Improving e-commerce fraud investigations in virtual, inter-institutional teams

based on the Master Thesis by Andreas Gerlach

3 initial assumptions

Transmission of credit card data over insecure co
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Investigation of edge cases involves elaborate ma
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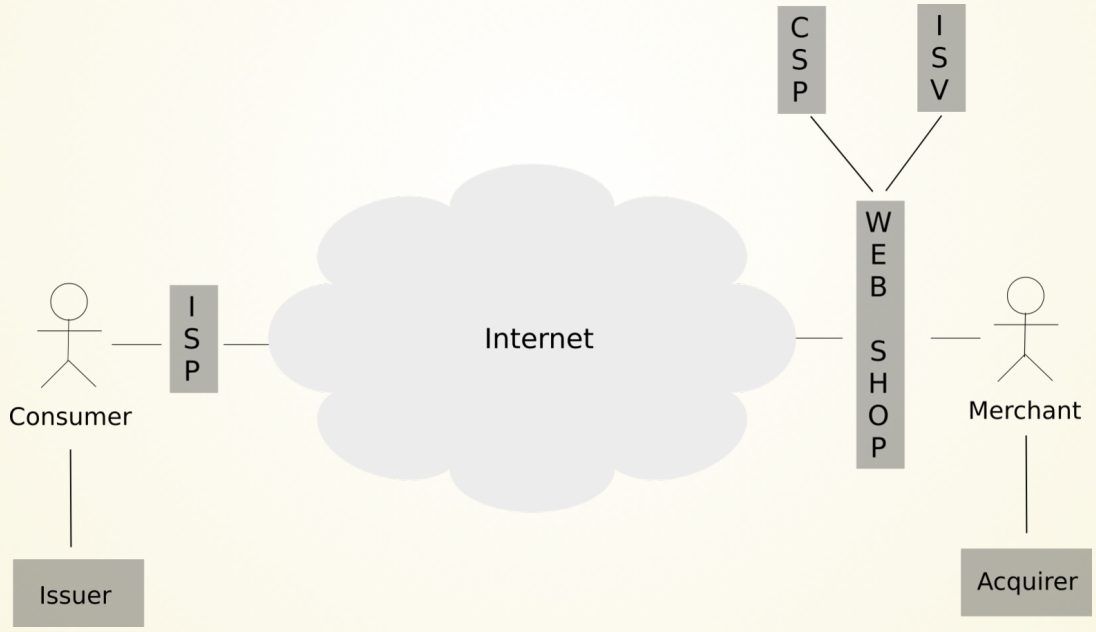

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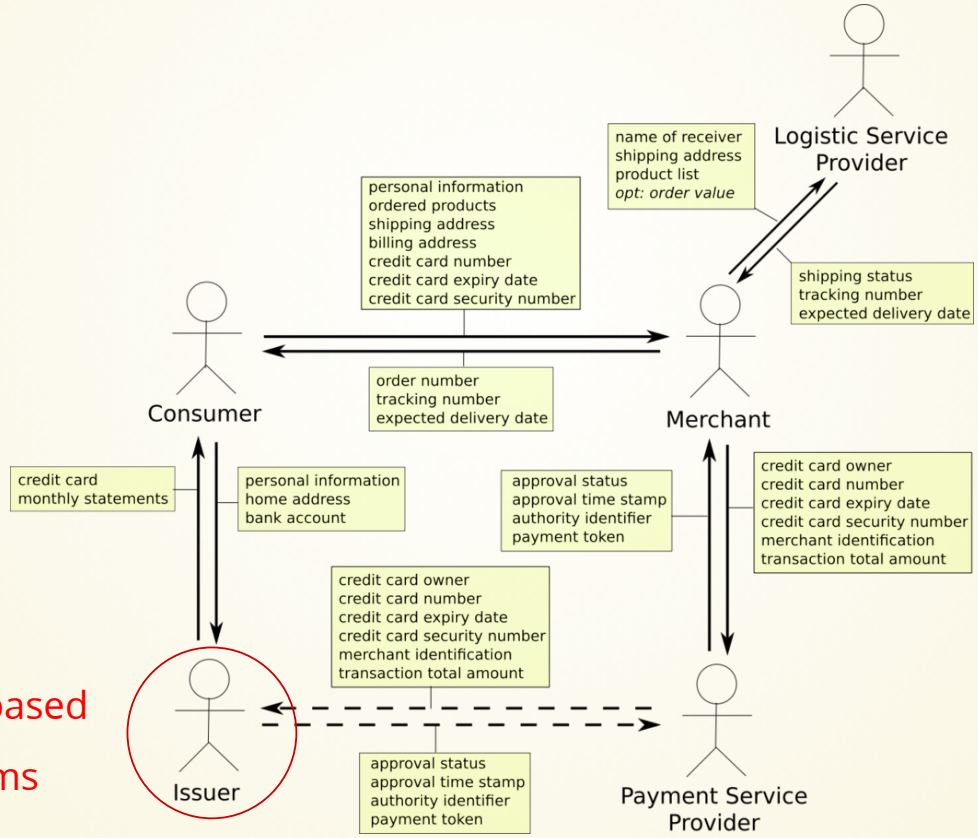


