

Theoretical User Case One

Government Licensing Systems - Provenance/Proof chain use

A government body needs to issue, authorize and manage licenses as part of their service to the public.

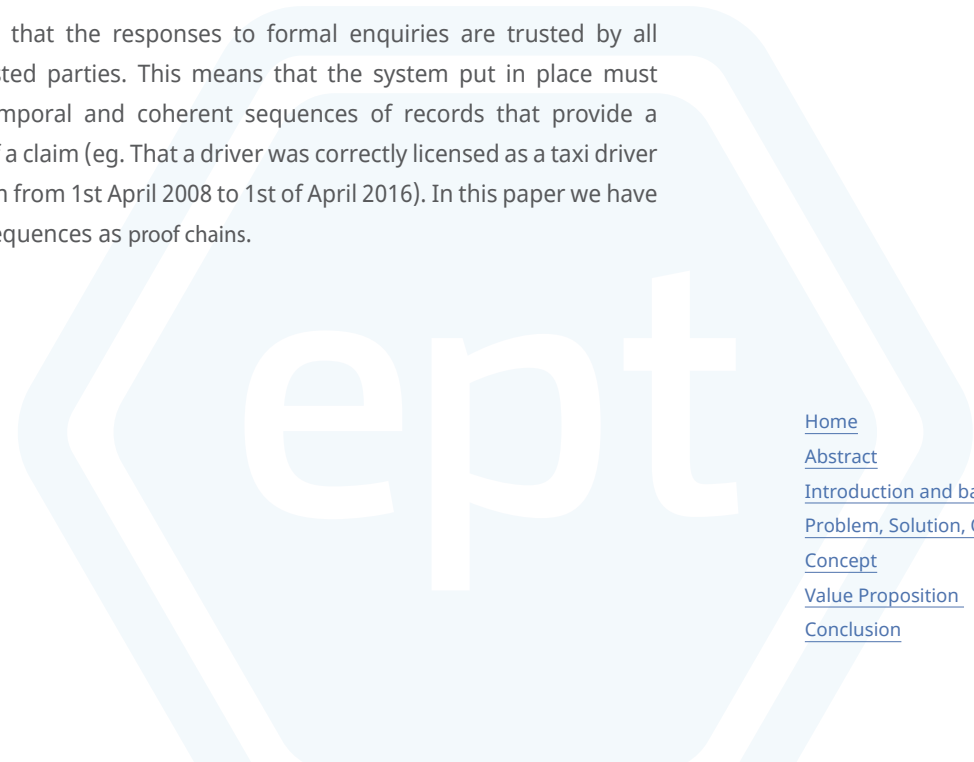
They use an on premise SQL 2008 database for this. For the sake of this example we will use Taxi licenses.

Every individual driver must be licensed based on their own and possibly their employer's (the taxi firm) profile.

Records are kept on each driver and taxi firm so that licences may be issued, controlled and managed; the records include inputs from individual drivers and the firms. The system put in place must not unreasonably obstruct the drivers' or their employing companies' abilities to earn revenue.

And, vitally it must be possible to audit any individual license, or group of licenses to serve legitimate enquiries by interested parties such as the public, government, anti-fraud, board of commerce and police; concerned about matters such as awarding and rescinding licenses, public safety, unreasonable obstruction of business and compliance to data protection and usage regulations.

Clearly it is crucial that the responses to formal enquiries are trusted by all legitimately interested parties. This means that the system put in place must provide trusted temporal and coherent sequences of records that provide a compelling proof of a claim (eg. That a driver was correctly licensed as a taxi driver working for the Firm from 1st April 2008 to 1st of April 2016). In this paper we have referred to these sequences as proof chains.



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Why might the government body want to link their data to a data provenance / immutable proof chain service?

The decisions government bodies make and the way they process/ evaluate taxi drivers and license application data effects:

- drivers' ability to work or not
 - companies' ability to earn revenue
 - companies' ability to employ a driver
 - the safety of members of the public using taxis
 - the safety of other road users
 - the ability of the police and the public to reliably judge if a driver is properly licensed
 - the number of criminal activities involving taxi drivers and the public.
- assure the public that they are at all times taking measures to protect them
 - counter the scenario of their own databases being hacked
 - have a fall back record in the case of any or all of their data being lost, corrupted or deleted
 - ensure reliable reporting that will stand up to 3rd party scrutiny.

