



## Place of consent in new French bovine genetic data management system

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# Summary



- ▶ Introduction
- ▶ Legal and professional context of animal data management
- ▶ Consent concept and its importance
- ▶ New French bovine information system
  - ▶ Central database (Base Pro)
  - ▶ Exchanges modalities
  - ▶ Consent management system
- ▶ Conclusion



# What are we speaking about ?

- ▶ French technical data records structured by breeders' organizations since the 60's
- ▶ System in production managed by France Génétique Elevage in the last 14 years with a large amount of data collected on animal identification, parentages, performances and genotyping, with record of consent available since 2016

	Identities	Births	Lactations	Milk records	Weighing	Morphology records	Inseminations
Records created in 2021	7,012	6,749	2,232	20,393	1,271	1,156	6,514
Total in the Data base	233,6	158,0	114,3	857,0	49,1	25,2	189,0

*Number of data managed in the cattle information system (in Millions)*

- ▶ More than 300 data providers contributed to the system in 2019
  - ▶ 135 of them who exchanged more than 10 000 records

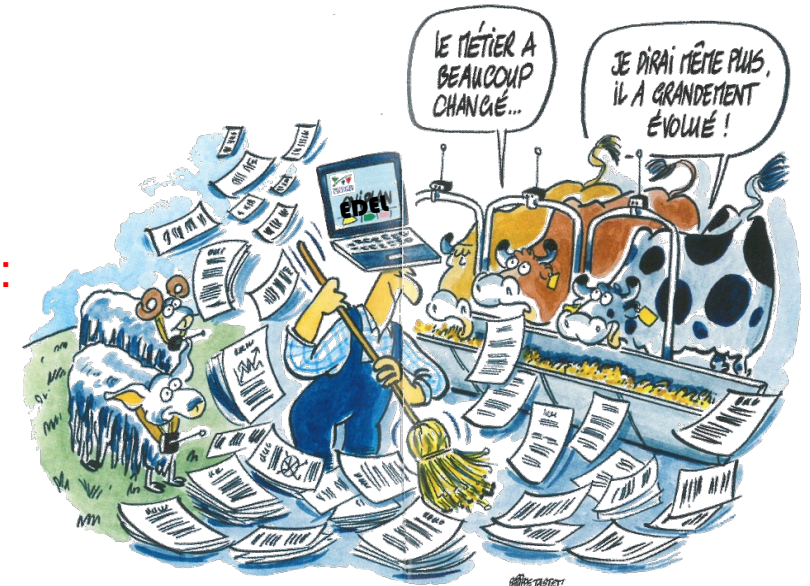
# Importance of the issue of data in livestock sector



- The livestock sector has been managing collective systems for 60 years, the historic challenge of which was to promote the widest possible use of data (*genetic, health, technical*).
- Since the 2010s, data has been the new rising value: *Multiplication of sources (robots, sensors, etc.), Basis of breeding advice, data is becoming a commercial issue in a context of competitive restructuring of players*
- 2016: EU GDPR (General Data Protection Regulation) *applicable since 2018*

The current challenge for collective systems is to enforce the rules of access to data with the question that has been asked for 8 years now: “What are these rules? »

The same question arises for each actor collecting data or wishing to use it.



# Elements on data law: Data protection as such



## Legal principles

- “Pure” or “raw” information: **cannot be appropriated by an intellectual property right or another private right**
- Scope of intellectual property rights is limited to:
  - Copyright (which does not apply to “news of the day and news items which have the character of simple press information”)
  - Brand
  - Patent
- **We cannot talk about OWNERSHIP of data but only about rights management.**

And these rights depend on the characteristics of the data



## Elements on data law:

# Is agricultural (or livestock) data a personal data ?



Personal data

- Is data that allows a person to be identified
- This legal framework does not apply to animal data

- A priori breeding data is NOT personal data
- **BUT when it is linked to an holding number making it possible to find and identify the holder, it becomes so !**

***Specified since the application of GDPR: TRUE only if it is an individual holding***



# Consequence on the processing of agricultural data → Compliance with GDPR



## Principle of legality and legitimacy

**Most common legitimacy basis**

Articles 5-1  
a) and 6 of  
GDPR

- a** **Consent of the data subject**
- b** Contract or pre-contractual measures at the request of the data subject
- c** Compliance with legal obligation
- d** Protecting data subject's vital interests
- e** Mission of public interest or in the exercise of official authority vested in the controller
- f** Legitimate interests of the controller unless the interests, freedoms or fundamental rights of the person prevail

# A new landscape for regulation



- ▶ By the end of 2023, EU regulation on personal information (RGPD) will be updated with the Data Governance Act
  - ▶ It creates the processes and structures to facilitate data sharing
  - ▶ It clarifies who can create value from data and under which conditions
  - ▶ It defines a new role of Data Intermediary Service Provider which must be independent of any storage or treatment of any kind
  - ▶ It asks for an explicit consent on non personal data





