

CyBaDe : a relational database and a web interface to help the DEPE* animal facility at IPHC

* Département Ecologie Physiologie et Ethologie

5ème rencontre sur les logiciels libres de recherche de l'Unistra, 2024-10-15

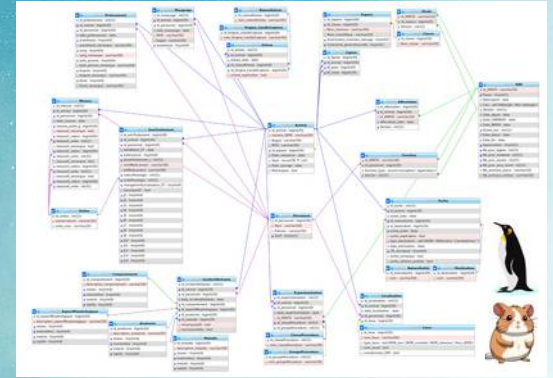
IPHC, Service Technique Informatique, Plateforme SCIGNE

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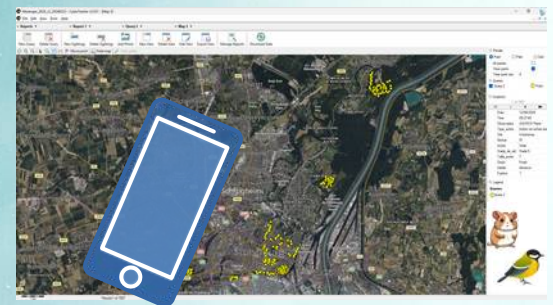
Overview

- 🍃 What was the need ?
- 🍃 What were the existing solutions ?
- 🍃 CyBaDe relational SQL database
- 🍃 The web interface for data collection
- 🍃 Perspectives & sharing
- 🍃 Extra : Open-source IT tool to collect data in the field



Screenshot of a web interface for data collection. The interface has a dark green background. At the top, there is a navigation bar with the text "Accueil" and "Espèces" followed by a dropdown menu showing "Animal" and "Environnement". Below this is a table with columns: "ID", "Nom", "Date de naissance", "Sexe", "Statut", and "Statut de la mère". The table contains several rows of data. Below the table, there are several buttons and a small text box at the bottom.

ID	Nom	Date de naissance	Sexe	Statut	Statut de la mère
1000001	1000001	2010-01-01	M	1	1
1000002	1000002	2010-01-01	F	1	1
1000003	1000003	2010-01-01	M	1	1
1000004	1000004	2010-01-01	F	1	1
1000005	1000005	2010-01-01	M	1	1



What was the need ?

