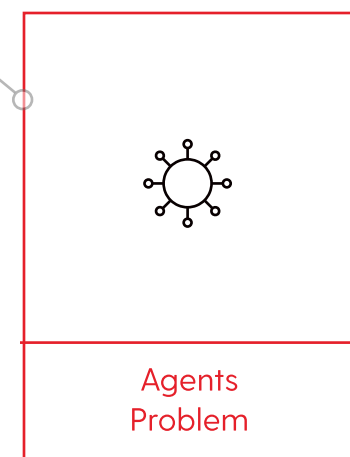


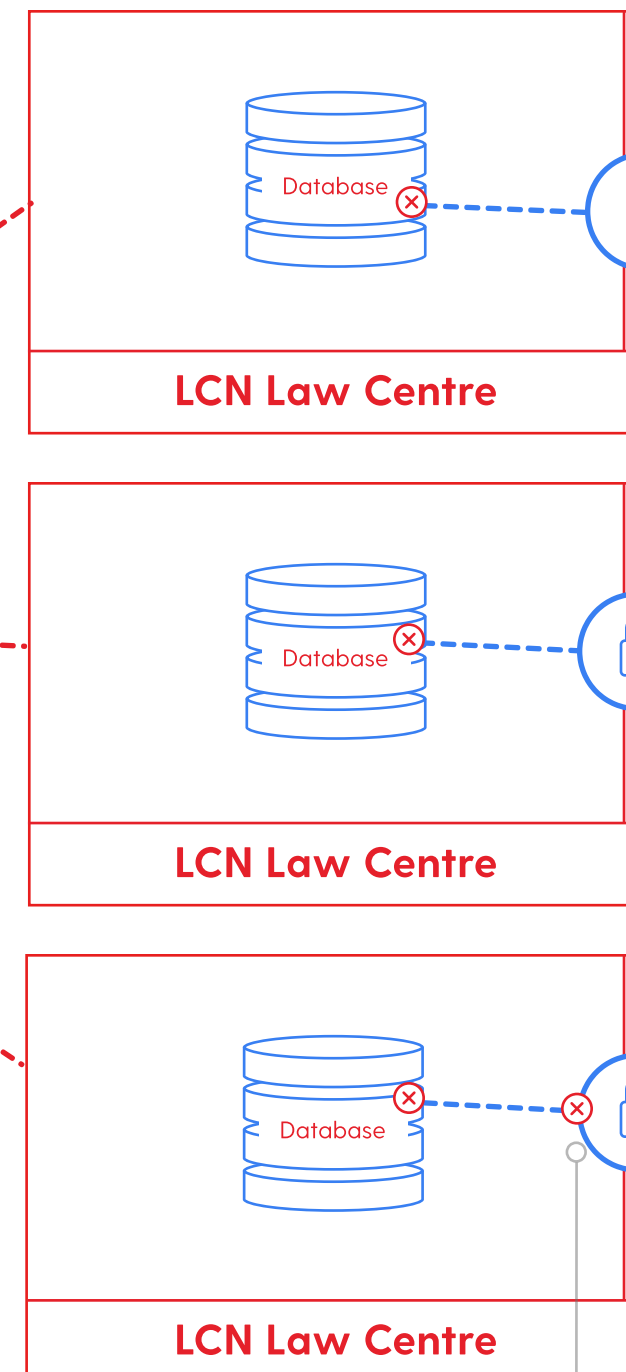
Searching for Solutions: Before Federated learning

1. Agents recognise that a problem could be addressed through the collaborative sharing of data. That when able to view the "whole" picture, a solution might emerge.

They also recognise that on their own, they don't have enough data, and if they did, would lack the facility for tackling it's analysis and exploitation in-house.



2. Even with an established network like LCN, both they and individual entities recognise that using data to inform solutions exposes them to an ever-growing list of vulnerabilities that mean the the process isn't feasible.



