

Centro di Referenza Nazionale  
per Sequenze Genomiche di  
microrganismi patogeni:  
banca dati e analisi di Bioinformatica

## OH EJP COHESIVE

**WGS data and metadata sharing at member state level**



**Adriano Di Pasquale**

**Teramo, 4 July 2019**

**LNR *Listeria monocytogenes***

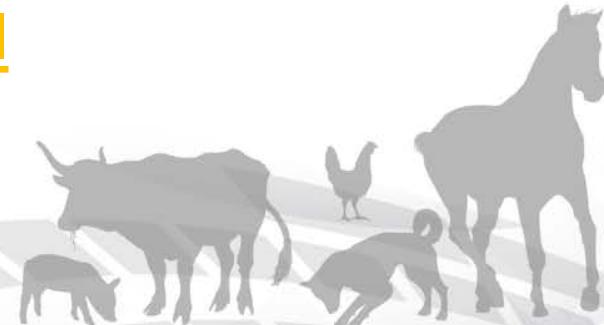


# Task 4.1. Objectives

The OHEJP COHESIVE project aims to improve efficiency on outbreak management, surveillance and risk assessments in a One-Health approach at Member State level.

The goal can be achieved by

**integrating information on pathogens  
from the human and veterinarian side,  
present at  
Member State level**



# Task 4.1. Information



Information under consideration in COHESIVE  
are:

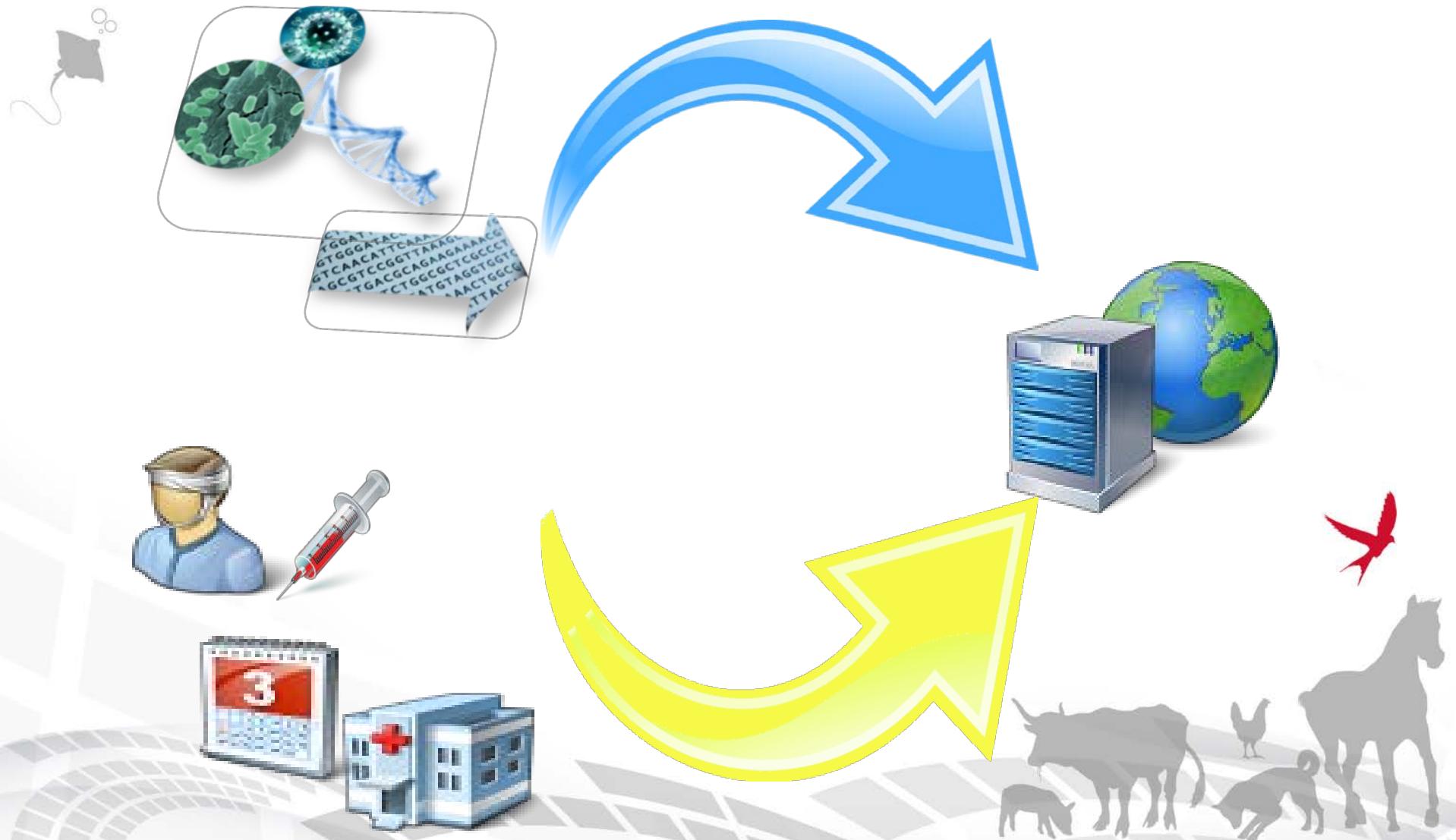
- **WGS data** produced by analysis of pathogens by the Member State laboratories
- **Metadata**, such as the minimum epi-data associated with a pathogen.
  - Moreover, additional useful metadata sources will be considered