rule- or score-based

rating systems

Investigation of edge cases involves elaborate manual processes on the issuers:

- figure out contact details of each merchant affected,
- send an inquiry to each merchant asking for order details of recent purchases,
- collect, combine and analyse the information received,
- decide on edge cases based on consumer behaviour.

Hypothesis

Keeping the amount of fraudulent transactions low can not be solved by technology alone.

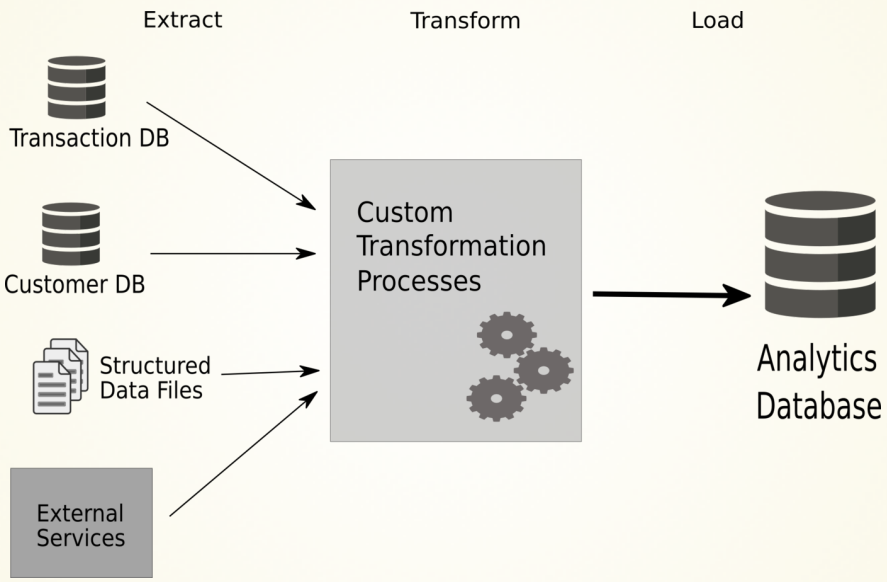
Edge cases are not evaluated in-depth, but rather be acknowledged after first plausibility checks.

A shared information space can bring together the know-how of relevant experts to improve the decision-making process.