They want to be able to show provenance and immutable proof for the decisions they make and the way they use personal PI (personal identification) data to:

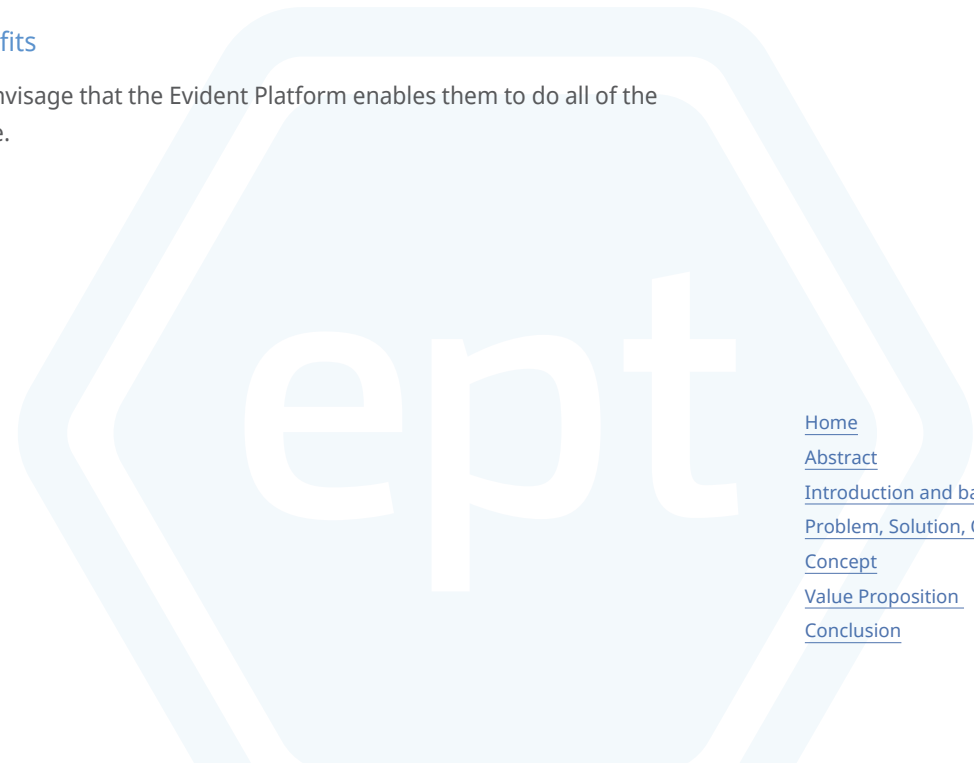
- prove that they comply with current data protection standards around the use of personal data
- prove to the competitive taxi industry that all licensing processes have been made fairly and in accordance with agreed procedures
- have available evidence in the case of a driver acting in a manner that results in a dispute where the council's grant of a taxi licence and their liability for the event are called into question

Benefits

We envisage that the Evident Platform enables them to do all of the above.

evident
proof

Evident Proof Token
Whitepaper V2.7



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Problem Domain

A requirement has been identified to store proof of licenses issued, maintained and renewed in an immutable, decentralized fashion. The entire lifecycle of a license must be provable. The key thing is creating a demonstrable proof-chain of data for each license.

The council's licensing activities create around 125,000 data transactions a year.

Integration to Existing Systems

A key requirement is that the storage of the licensing data should not add any additional overhead to the line-of-business processes already involved in generating the license. Therefore, any solution must allow integration.

At present, XYZ Consulting's Taxi Licensing solution saves all data to a Microsoft SQL Server database on Windows Server 2012 virtual machine. Data can be passed to the proof chain solution API web services, dynamically, using bespoke tools, for example:

Triggers on database tables, posting to the API. At the point at which the data is entered into the software