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# Human side

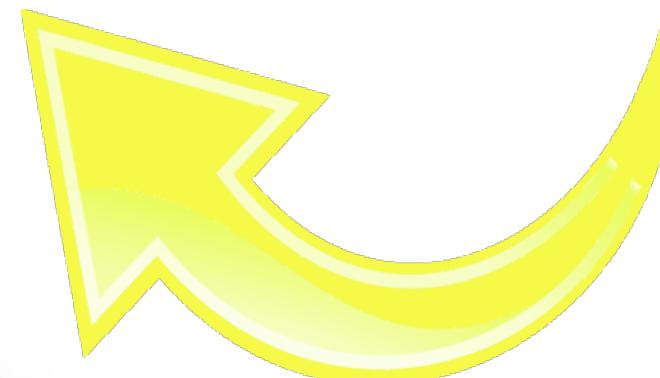
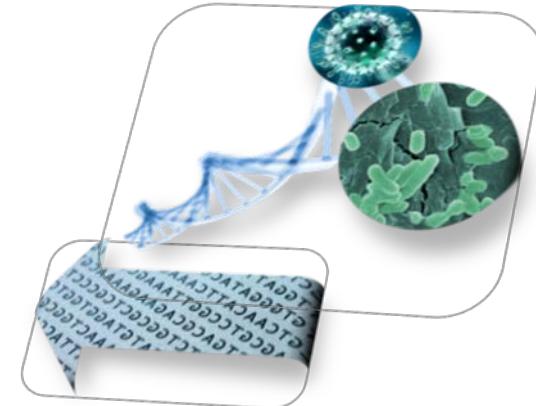
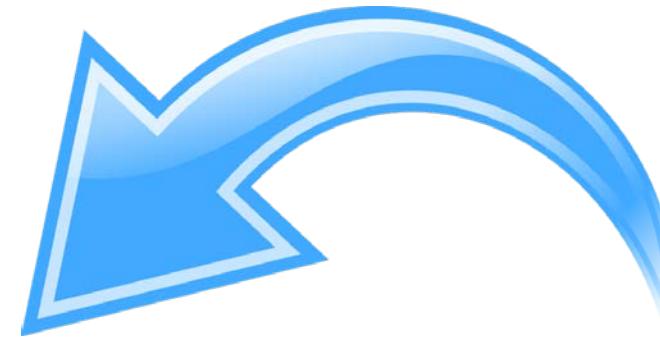




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# Veterinarian side





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# Integration

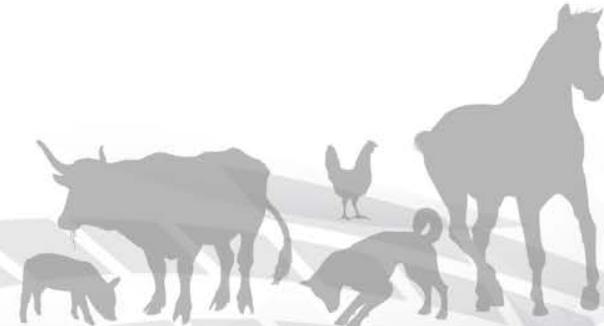




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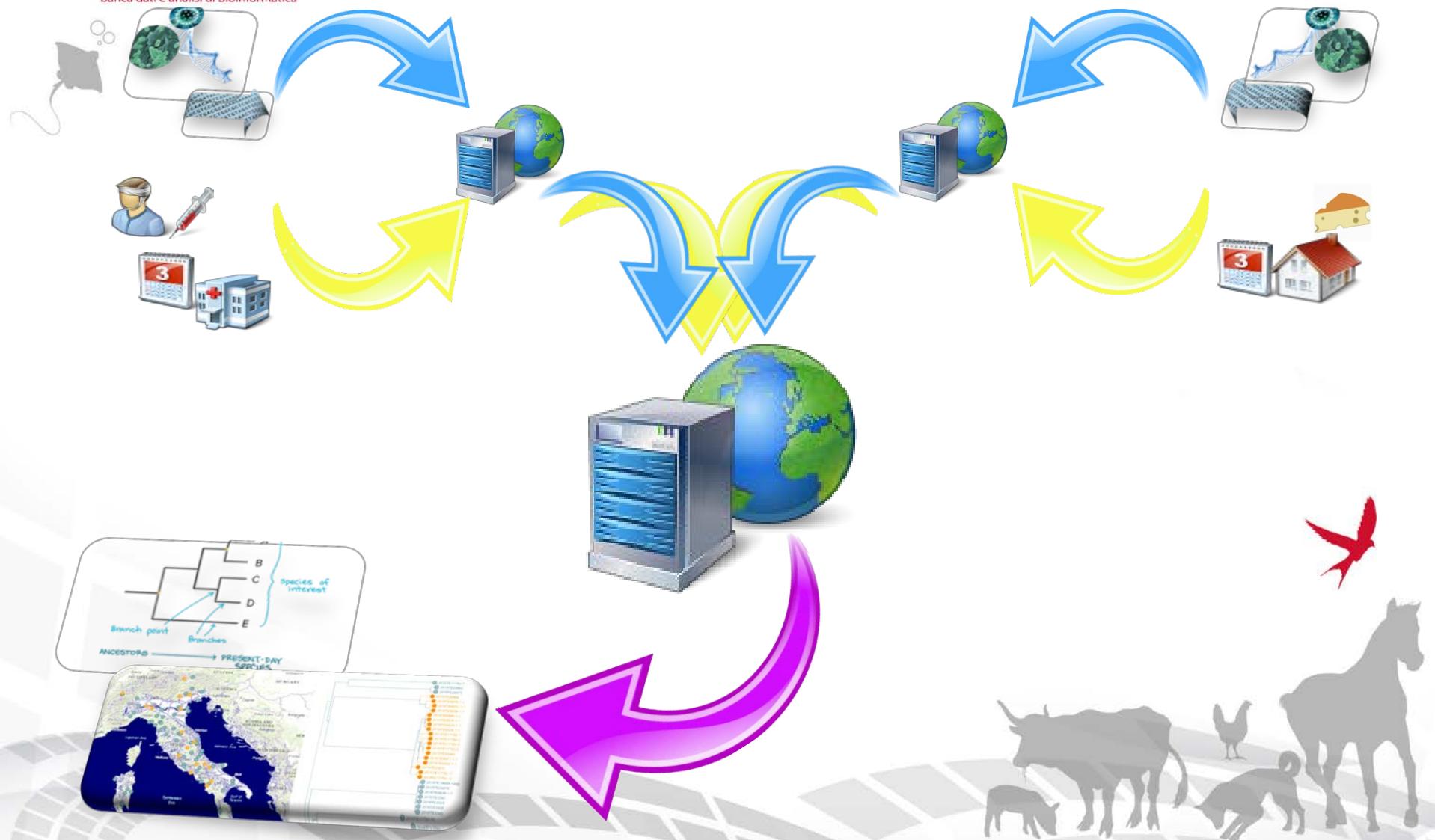
# Integration