 **WHO ?** IPHC / DEPE / Animal facility

 **WHAT ?** A solution to efficiently manage animal registers

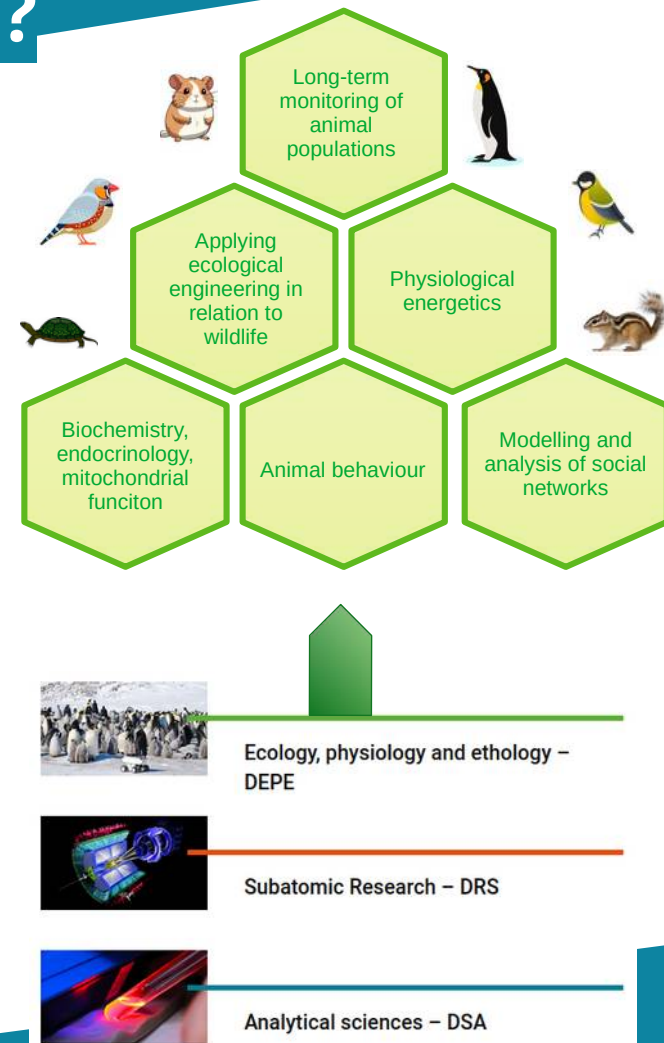
 **CONSTRAINTS ?**

- Reglementation on research projects involving animals (APAFIS number)
- Semestrial DDPP report
(Direction Départementale de la Protection des Populations)
- Wide variety of animal species and accomodation type
- In the lab & in the field

 **HOW ?**

- Animal registers in .xls files
- Accomodation management with AHU (Air Handling Unit) for temperature monitoring

 **PROJECT ?** Relational database with an associated web interface



What were the existing solutions ?



Existing solutions ?

(C) Geranimaux 2.0 (Sigma):

Providers, drugs, premises & cages management, projects planification, lineage, phenotyping, breeding ...

(C) AniBio WEB 5.0 (Noraybio) :

Animal crossing, transgenic lines, drugs, vet follow-up, barcodes for cages, cryo-preservation, facturation, ...

(C) MayaKind 12.0 (FLPG Software – CEA) :

Premises, cages management, labels, protocols, ...

(OS) TopoDB (UCSF) :

