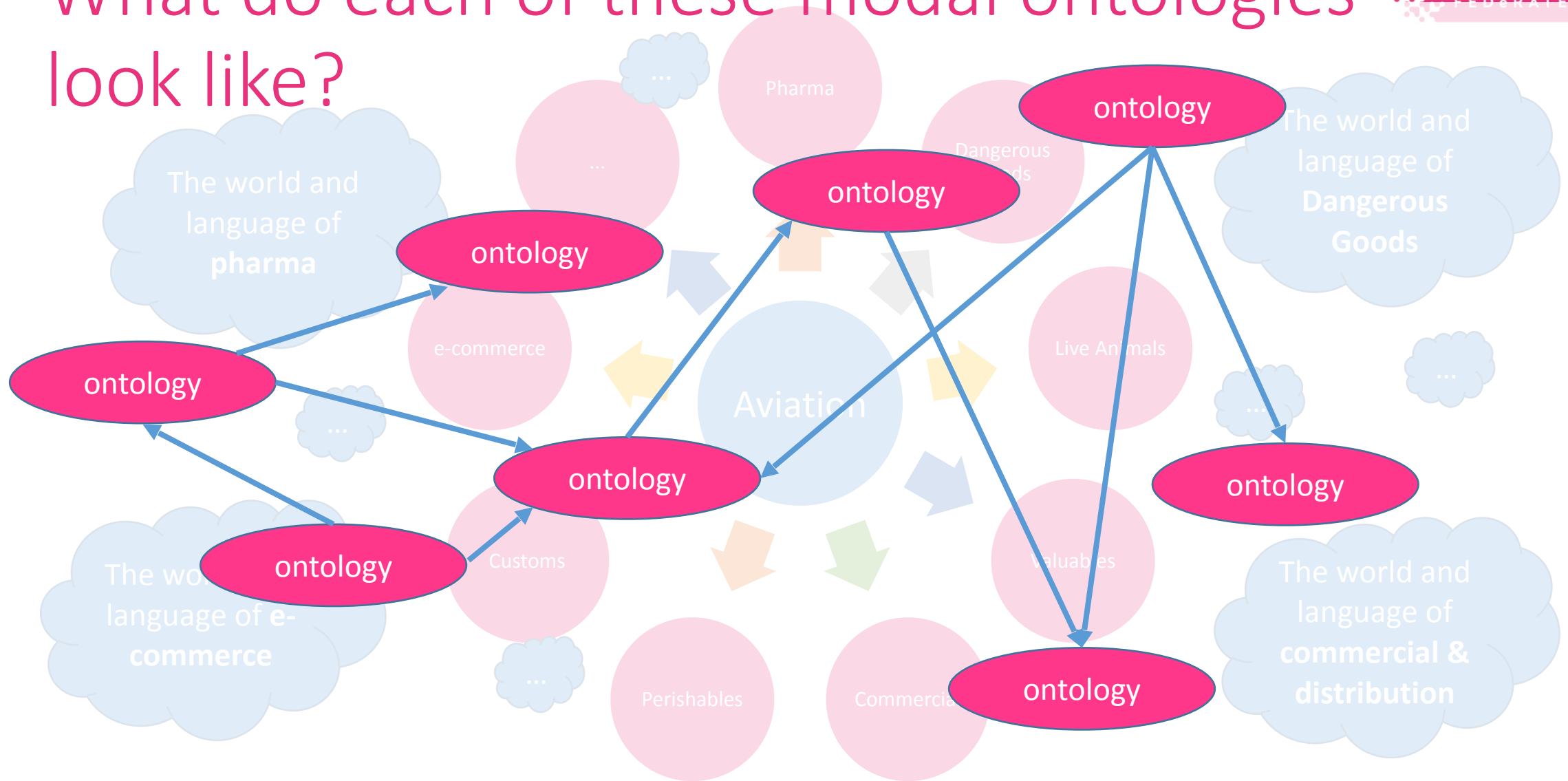
Develop a full
semantic
implementation



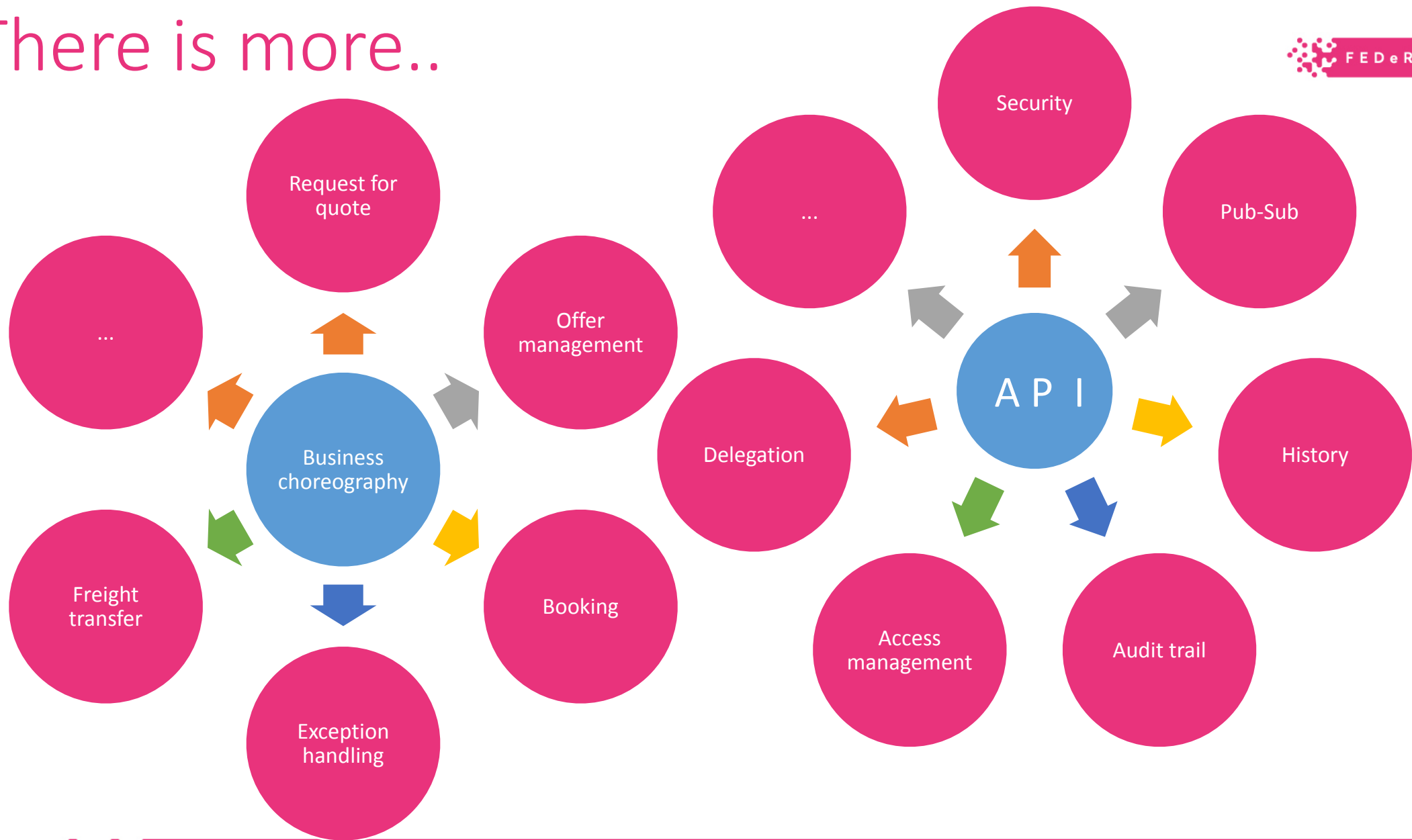
Back to semantic basics



What do each of these modal ontologies look like?



There is more..



For the

ontology

ontology

ontology

ontology

ontology

ontology

ontology

ontology

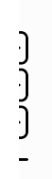