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# Harmonization





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# Feasibility study

  
**The main activity is to analyze at MS level  
the feasibility of such integration.**

On each Member State, the integration of national systems will be analyzed from two points of view:

**Technical and Political.**



# Technical analysis

At Member State level

1. List of all the useful **information sources**,
2. Evaluate **integration** of the systems
3. Evaluate the possibility to provide **EU harmonized output**.
4. A **prototype system** is used to let the Member State evaluate the expected improvements.



# Political analysis

At Member State level

1. Barriers to data exchange,
2. Privacy issues,
3. Data access and profiles



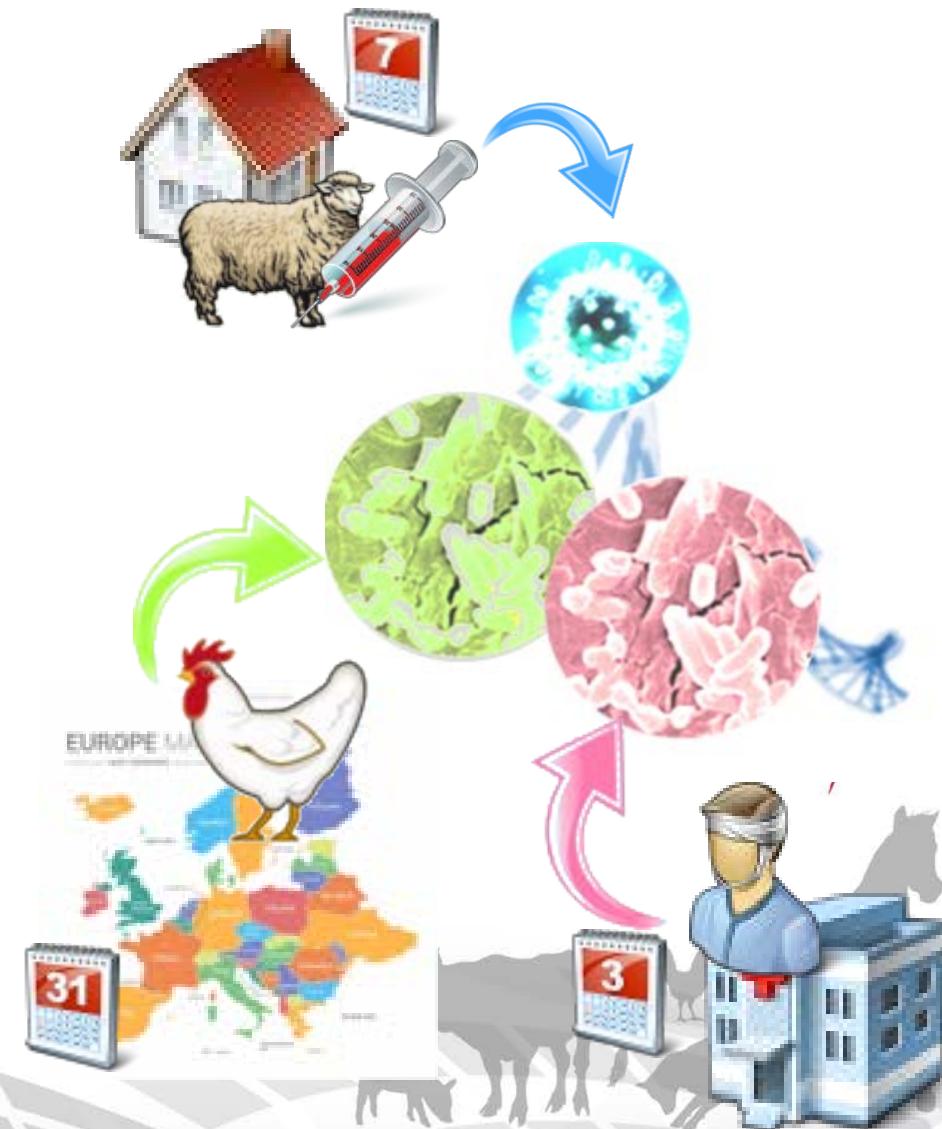
# Status of activities

ID	Icon	Nome attività	Durata	Inizio	Fine	Semestre 1		Semestre 2		Semestre 1		Semestre 2		Semestre 1		Semestre 2					
						D	G	F	M	A	M	G	L	A	S	D	G	F	M	A	M
1		Init	0 g	lun 01/01/18	lun 01/01/18	◆	01/01														
2		Kick-off meeting	0 g	mer 28/03/18	mer 28/03/18	◆	28/03														
3		WP4: Data platform to facilitate risk-analysis and outbreak control	566 g	lun 02/07/18	lun 31/08/20																
4		T 4.1 Molecular typing data and metadata: database creation	566 g	lun 02/07/18	lun 31/08/20																
5		T 4.1.1 Workshop on data and DBs	0 g	lun 26/11/18	lun 26/11/18	◆	26/11														
6		T 4.1.2: Design and implementation of DBs	240 g	lun 02/07/18	ven 31/05/19																
7		T 4.1.3: Interconnection of the three DBs	172 g	ven 01/02/19	lun 30/09/19																
8		T 4.1.4: Analysis of the systems in involved countries	260 g	gio 01/11/18	mer 30/10/19																
9		T 4.1.5: Linking of the national databases with the COHESIVE prototyp	240 g	lun 01/04/19	sab 29/02/20																
10		T 4.1.6: Design and implementation of pipelines	261 g	lun 02/09/19	lun 31/08/20																
11		D 4.1.1 implemented database	0 g	ven 31/05/19	ven 31/05/19	◆	31/05														
12		D 4.1.2 description of the links and the linked databases	0 g	lun 30/09/19	lun 30/09/19	◆	30/09														
13		D 4.1.3 Databases containing the country data	0 g	sab 29/02/20	sab 29/02/20																
14		D 4.1.4 description of the pipelines	0 g	lun 31/08/20	lun 31/08/20																