For rodents only, MIT licence, Ruby, MySQL database

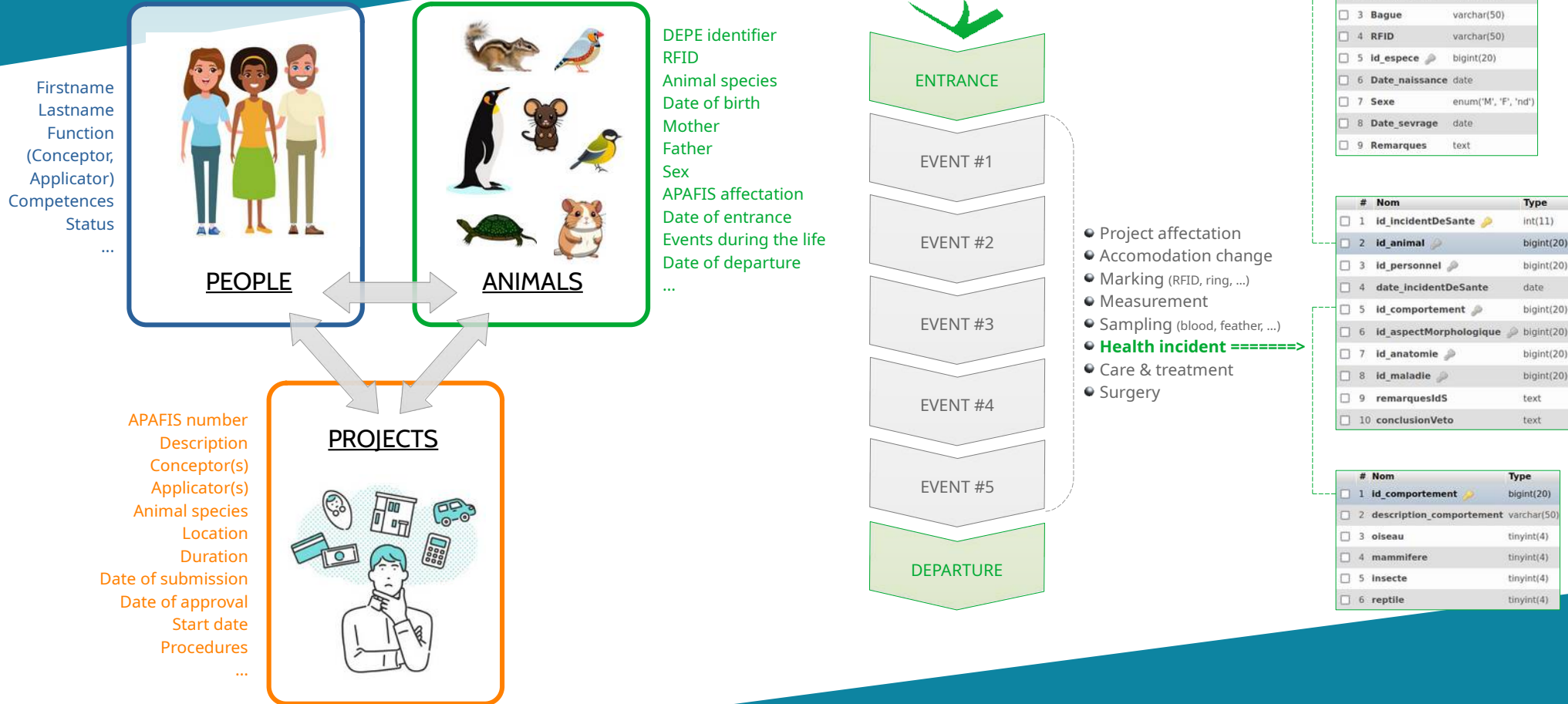