# A new landscape for Farmer Union position on Data



- ▶ Data-agri is an approach
  - ▶ Promoted by French farmer Union FNSEA
  - ▶ That aims to raise farmers' awareness of the use of agricultural data, to create trust in digital farming and to guarantee constant innovation and fair use of agricultural data
  
- ▶ Data-agri consists of two elements
  - ▶ A charter and a label.
  - ▶ The Data-agri label distinguishes companies that collect agricultural data and that respect all the principles defined in the Data-agri charter



# DATA AGRI Charter



Farmers' questions about the data collected on their farm



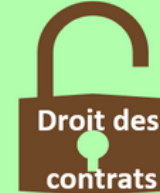
## Agricultural data

Personal data



Protected area

Non Personal data



Negotiation area



Data circulation

Innovation and valuable creation

Fair competition

Mastery of uses



Dissemination to farmers

4 axis  
13 principles



Labeling of operators



Readability - Transparency -  
Use's control -Security

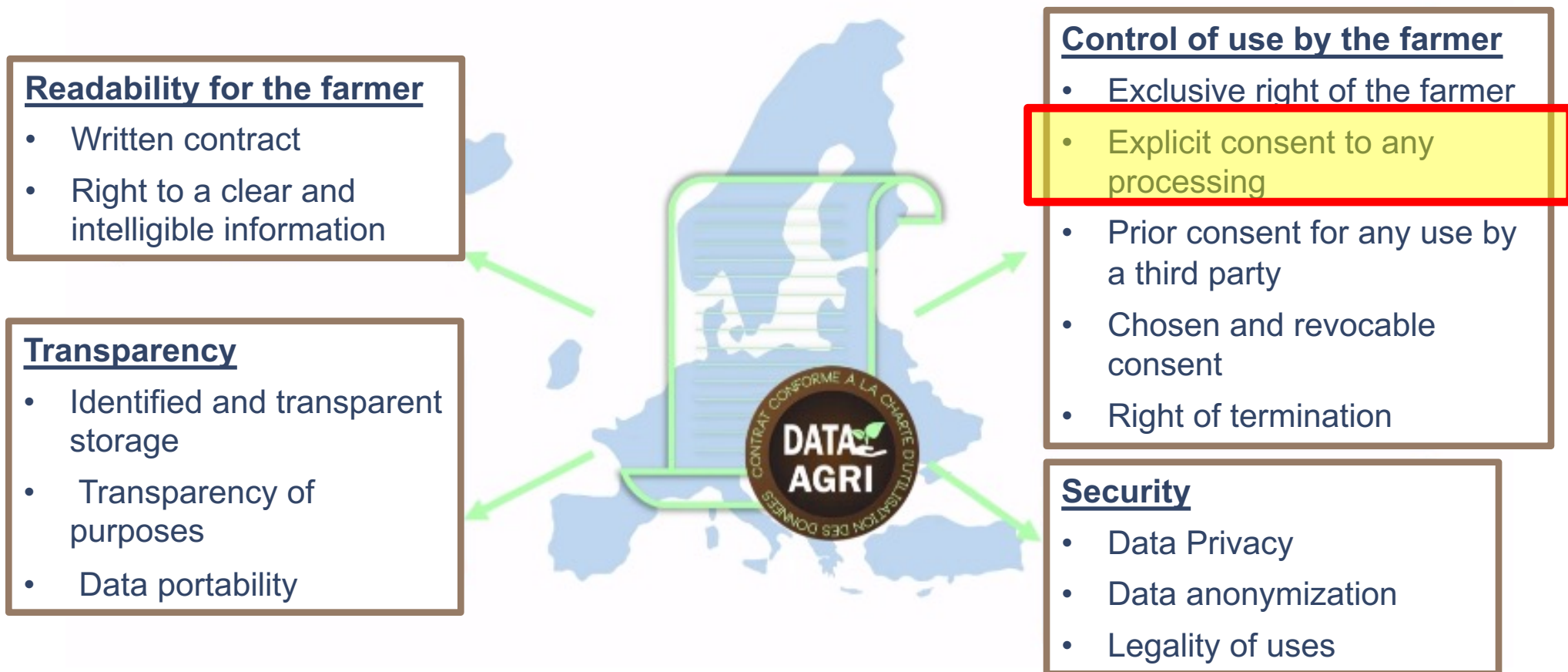
The charter defines 13 principles which must be included in the T&Cs of any actor working with farmers. A label will promote operators respecting the principles of the charter. It is intended to be widely distributed.