31/08

- **What:** pathogen species
- **Matrix (source of isolation):**
  - cheese, blood, water
- **When, Where:**
  - sample collection date and place

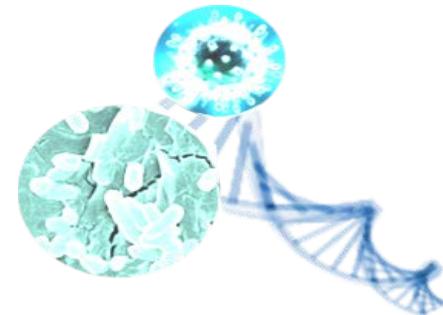
# Meta-data: epi-data



# Meta-data 2: Non WGS analysis

- Additional analysis are meta-data?

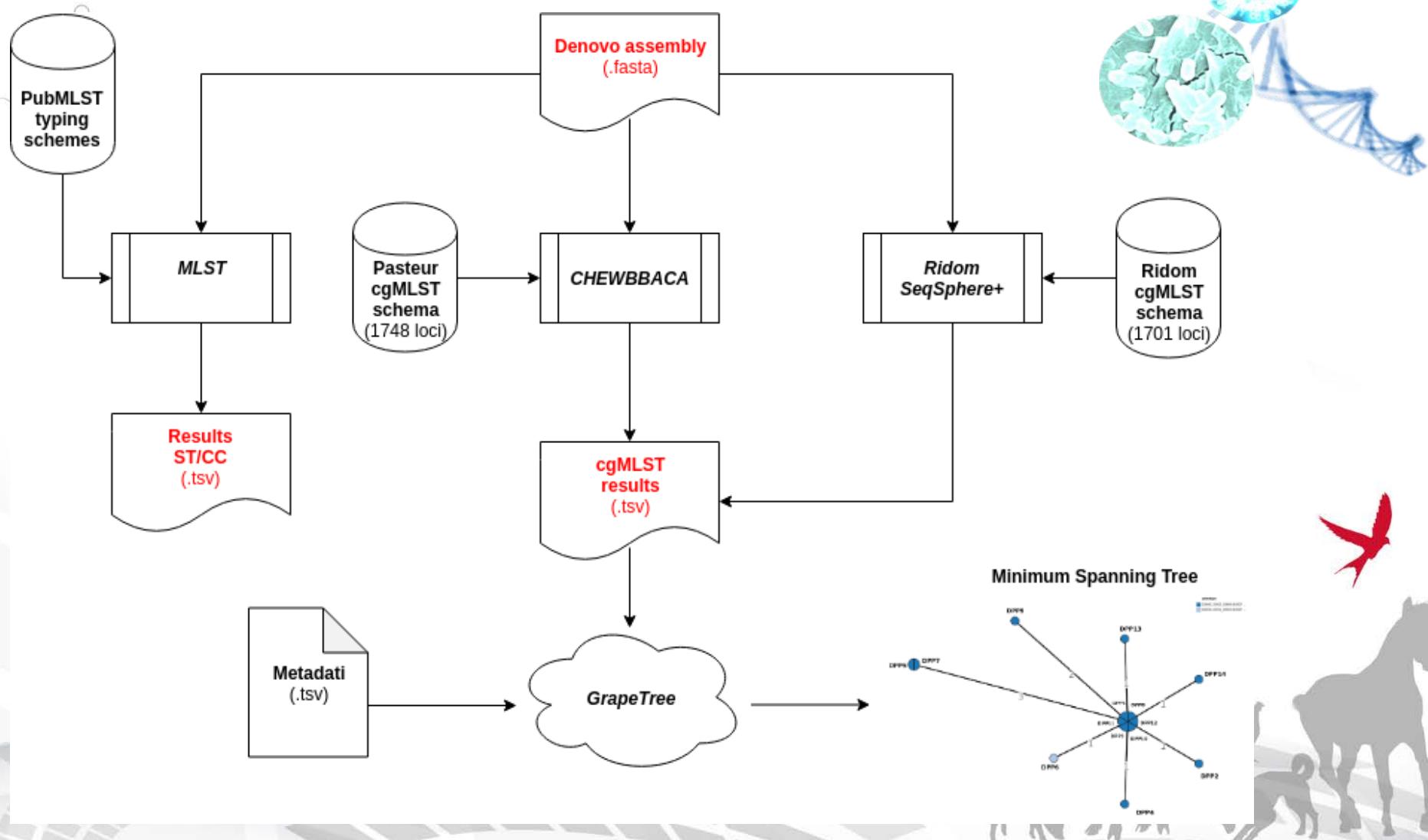
- Sequence Type (MLST)
- Pulsotype (PFGE)
- Serotype
- MLVA
- Antimicrobial susceptibility testing/AMR genetic determinants
- etc.