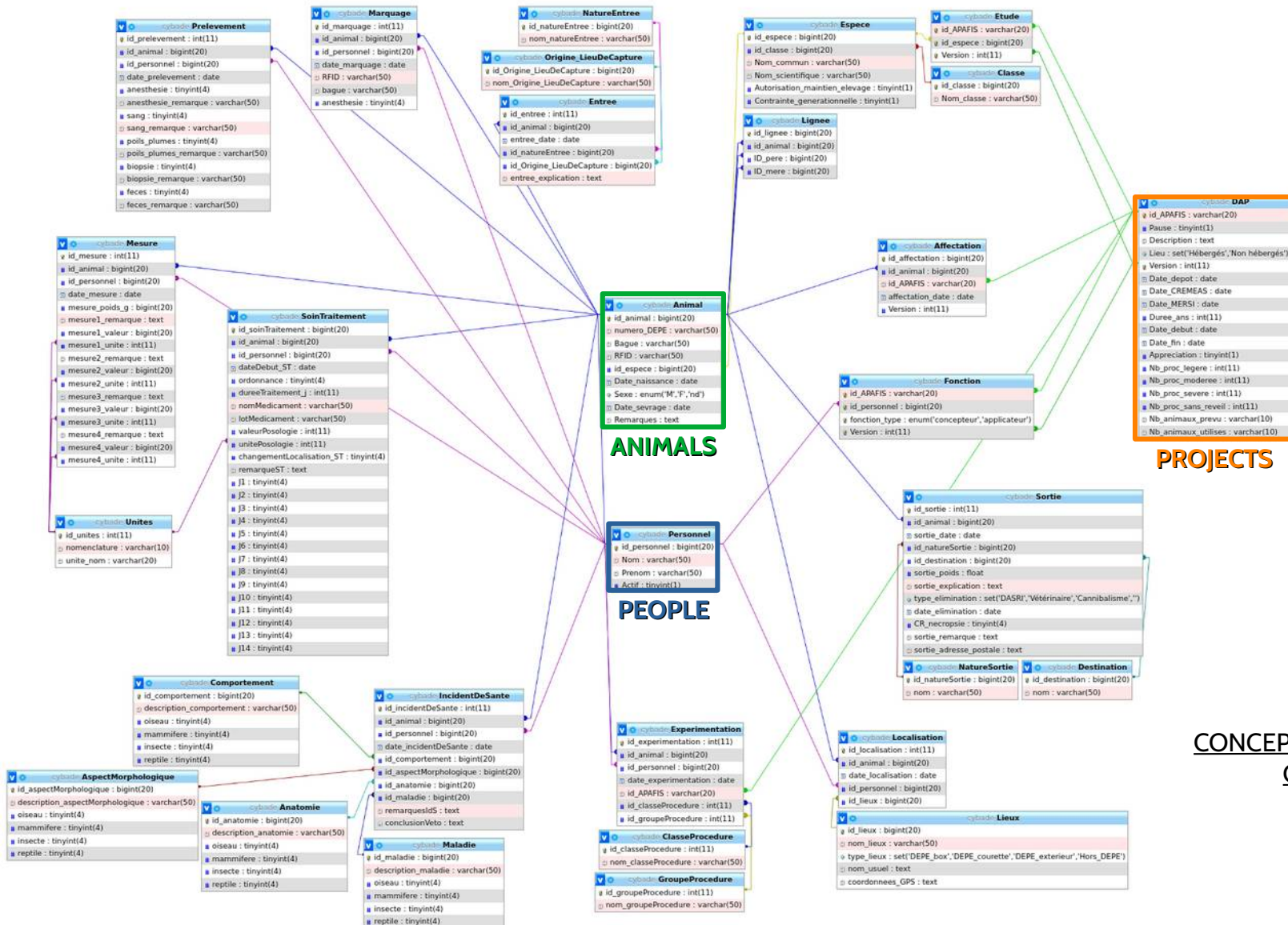
Why not ?