# DATA Agri Charter:

## 13 principles organized in 4 axis



### Promote and secure farm data in contracts



# A new landscape for actors...



- ▶ Very Different sizes of actors in the field of genetic improvement
  - ▶ Some with internal information system where zootechnical data are integrated in their ERP



- ▶ Demand of
  - ▶ Exchange of data for multiple uses by many companies
    - ▶ Inside and outside the genetic field
  - ▶ With the guaranty of verification of breeder consent
    - ▶ *Is pushing the development of new solutions of exchange*

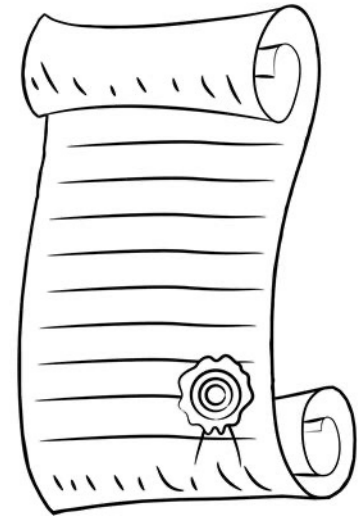
# Concept of consent



## ➤ What is consent from a breeder for access to his data?

It is the agreement formulated by the breeder which must specify the following elements in particular:

- Holding number of which the holder is the right holder of the data
- Beneficiary organization
- Start and optional end dates
- Types of data concerned
- For what use is access granted
- Organization guarantor of the consent's collection





# Consent management



## The consent lifecycle has several steps:

1. Collection from the breeder: via a paper form, via a check box on a screen, etc.
2. Registration in an Information System
3. Consultation by breeders (and organizations) of the consents they have granted (or from which they are beneficiaries)
4. Enhancement of consent by systematic verification before each access to data

**Warning: When we talk about “Management”, we sometimes only think of the first 3!**

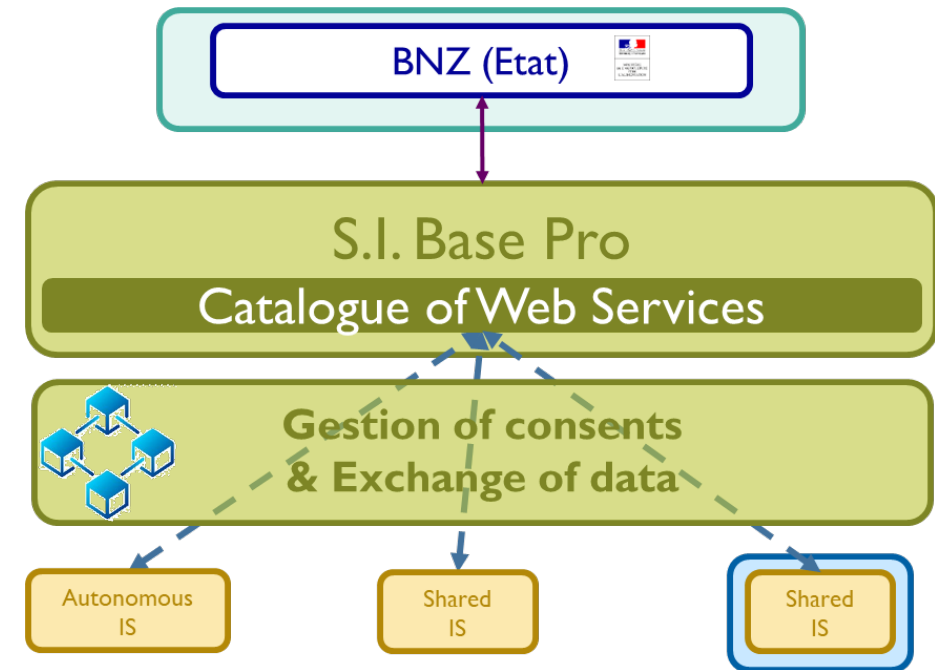
**Let's see how FGE new bovine information system manages the 4 steps**