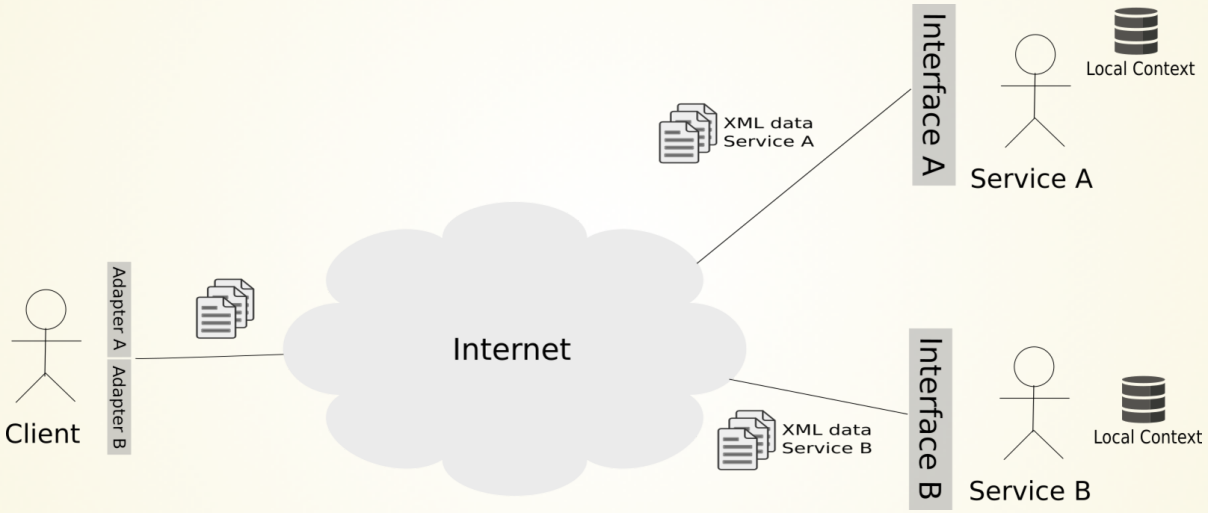
A collaborative system that combines information from relevant stakeholders can improve the current situation of investigating suspicious e-commerce activities.

Current approaches
for information sharing

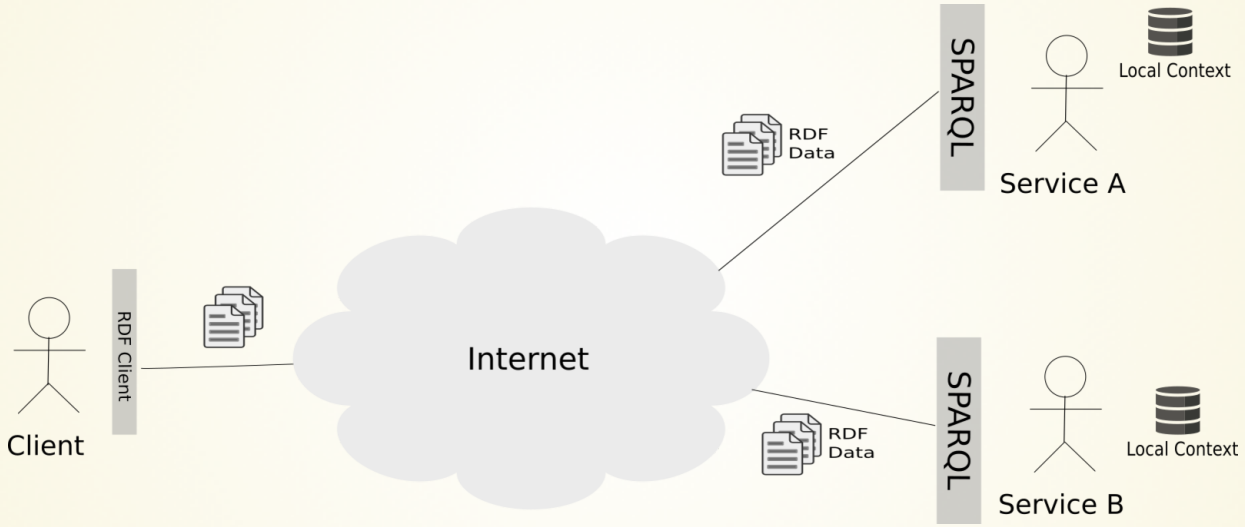
ETL


Extract
Transform
Load
Transaction DB
Customer DB
Structured
Data Files
External
Services
Custom
Transformation
Processes
Analytics
Database

Web Services



Semantic Web



ETL is well suited for collecting and combining i nformation within a single company.