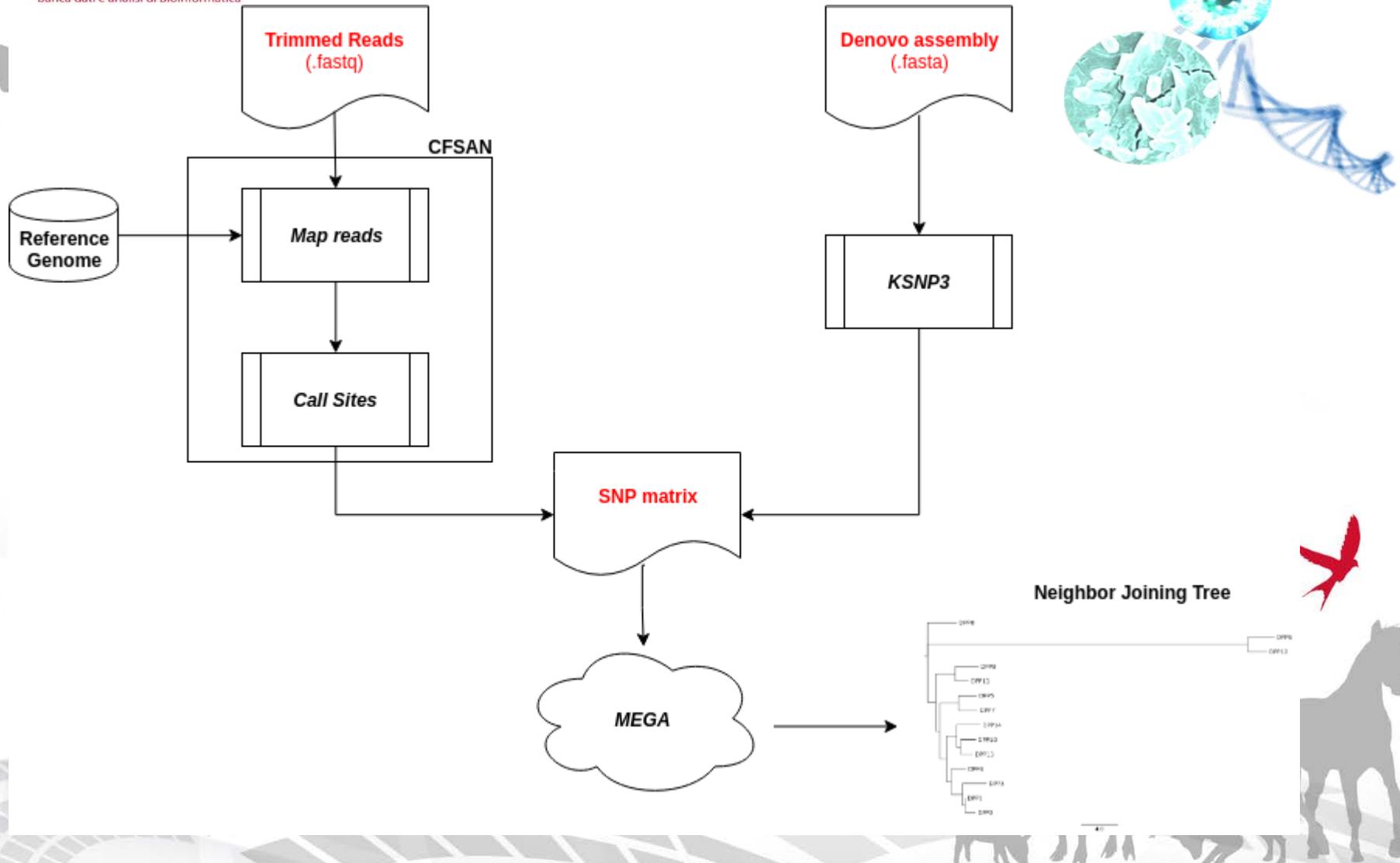
- Can be used to filter interesting isolates