# FGE Bovine information new system

## Central database + Management of consents



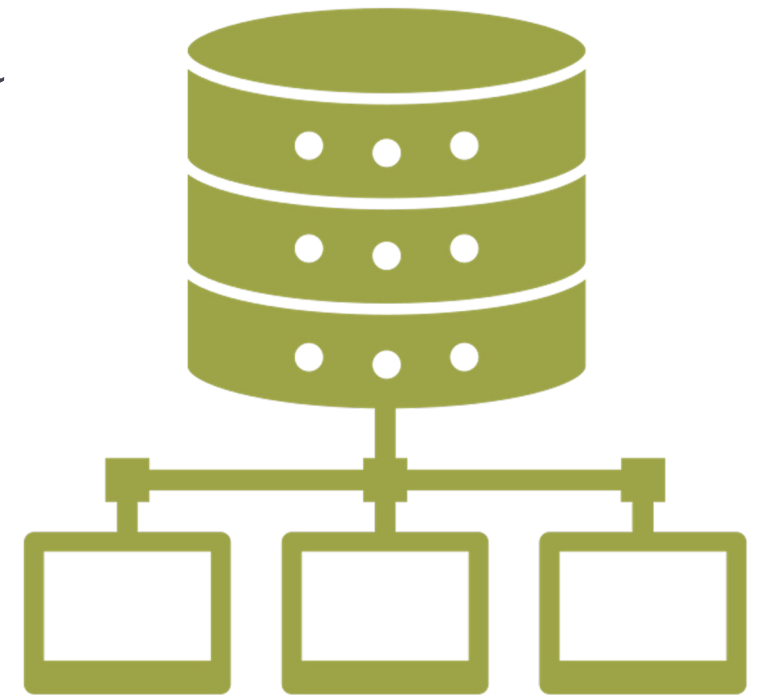
- ▶ A central system
  - ▶ National database managed by FGE to capitalize all the data
  - ▶ Set of web services published to support data exchange with all the other information systems
- ▶ A consent management system based on blockchain
  - ▶ capacity of disintermediation, trust creation and the legal value of data encrypted and stored
  - ▶ Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network (<https://www.ibm.com/topics/what-is-blockchain>)
- ▶ High compatibility of the new system with international data exchange standard included **ICAR ADE** and with legal (**Data Governance Act**) or professional requirements (**Data Agri**)



# National database and exchange system (1/2)



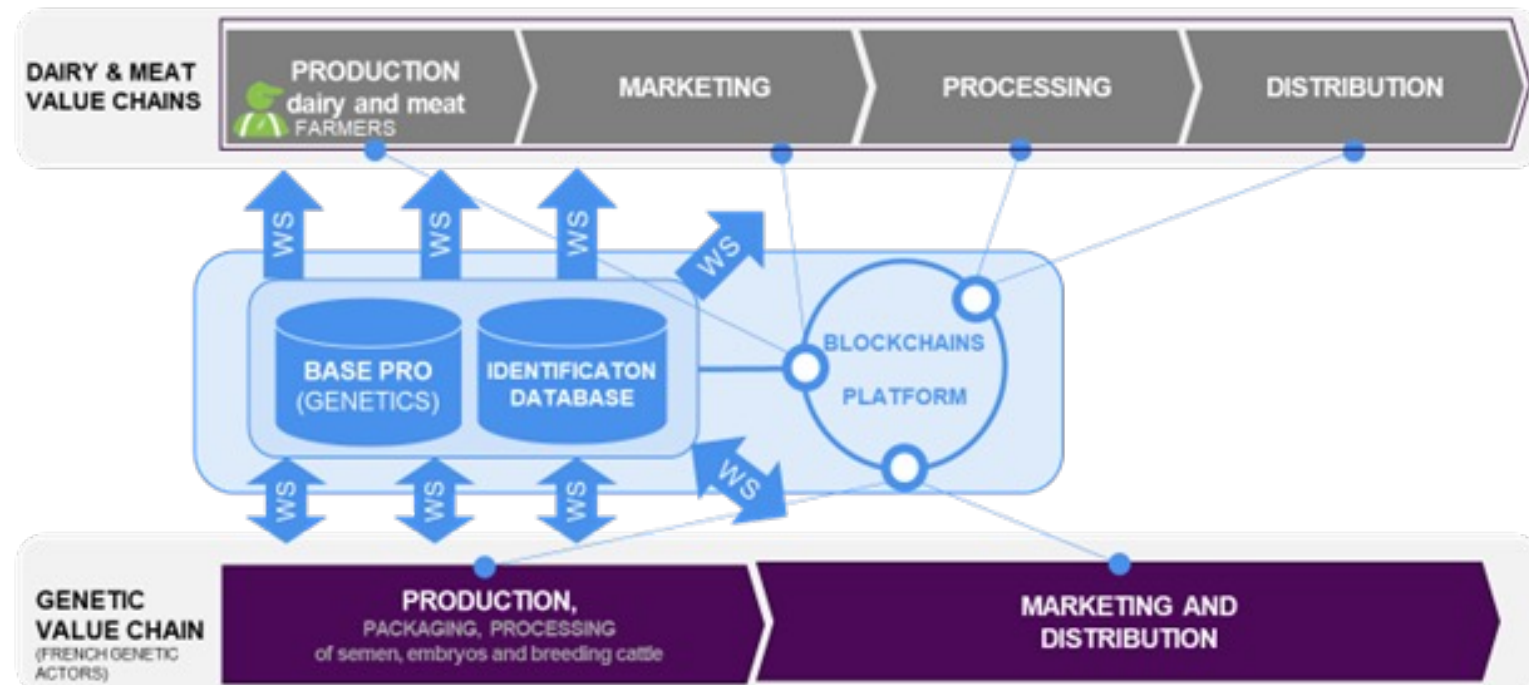
- ▶ Based on the PostgreSQL opensource technology
- ▶ Modalities of exchange compliant with IT state of the art
- ▶ Systematic consent verification before any access to data
- ▶ Technical application accounts are stored in a LDAP and managed through the administration portal which allows the management of the accounts and their access grants
- ▶ *Authentication based on a Keycloak standard solution*
  - ▶ *Open Source Identity and Access Management Server*
  - ▶ *OAuth2 and OpenID Connect(OIDC) protocol complaint*
- ▶ *Technical framework based on the standard technologies*
  - ▶ *java/Rest/Wildfly/Swagger*