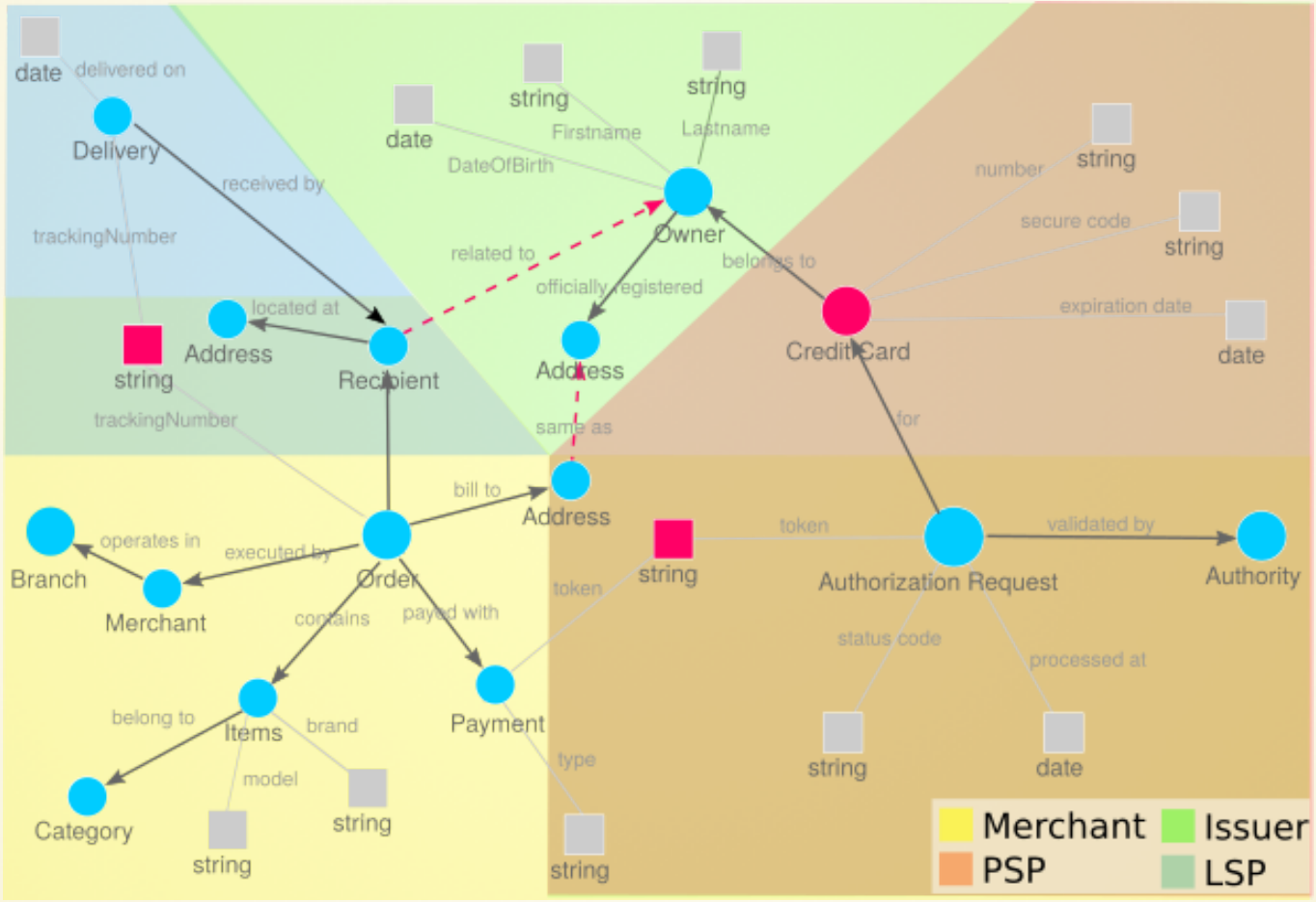
Web Services require adaptation to each service int erface that has to be integrated, do not provide th e semantics of the information exchanged.