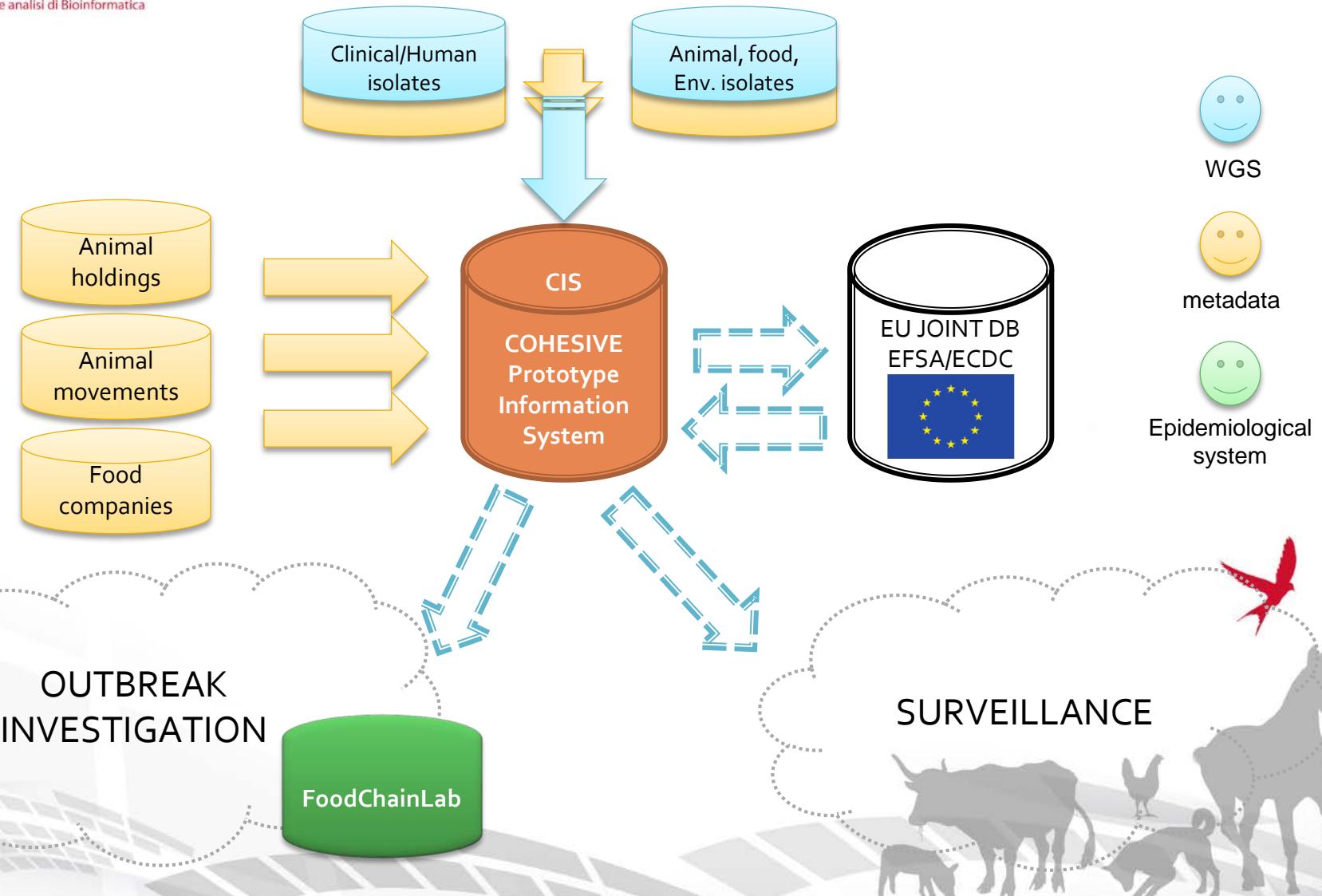


# WGS analysis



# WGS analysis

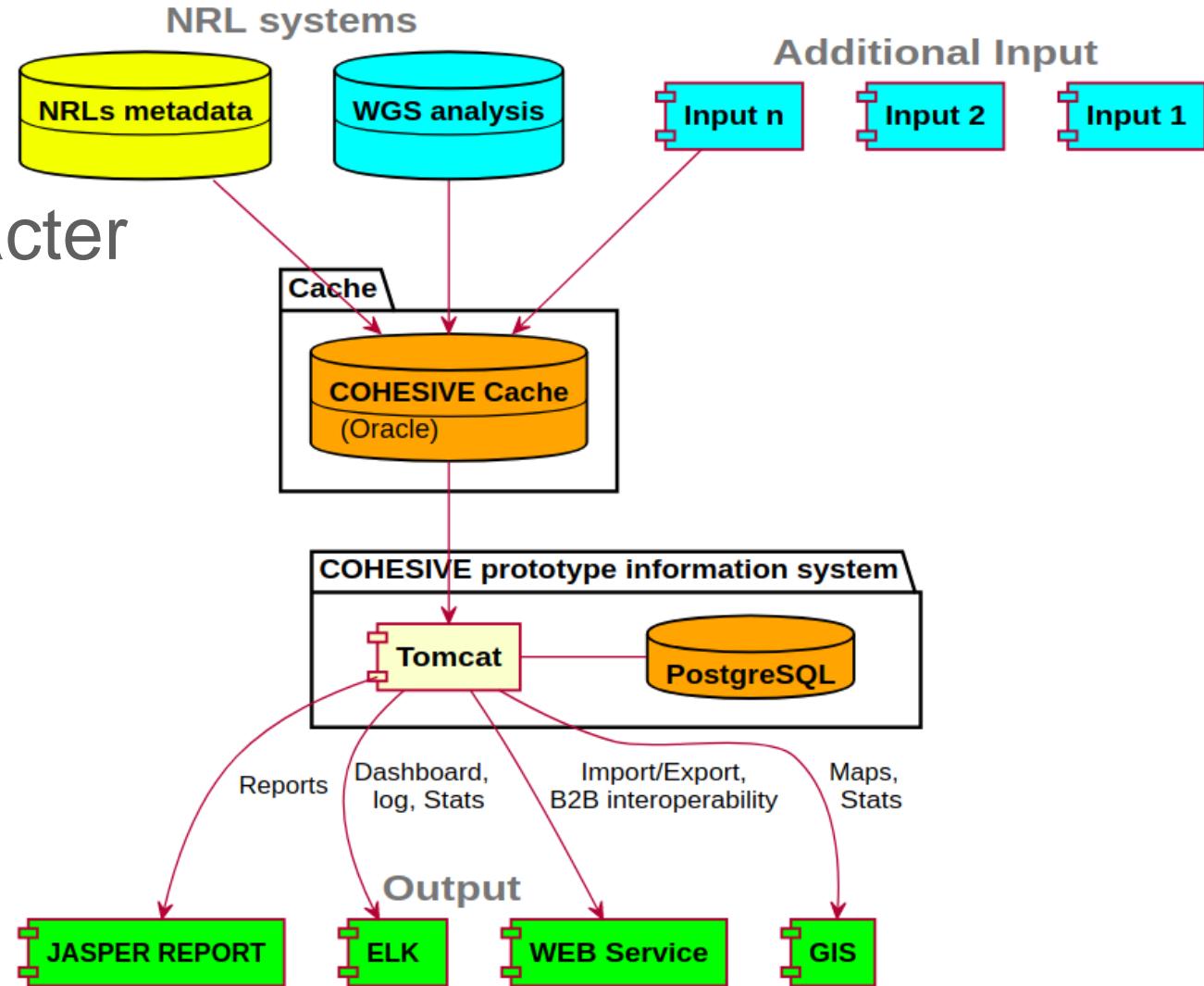