# National database and exchange system (2/2)

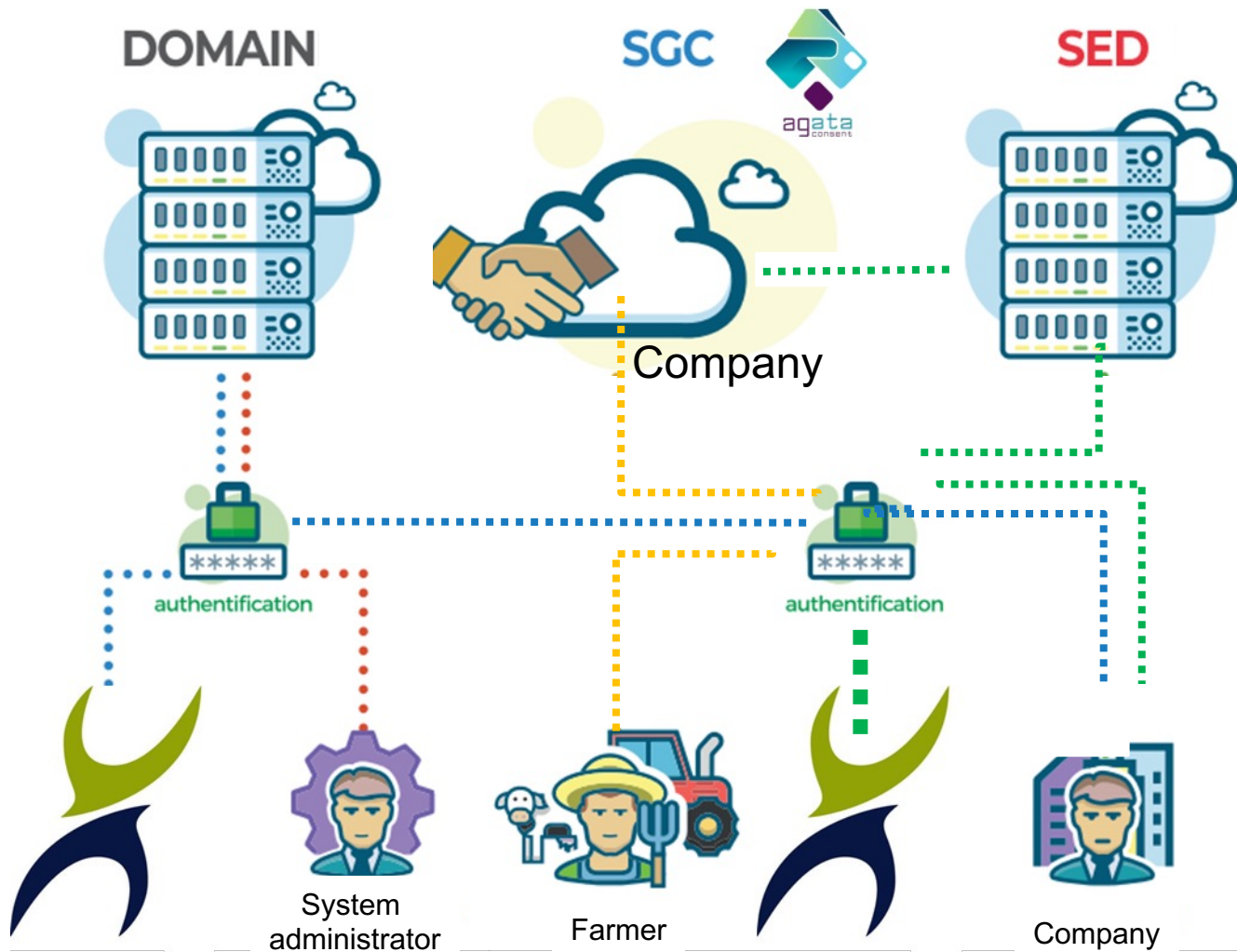


- ▶ The Base Pro web services are deployed on a multi-node infrastructure which offers
  - ▶ Scalability / Redundancy & Security
  - ▶ Multi-node load balancing and resilience
  - ▶ Continuous integration platform
- ▶ Industrialized platform
  - ▶ based on standard components
- ▶ Documented Interface Contract
  - ▶ Swagger
- ▶ Volumetric capacity
  - ▶ 100 000 000 requests/month
  - ▶ Peak of 20 000 000 requests/day
  - ▶ Capacity Load Tests
    - ▶ 13 000 000 requests/hour