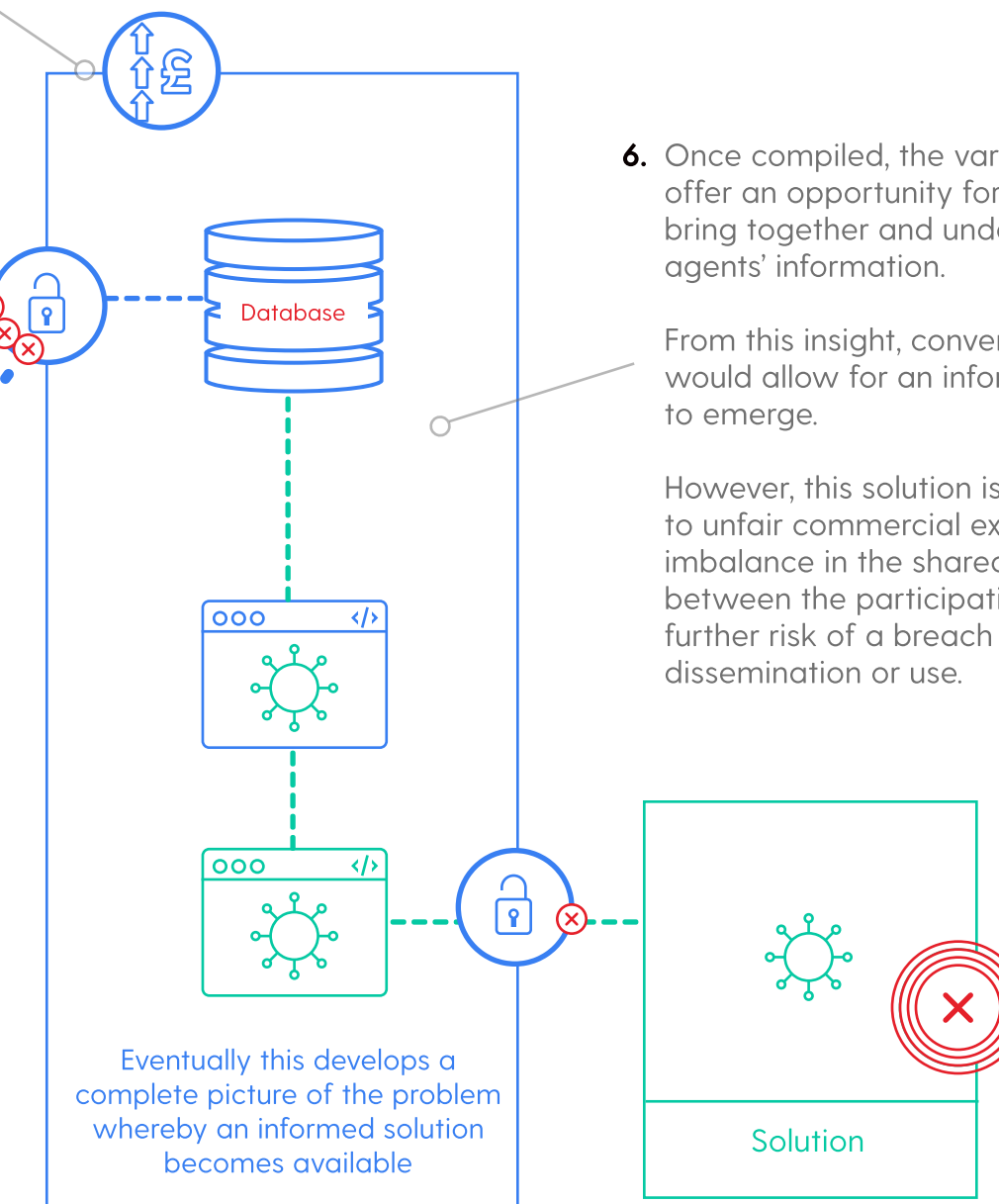
3. To get useful information into a system for analysis, processing and into a usable state where it can inform decision making would mean numerous red lines, both universal and internal have to be crossed.

GDPR Procedure
Commercial Exploitation
De anonymisation
Secure transfer
Delete / Track

5. In addition to these breaches, an additional resource from 3rd parties would be required even to attempt to handle the secure transfer, and deanonymisation of private data and the ability to track /delete lines in the databases for it to become useable.

4. A single entity would find itself in breach of both its policies, processes and broader obligations such as GDPR.

Each entity would also bring forward data littered with quirks in formatting and viability that would require expensive consideration in a centralised external solution.



6. Once compiled, the various databases offer an opportunity for a 3rd party to bring together and understand the agents' information.

From this insight, conventional wisdom would allow for an informed solution to emerge.

However, this solution is still vulnerable to unfair commercial exploitation, an imbalance in the shared benefit between the participating entities and further risk of a breach during dissemination or use.

7. This method also treats any solution discovered as an output. Not as a tool that can help everyone in the mid-to-long term.

The 'Fix' gets set in stone, and any change in the underlying nature of the process results in a need to go through the whole thing once again as it's no longer fit for purpose.

Searching for Solutions: With Federated learning

5. The software interacts with the entities database making use of the information there to run instances of the software model.

6. The software uses how the data effects each instance to build on its overall understanding. There's no need for the data to remain 'in' the software, as what it 'learns' is helping to form a clearer picture of at least part of the overall problem.

7. With different data on different databases, the software, when deployed across a federated network is able to learn different things about the networks problem overall that might get missed with a narrower conventional analysis.

4. Securely deployed on-site with an individual entity, the model can get to work learning about the agents' problem using the data collected through that entities operations.

8. Once complete the analysis or 'learnings' become the outputs that leave the entities site. No data, or private information leaves, just what the software model has 'learned'. Because of this, the output has no red lines to cross.

3. This software if officially authorised to travel securely from the third party to each entity in the network.

9. These learnings return to the 3rd party where they compile to form the "complete picture" of a problem - Each addition, from each entity improving clarity to the point where an informed solution, one based on a shared understanding of the entire federations available data presents itself.

2. They work with a third party to develop a software model. One that speaks to understanding the context of the networks problem in a holistic sense. The software is produced so that it can interrogate the networks data to inform its own development.

1. Agents recognise solutions are available it networks can understand the context of the problems they face as much as being able to evaluate every instance of them occurring within the sector.

10. This solution expressed as a software tool. A version based on the current and evolving state of the information an entity captures informed by the context in which it exists and ready to be reused and updated as required.