# CIS. Data flow from NRLs

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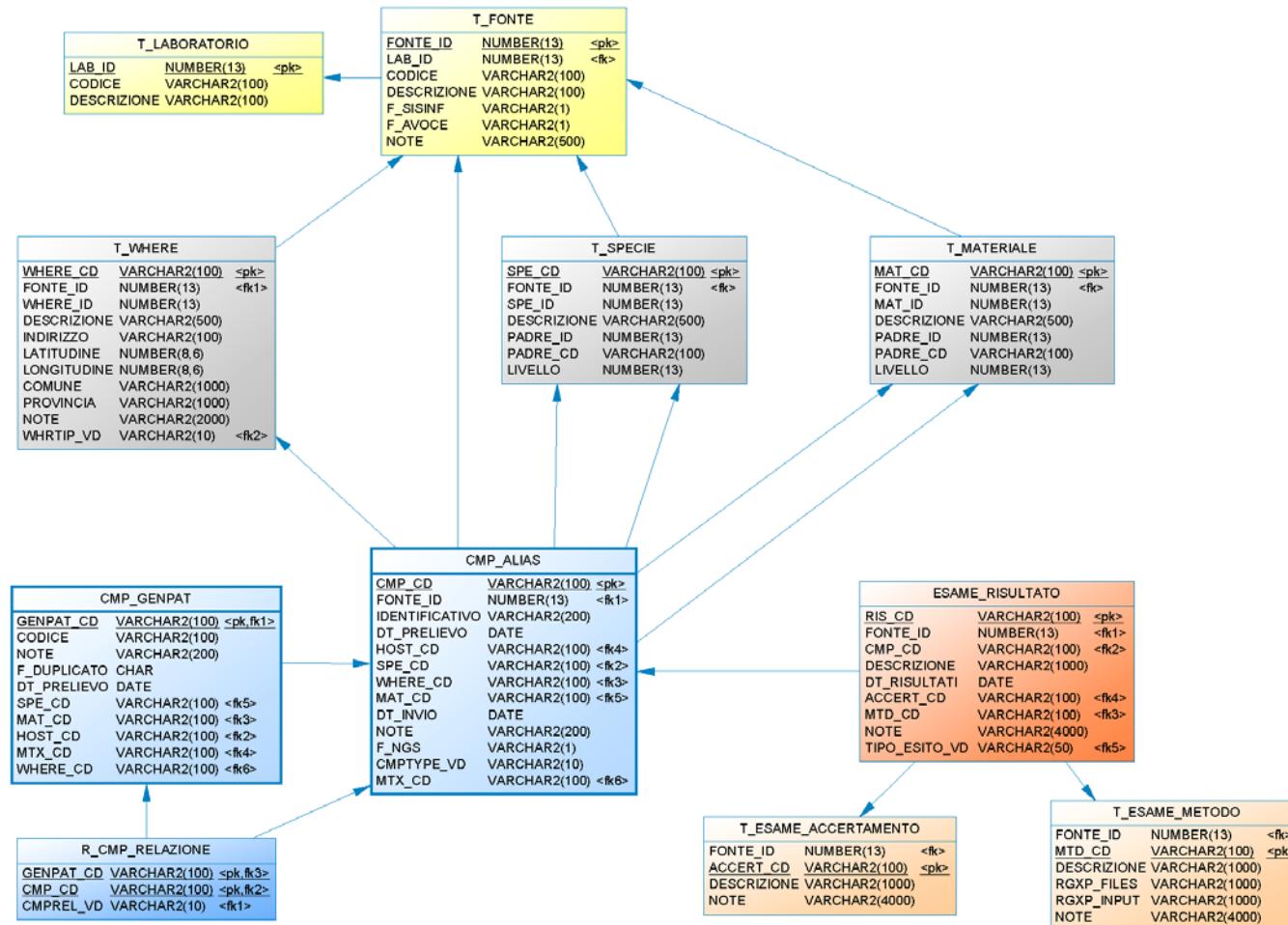
Listeria,  
Campylobacter