- Rodents breeding & phenotyping -VS- Monitoring & wild animals
- Cost (~ 25k€ licence, + support)

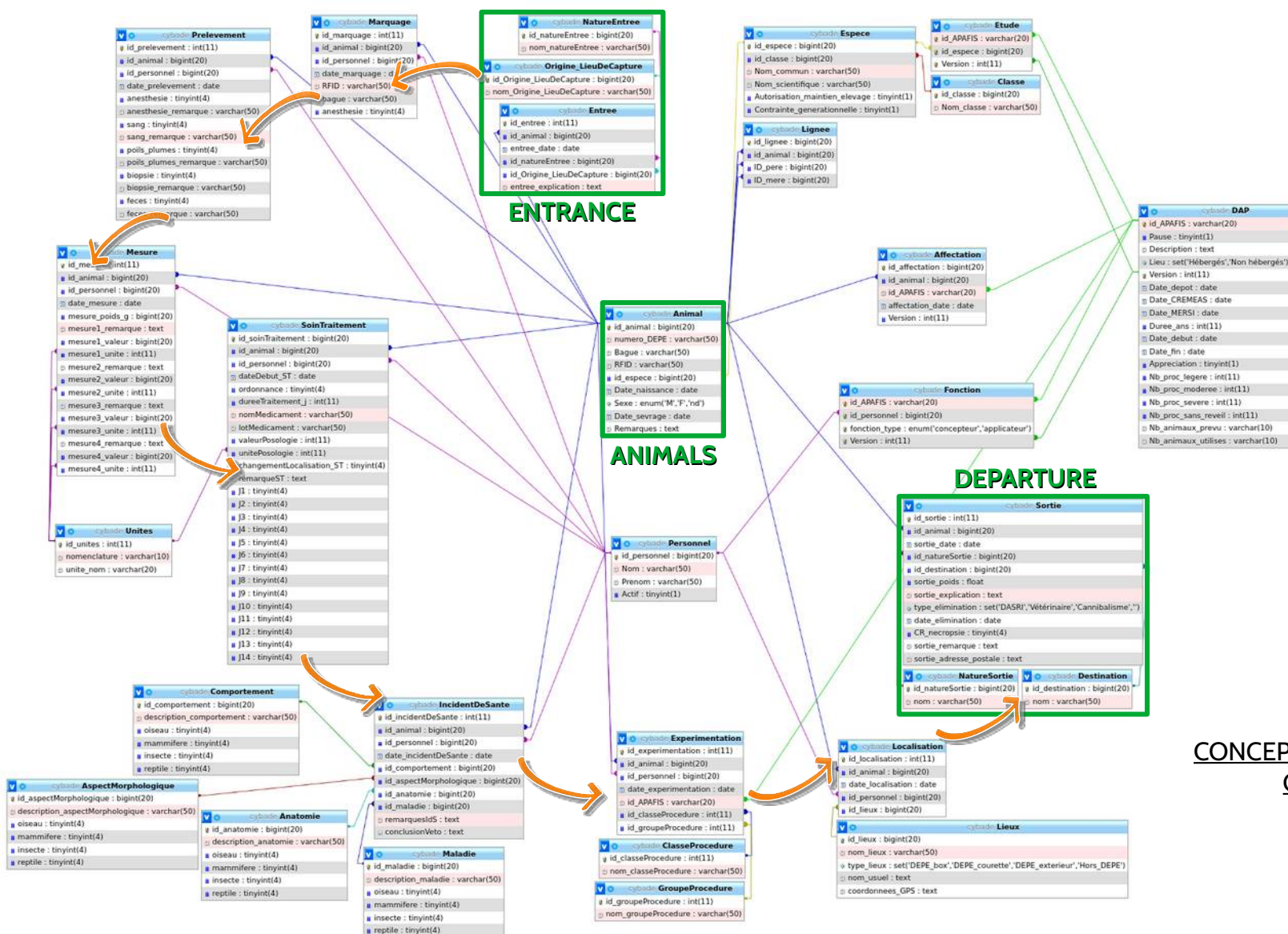


CyBaDe relational SQL database





**CONCEPTUAL SCHEMA FROM THE
CyBaDe DATABASE**



**CONCEPTUAL SCHEMA FROM THE
CyBaDe DATABASE**

CyBaDe relational SQL database

The screenshot shows the phpMyAdmin interface with a SQL query and its results. The query is:

```
SELECT * FROM `B4_Registre-anima` ORDER BY `B4_Registre-anima`.`typeMarquage` DESC
```

The results table has the following columns: numero_DEPE, typeMarquage, numeroMarquage, Nom_commun, id_APAPIS, concepteurs, Date_naissance, Mere, Pere, Sexe, Date_sevrage, entree_date, nom_natureEntree. The table contains 25 rows of data, including columns like numero_DEPE, typeMarquage, numeroMarquage, Nom_commun, id_APAPIS, concepteurs, Date_naissance, Mere, Pere, Sexe, Date_sevrage, entree_date, and nom_natureEntree.

Operations sur les résultats de la requête:

- Imprimer
- Copier dans la presse-papiers
- Exporter
- Afficher le graphique

Conservation de la requête SQL:

Intitulé: Signet visible pour les autres utilisateurs

Conservation de cette requête SQL dans les signets

```
SELECT `id_APAPIS`, CASE WHEN `date_ministere` IS NULL THEN '(1)Déposée' WHEN `date_ministere` IS NOT NULL AND `date_debut` IS NULL THEN '(2)Autorisée' WHEN NOW() > `date_ministere` AND `date_fin` IS NULL THEN '(3)Active' WHEN NOW() > `date_fin` THEN '(4)Finie' WHEN `date_fin` IS NULL THEN '(4A)-finir' WHEN `date_fin` IS NOT NULL THEN '(5)Terminée' ELSE 'Autre statut' END AS Statut, DAP.Description, concat_especes.concat_especes AS Espèces, T3.Responsabilites.concepteurs, T3.Responsabilites.applicateurs, `Lieu`, `Version`, `Date_depot`, `Date_CE`, `date_ministere`, `date_debut`, DATE_ADD(date_debut, INTERVAL Duree_ans YEAR) AS Date_fin_previsionnelle, CASE WHEN `date_fin` IS NOT NULL THEN 'OVER' ELSE DATEDIFF(DATE_ADD(date_debut, INTERVAL Duree_ans YEAR), NOW()) END AS Nb_jours_avant_fin, `date_fin`, `Appreciation`, `Nb_animaux_prevu` FROM `DAP` LEFT JOIN T3.Responsabilites using (`id_APAPIS`) LEFT JOIN concat_especes using (`id_APAPIS`) ORDER BY `Statut` ASC, CASE WHEN Nb_jours_avant_fin REGEXP "[0-9]+$" THEN CAST(Nb_jours_avant_fin AS UNSIGNED) ELSE 0 END ASC, CASE WHEN Nb_jours_avant_fin REGEXP "[0-9]+$" THEN 0 ELSE 1 END ASC;
```



PROJECTS :

- * dashboard with active projects
- * number of days until project provisional end with corresponding conceptors
- * total number of animals affected to a project
- * status for each project (pause)
- * ...



ANIMALS :