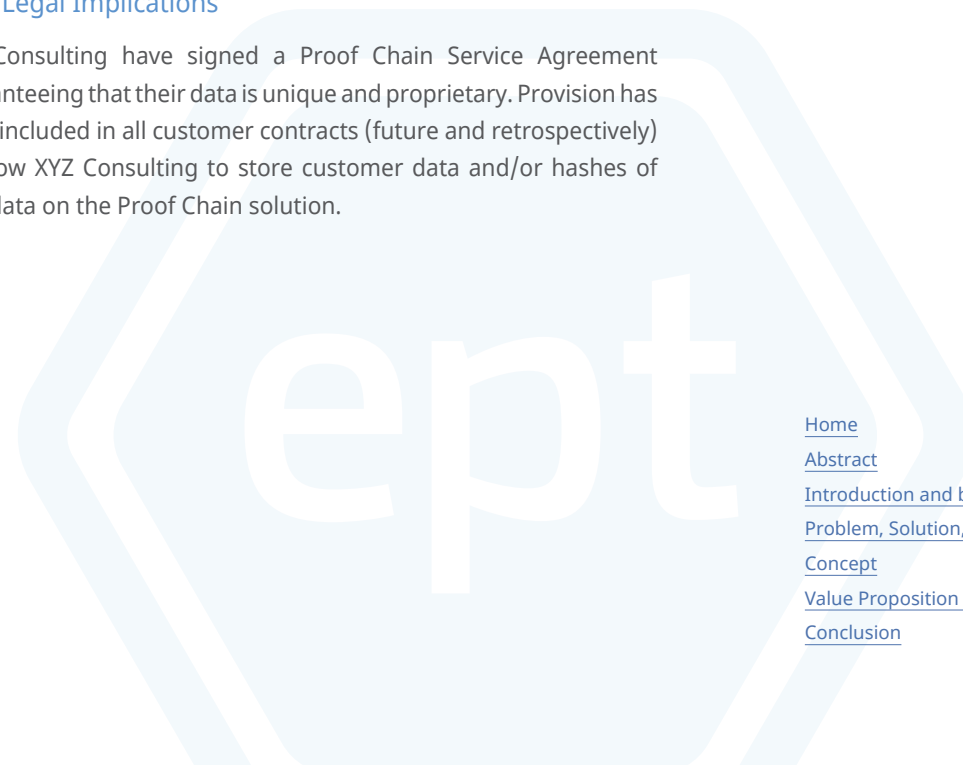
Client tool to transform the data into a json format which includes required properties.

In order to save the client time, the following could be provided with the proof chain solution:

- SDK's compatible with a wide range of platforms, which includes a DLL within which an ETL algorithm is implemented and data hashes created
- T-SQL Trigger Scripts to perform ETL and post to an API endpoint.

Data Legal Implications

XYZ Consulting have signed a Proof Chain Service Agreement guaranteeing that their data is unique and proprietary. Provision has been included in all customer contracts (future and retrospectively) to allow XYZ Consulting to store customer data and/or hashes of that data on the Proof Chain solution.



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Provenance records need to be stored for the following data:

Data Schema

Table Name: Application	
Property	Data Type
Id	int (PK)
ApplicantId	int (FK Applicant)
VehicleLicenseTypeId	int (FK VehicleLicenseType)
ApplicationTypeId	int (FK ApplicationType)
IsOnlyVehicleOwner	bool
IsOnlyVehicleDriver	bool
IsOnlyLicensedVehicleDriver	bool
VehicleId	int (FK Vehicle)

Table Name: Applicant	
Property	Data Type
Id	int (PK)
Title	string
Surname	string
FirstNames	string[]
OtherNamesKnownBy	string[]
DOB	DateTime
NationalInsuranceNumber	string
Address	int (FK Address)

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Data Schema

HomePhoneId	int (FK PhoneNumber)
MobilePhoneId	int (FK PhoneNumber)
EmailAddress	string
LicensedDriverBadgeNumber	string
LicensedDriverBadgeExpiry	DateTime
CRBCheckId	int (FK CRBCheck)
DVLACheckId	int (FK DVLACheck)

Table Name: Address	
Property	Data Type
Id	int (PK)
AddressLines	string[]
TownCity	string
County	string
Country	string
Postcode	string

Table Name: PhoneNumber	
Property	Data Type
Id	int (PK)
CountryCode	int
AreaCode	long
MainNumber	long

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Data Schema

Table Name: VehicleLicenseType	
Property	Data Type
Id	int (PK)
VehicleLicenseTypeName	string

Table Name: ApplicationType	
Property	Data Type
Id	int (PK)
VehicleTypeName	string

Table Name: Vehicle	
Property	Data Type
Id	int (PK)
IsVehiclePreviousLicensed	bool
PreviousLicenseLocalAuthority	string
TypeOfLicenseId	int (FK VehicleLicenseType)
YearLicensed	string
LicenseNumber	string
LicenseRenewalLicensePlateNumber	string
LicenseRenewalLicensePlateExpiry	DateTime
LicenseRenewalVehicleTestCertExpiry	DateTime
Make	string
Model	string

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Data Schema

Colour	string
SeatingCapacity	int
RegistrationNumber	string
DateOfOriginalVehicleReg	DateTime
EngineCapacityCC	decimal
EngineChassisNumber	string
MileageCurrent	long
OtherApplicantId	int (FK Applicant)
AdditionalDriverId	Int (FK Applicant)

Table Name: CRBCheck	
Property	Data Type
Id	int (PK)
CheckDate	DateTime
IsConvictions	bool
NumberOfConvictions	int

Table Name: DVLACheck	
Property	Data Type
Id	int (PK)
CheckDate	DateTime
IsDisqualifications	Bool
DisqualifiedUntil	DateTime