Semantic Web do not restrict access to sensitive information, make any of them publicly available on the Web.

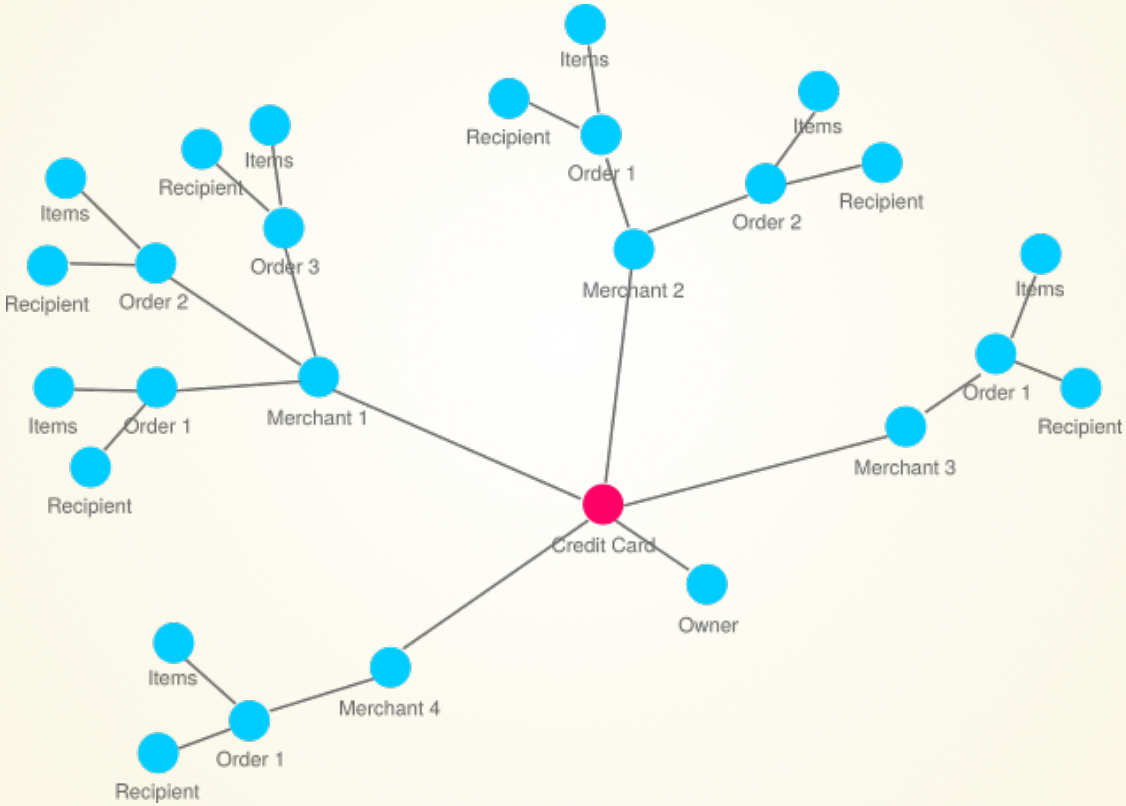
Proposal

The collaborative system should use fundamental technologies of the Semantic Web for describing resources as well as P2P technologies for securely sharing them.