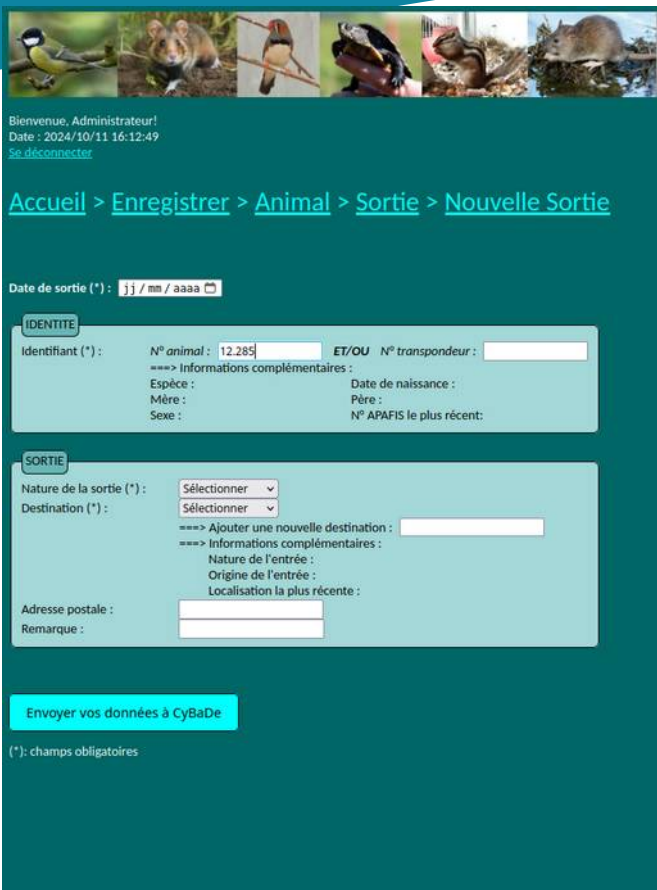
- * animal logbook with all events (entrance-departure)
- * care & treatment (#days & monitoring)
- * breeding (lineage table and birth = entrance)
- * accommodation management
- * behavior / illness / anatomy according to animal class (mammal, bird, insect, reptile)
- * ...



PEOPLE :

- * involvement and role in each project
- * association with an event during animal life
- * ...

The web interface for data collection



Bienvenue, Administrateur!
Date : 2024/10/11 16:12:49
[Se déconnecter](#)

[Accueil](#) > [Enregistrer](#) > [Animal](#) > [Sortie](#) > [Nouvelle Sortie](#)

Date de sortie (*):

IDENTITE

Identifiant (*): ET/OU N° transpondeur:

==> Informations complémentaires :

Espèce: Date de naissance:
Mère: Père:
Sexe: N° APAFIS le plus récent:

SORTIE

Nature de la sortie (*):

Destination (*):

==> Ajouter une nouvelle destination:

==> Informations complémentaires :

Nature de l'entrée:
Origine de l'entrée:
Localisation la plus récente:


Adresse postale:


Remarque:

[Envoyer vos données à CyBaDe](#)