ontology

Just maintain the FEDeRATED,
modal, business sectors &
processes and API **semantic
models.**

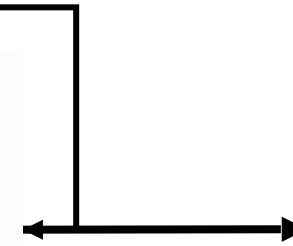
The rest is automatically
updated...



humans



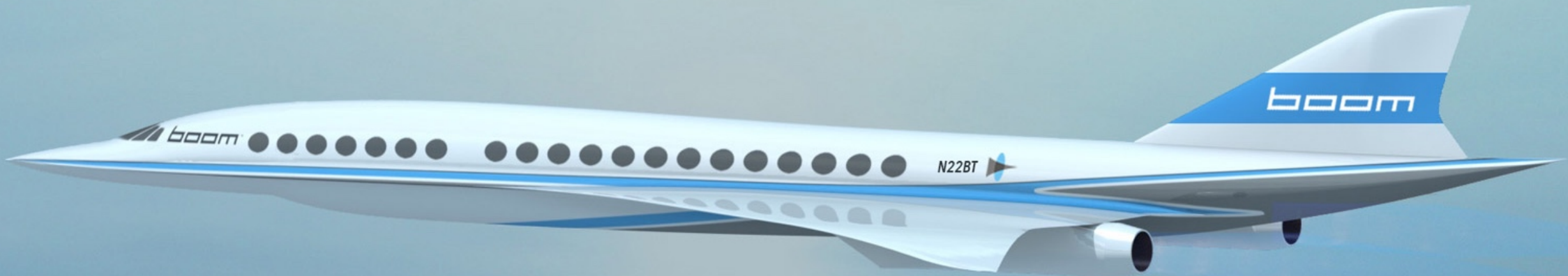
FEDeRATED
network of
platforms



Ordinary API
for REST JSON
service



For the techies: SPARQL performance?