# Exchange architecture



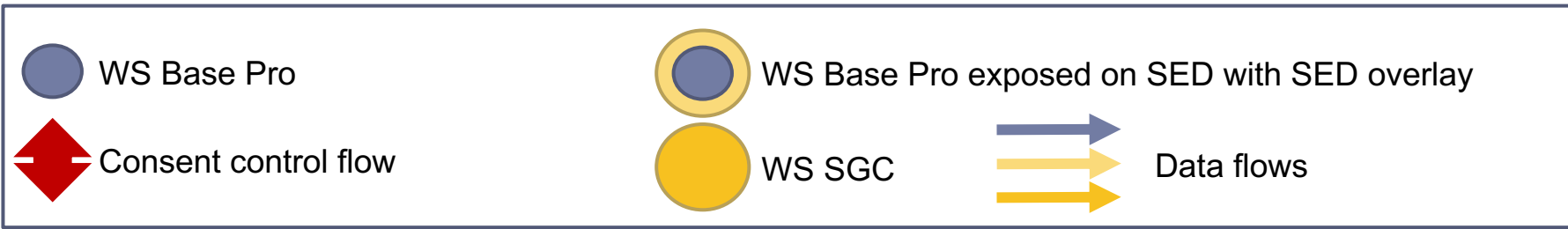
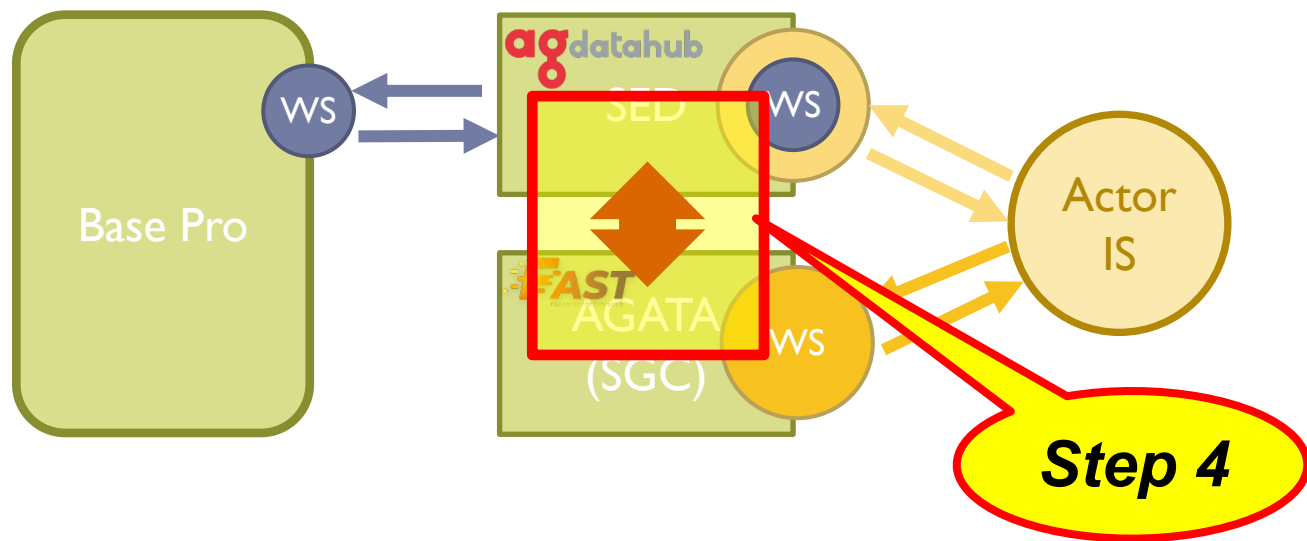
*The consent management system (SGC) paired with a web services exchange system (SED) aims at ensuring the informed consent of breeders speaking about the use of their data*



# Web Services, Data exchanges (SED) and Consent management (SGC)



► **New exchange modalities between the IS Actors and the Pro Base:**  
 Each IS actor consumes the WS exposed on the SED which systematically controls the consents of the actors.