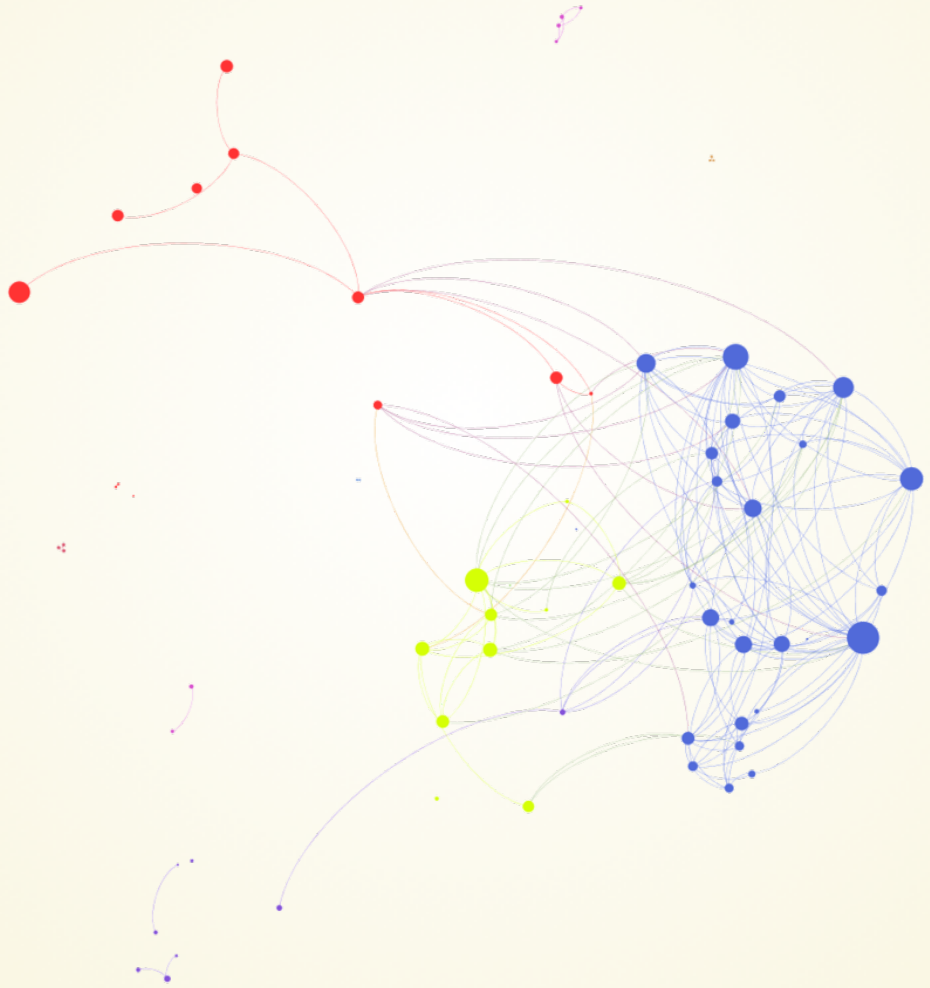
ER model for e-commerce activities



Initial collection of recent e-commerce activities



Classifying and clustering of e-commerce activities



RDF vocabularies and ontologies

- follow core principles of the Web

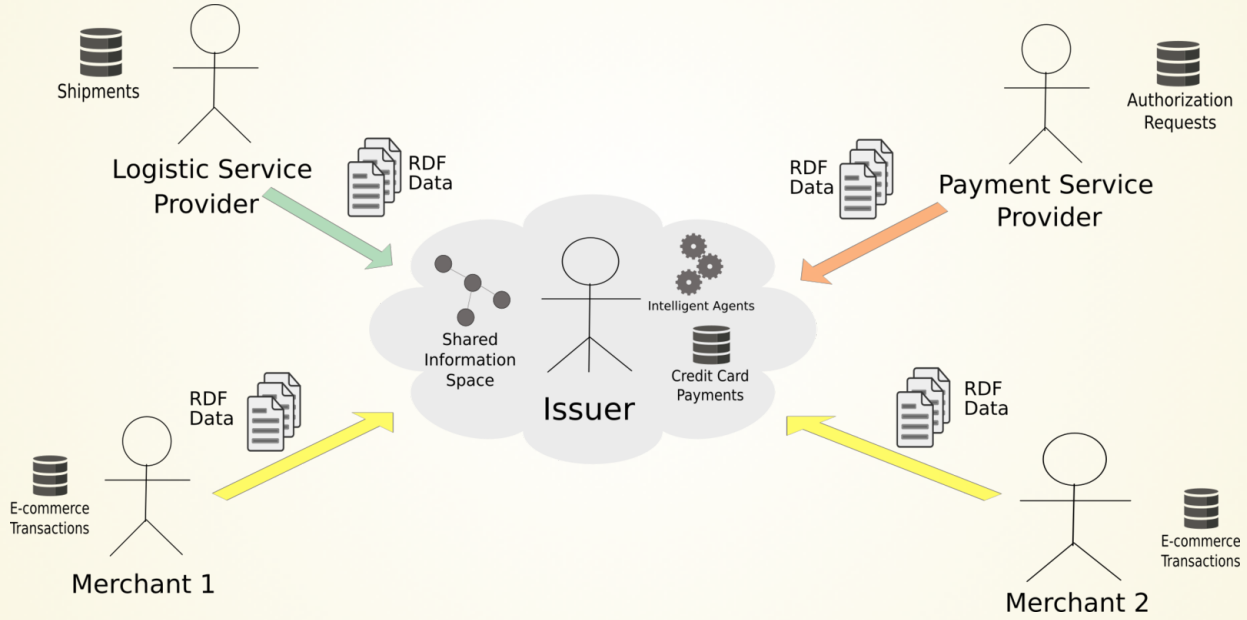
Mapping of RDF vocabularies

- classes and properties, equality or inheritance

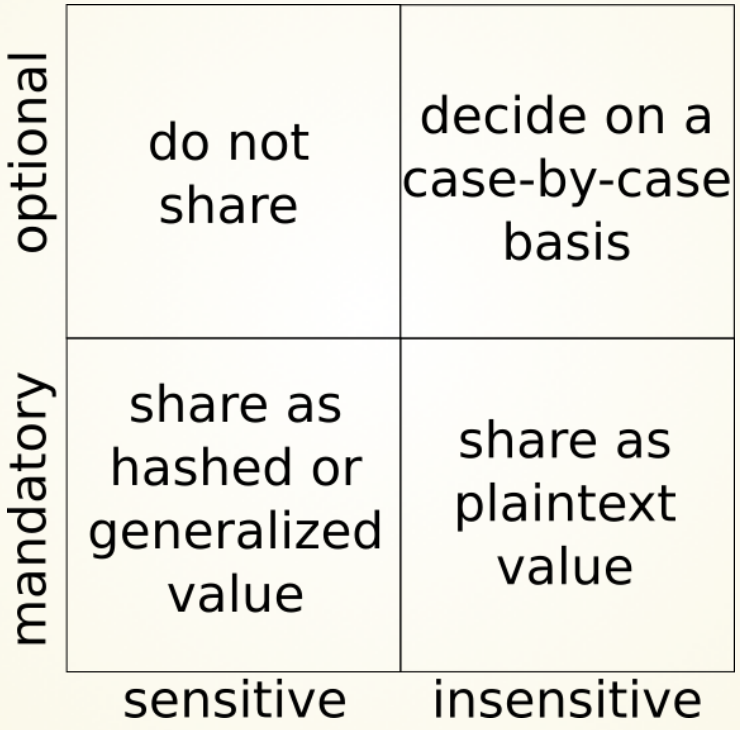
Linking of individual resources

- use unique identifiers or infer equality

A partially centralized P2P collaborative system



Dealing with privacy concerns



Conclusion

Core Semantic Web technologies enable information sharing across organisational boundaries.

In combination with P2P technologies a secure collaborative system can be developed.

Graph-oriented representation of information, its visualization and clustering can support the investigation process.

However, information have to be duplicated to the issuers as main actors (privacy concerns).

Different techniques to obfuscate sensitive information are available (hash, generalization).

A decentralized P2P system can solve most of the privacy issues. It needs further research though.

Thank you for your attention!