JSON = 10 lane motorway

JSON-LD = A few closed lanes

RDF = no motorway sticker

SPARQL = driving lessons on a parking



Expectations met?



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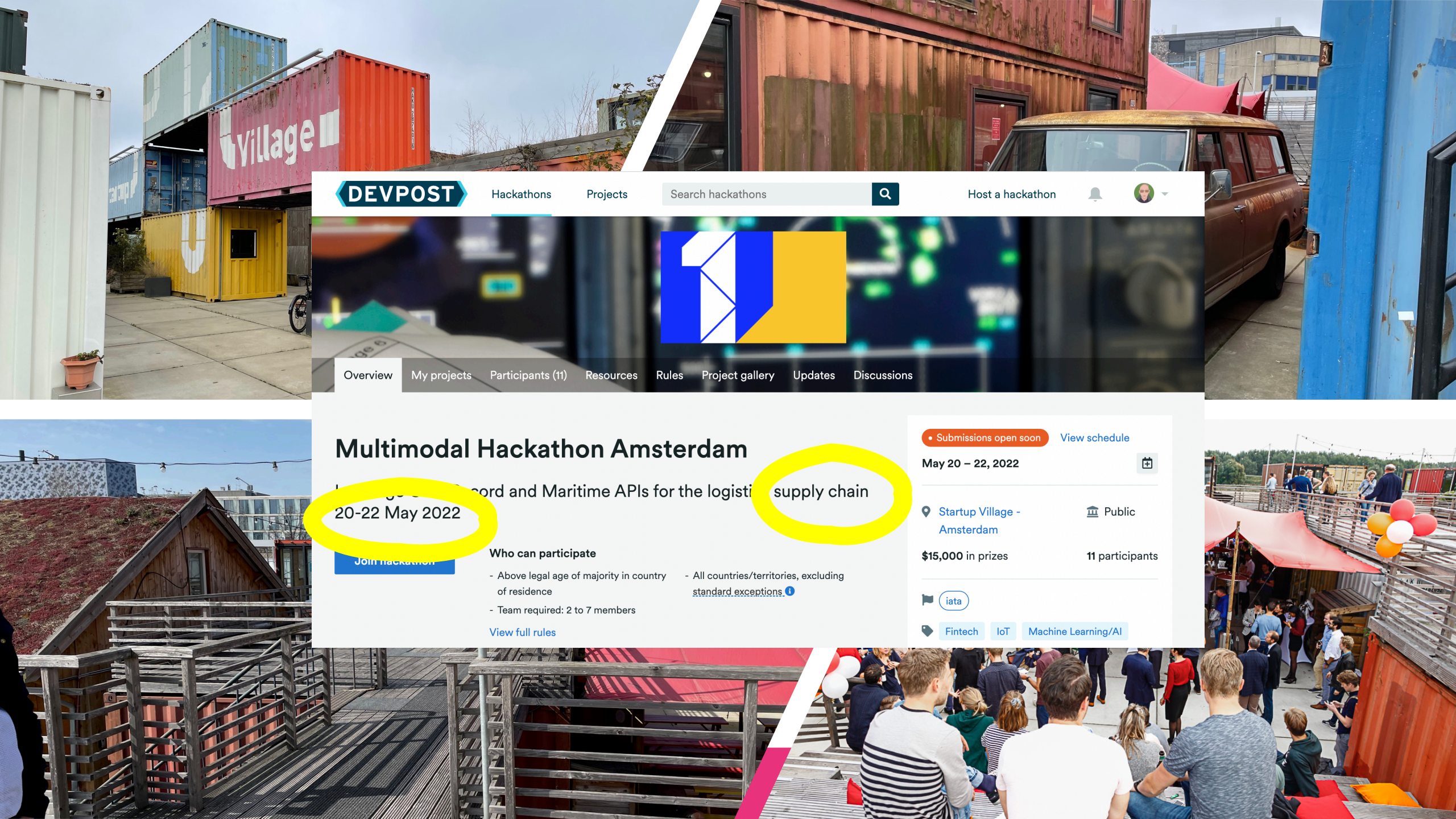
How can we implement this without tears?



A background image showing a group of people in a meeting or workshop. Many of their hands are raised, suggesting an interactive session. The image is slightly blurred, with a focus on the hands in the foreground. A semi-transparent circular overlay is positioned on the left side of the image, containing text.

What's next?

Topics you want to
hear more about.



DEVPOST

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[Overview](#) [My projects](#) [Participants \(11\)](#) [Resources](#) [Rules](#) [Project gallery](#) [Updates](#) [Discussions](#)

Multimodal Hackathon Amsterdam

[Join hackathon](#)

20-22 May 2022

Logistics and Maritime APIs for the logistics supply chain

Who can participate

- Above legal age of majority in country of residence
- All countries/territories, excluding [standard exceptions](#)
- Team required: 2 to 7 members

[View full rules](#)

Submissions open soon [View schedule](#)

May 20 – 22, 2022

Startup Village - Amsterdam **Public**

\$15,000 in prizes **11 participants**

iata

Fintech IoT Machine Learning/AI