# Consent management system (1/3)

System managing consents organized into functional areas called “domains”

- Adaptable to data from all sectors (agri-food value chains and other sectors of economy)

APIs or ergonomic interfaces for administrators of the system

- To administrate, create, modify the consents



**Step 2**

Free farmers’ interface

- To consult and manage consents



**Steps 3 & 1**

The DIGITAL OFFICE for farmers

## Solution based on open-source components

Webservices : Opensource Springboot framework

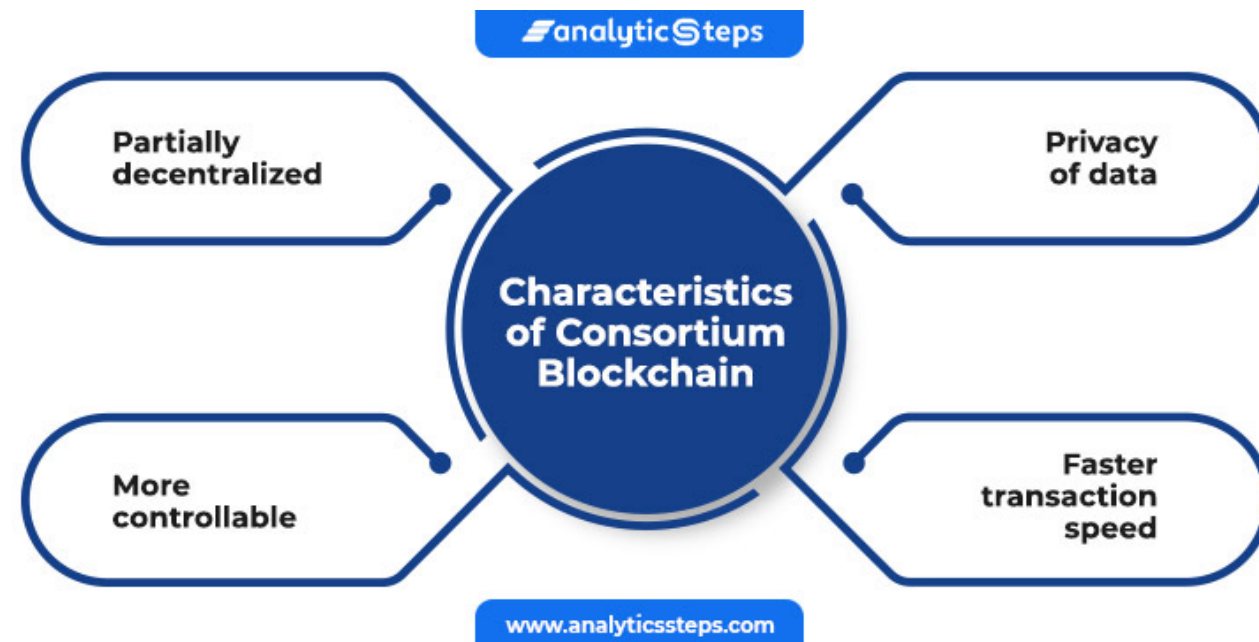
Full web management interfaces : Javascript Angular framework, design responsive

Types encoding uses UTF-8 for exchange and storage, dates are encoded using the ISO 8601 norm