# CIS E-R diagram.

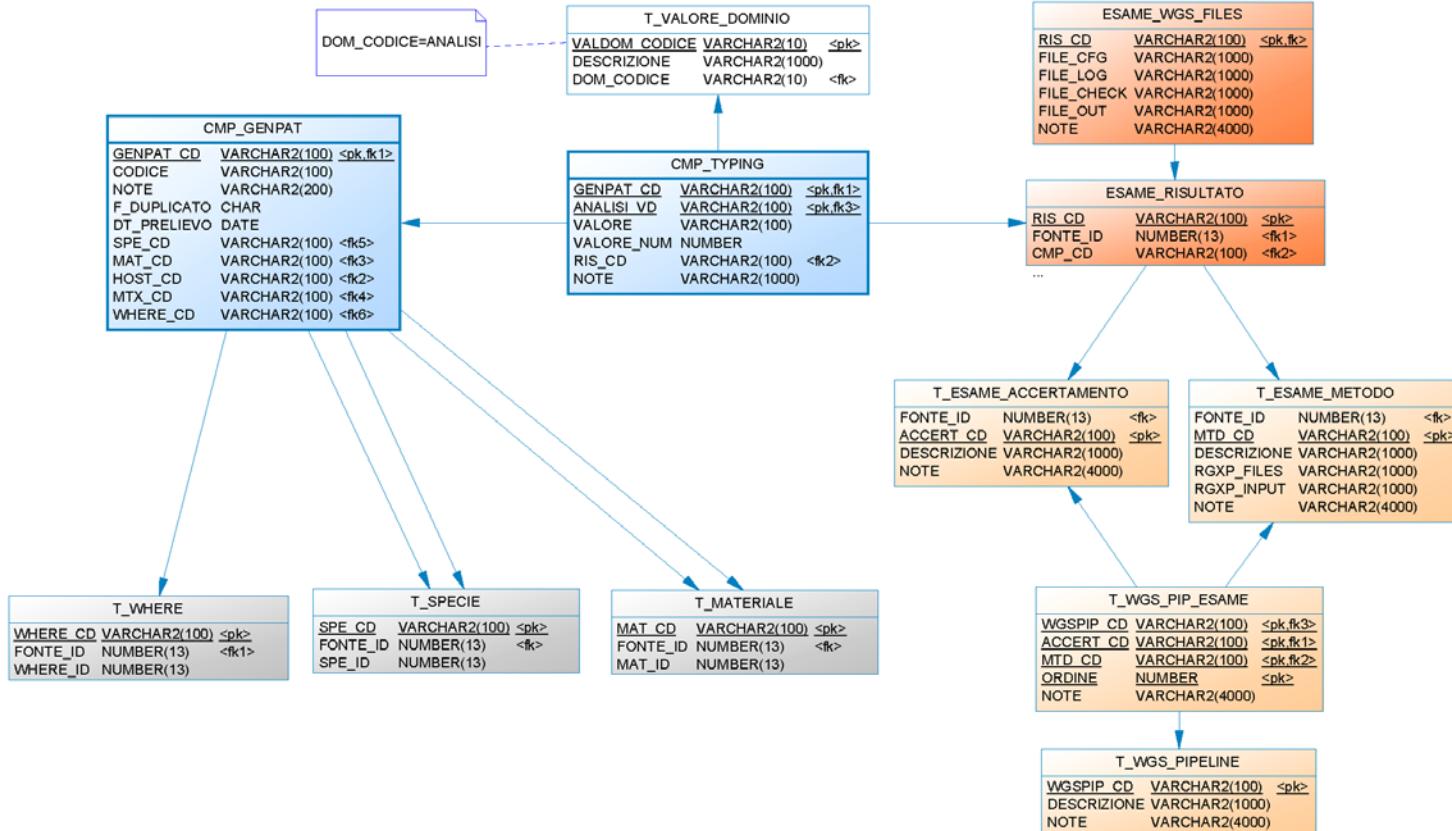
## Import from sources

### CACHE



# CIS E-R diagram

## Harmonization





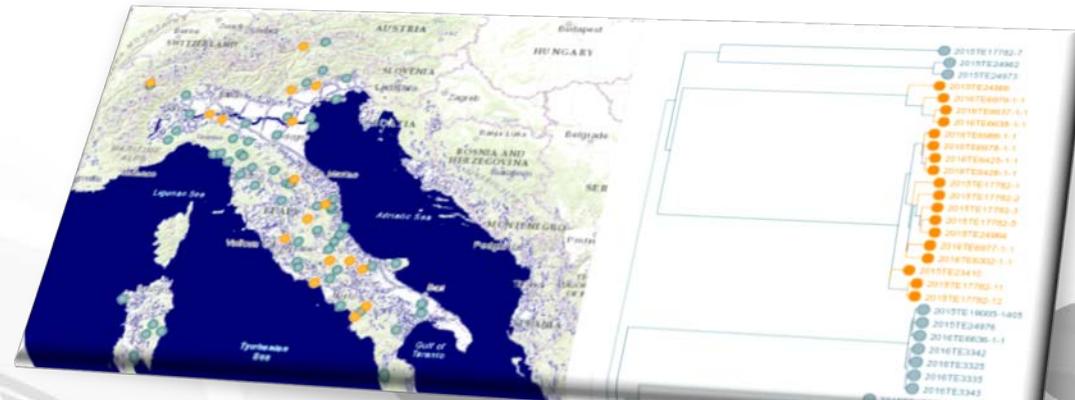
# COHESIVE prototype DEMO

# Main system

<https://bioinfodb.izs.it/cohesive>

## GIS module

[http://mapserver.izs.it/gis\\_genpat/](http://mapserver.izs.it/gis_genpat/)





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# Further issues

## Data Harmonization

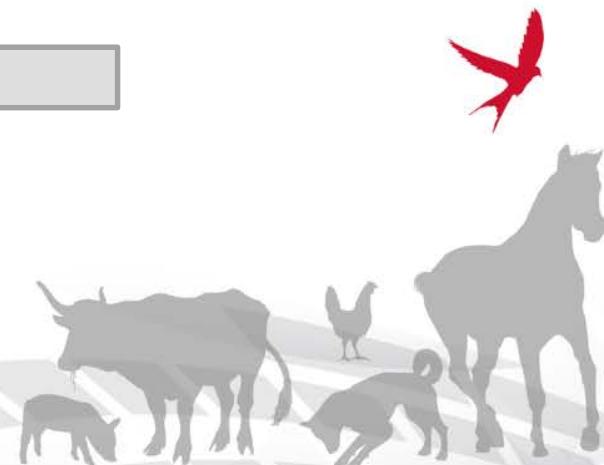
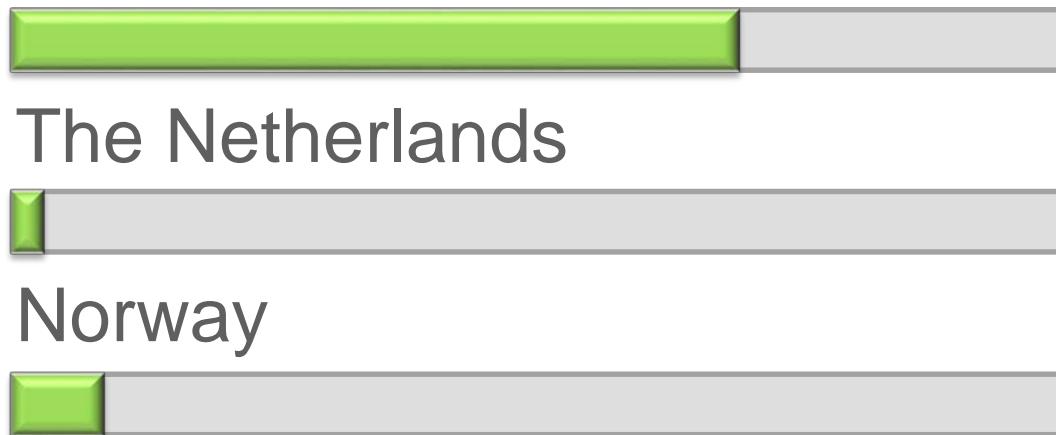
- EFSA SSD2
- ORION
- **EFSA SIGMA Project** (managed by IZSAM)



# Feasibility study Status

## Involved Member States

- Italy
- The Netherlands
- Norway





# Thank you for your attention

- CRN GENPAT
  - LNR per *Listeria monocytogenes*
  - LNR per *Campylobacter*
  - CRN per le Brucellosi
  - CSN (Centro Servizi Nazionale Anagrafi degli Animali)
  - COVEPI (CRN per l'epidemiologia veterinaria, la programmazione, l'informazione e l'analisi del rischio)
  - CESME (CRN per lo studio e l'accertamento delle malattie esotiche degli animali)
- 