# Consent management system (2/3)

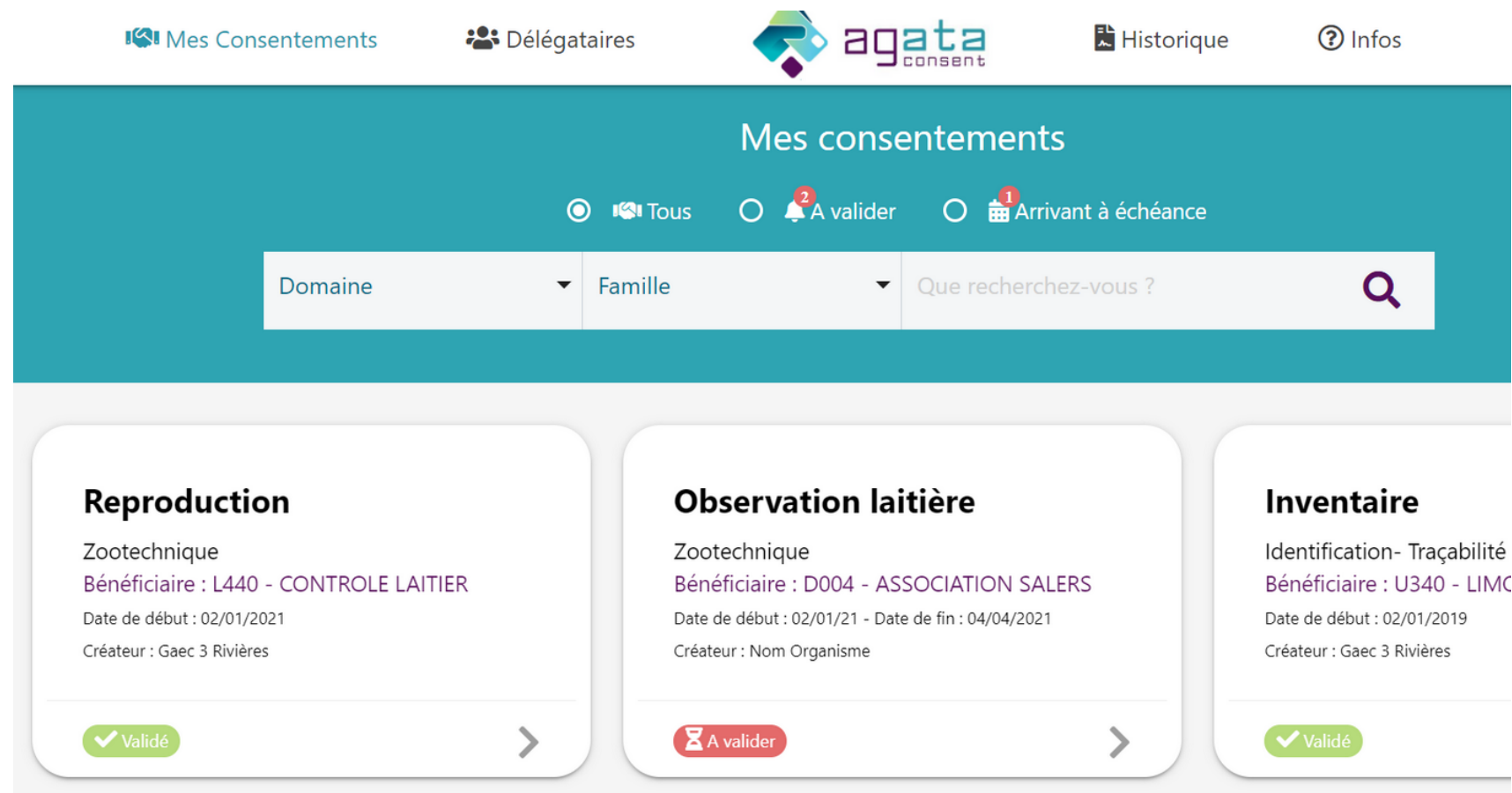
- ▶ Decentralized consent management solution (Blockchain of consortium)
- ▶ Distributed architecture with a variable number of nodes (coherent with blockchain philosophy) to ensure the security of the system
- ▶ *For each node :*
  - ▶ *HyperLedger Fabric Ledger*
    - ▶ *data storage in the blockchain*
  - ▶ *Smart contract*
    - ▶ *Java code used in the blockchain*
  - ▶ *Couch DB : database technology Fabric-CA*
    - ▶ *certification authority*
  - ▶ *Orderer*
    - ▶ *Hyperledger control*





# Consent management system (3/3)

- ▶ *System initialization*
  - ▶ **273 071 consents** have been loaded
    - ▶ **74 534 herds**
    - ▶ **138 companies**
- ▶ *1st test in production condition*
  - ▶ **0,2 second to**
    - ▶ *verify consent*
    - ▶ *exchange a set of Data*



The screenshot shows the 'agata consent' web interface. At the top, there are navigation tabs: 'Mes Consentements', 'Délégataires', 'Historique', and 'Infos'. The main header is 'Mes consentements'. Below it, there are filters for 'Tous', 'A valider' (with a '2' notification), and 'Arrivant à échéance' (with a '1' notification). A search bar contains 'Domaine', 'Famille', and 'Que recherchez-vous?'. The main content area displays three consent cards:

- Reproduction**: Zootechnique, Bénéficiaire : L440 - CONTROLE LAITIER, Date de début : 02/01/2021, Créateur : Gaec 3 Rivières. Status: Validé.
- Observation laitière**: Zootechnique, Bénéficiaire : D004 - ASSOCIATION SALERS, Date de début : 02/01/21 - Date de fin : 04/04/2021, Créateur : Nom Organisme. Status: A valider.
- Inventaire**: Identification- Traçabilité, Bénéficiaire : U340 - LIMC, Date de début : 02/01/2019, Créateur : Gaec 3 Rivières. Status: Validé.

Farmers' interface on Agri Maker

# Conclusion

## ...Beyond the technical choices



- ▶ A solution to recreate trust on the exchange of Data
  - ▶ High compatibility with
    - ▶ International data exchange standard included the ICAR ADE
    - ▶ Data Governance Act
    - ▶ Professional engagement Data Agri
  - ▶ Using technologies allow disintermediation



- ▶ The initialization of the system ended in May 2022 for genetic field, it is now followed by the phase of increase in load
- ▶ The promoters of this solution hope that it will be applied on a large fields of animal data exchange





# Thank you for your attention !



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