(*): champs obligatoires

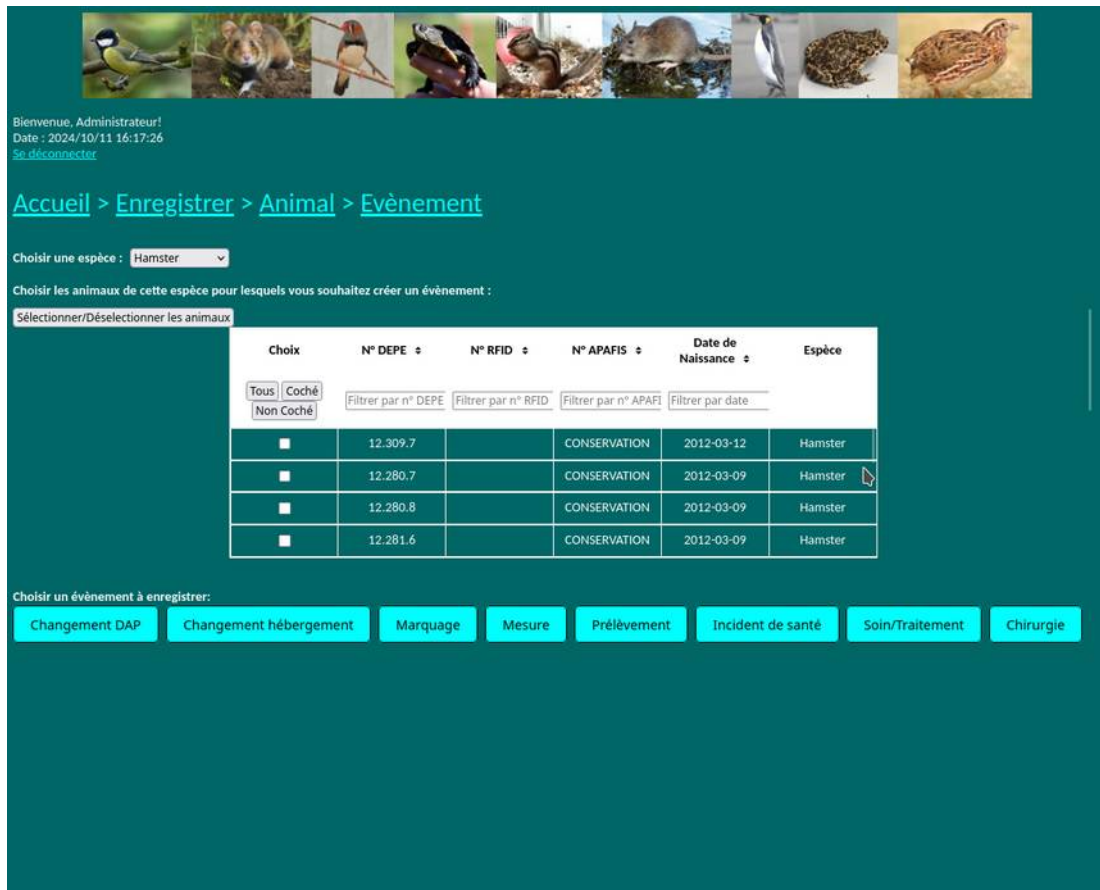
 **PHP**
Javascript

 **2 modes :**
* Consultation
* Modification

 **3 sections :**
* Project
* Animal
* People

 **Export :**
* csv
* pdf

 **Autorization & authentication**



Bienvenue, Administrateur!
Date : 2024/10/11 16:17:26
[Se déconnecter](#)

[Accueil](#) > [Enregistrer](#) > [Animal](#) > [Evènement](#)

Choisir une espèce :

Choisir les animaux de cette espèce pour lesquels vous souhaitez créer un évènement :

[Sélectionner/Désélectionner les animaux](#)

Choix	N° DEPE	N° RFID	N° APAFIS	Date de Naissance	Espèce
<input type="checkbox"/>	12.309.7		CONSERVATION	2012-03-12	Hamster
<input type="checkbox"/>	12.280.7		CONSERVATION	2012-03-09	Hamster
<input type="checkbox"/>	12.280.8		CONSERVATION	2012-03-09	Hamster
<input type="checkbox"/>	12.281.6		CONSERVATION	2012-03-09	Hamster

Choisir un évènement à enregistrer:

[Changement DAP](#) [Changement hébergement](#) [Marquage](#) [Mesure](#) [Prélèvement](#) [Incident de santé](#) [Soin/Traitement](#) [Chirurgie](#)

The web interface for data collection



Bienvenue, Administrateur!
Date : 2024/10/11 16:36:10
[Se déconnecter](#)

[Accueil](#) > [Enregistrer](#) > [Animal](#) > [Evènement](#)

Remplir le tableau ci-dessous :
(*: champs obligatoires)

[Afficher/masquer l'historique](#)

N° DEPE (*)	Opérateur	Ordonnance	Soin/traitement (*)	Médicament	Posologie	Changement de localisation (si oui, n'oubliez pas d'enregistrer une nouvelle localisation avec le bouton ci- dessous)	Remarque	Action
Nouvel enregistrement pour HAMSTER1	DEPE-Test.Cybade-Tes	non <input type="checkbox"/> oui <input type="checkbox"/>	Date début (*): 11/10/2024 Durée (j):	Nom: <input type="text"/> Lot: <input type="text"/>	Valeur: <input type="text"/> Unité: Sélectionner	non <input type="checkbox"/> oui <input type="checkbox"/>		
HAMSTER1	DEPE-Test.Cybade-Test	Oui	Date début : 2024-10-08 Durée (0-14j max) : 5 2024-10-08 : Oui 2024-10-09 : Oui 2024-10-10 : Oui 2024-10-11 : Non 2024-10-12 : Non Modifier	OphthalAg (Lot :A329)510-L	2 gt	Oui	Oeil à moitié fermé.	Supprimer
HAMSTER1	DEPE-Test.Cybade-Test	Oui	Date début : 2024-10-01 Durée (0-14j max) : 2 2024-10-01 : Oui 2024-10-02 : Oui Modifier	OphthalAg (Lot :A329)510-L	1 gt	Non	Oeil ouvert	Supprimer

[Envoyer vos données à CyBaDe](#)

[Changement DAP](#) [Changement hébergement](#)

[Marquage](#) [Mesure](#) [Prélèvement](#)

[Incident de santé](#) [Soin/Traitement](#) [Chirurgie](#)

[Enregistrer un nouvel évènement pour d'autres animaux](#)

MODIFIER SOIN / TRAITEMENT :

Numéro DEPE : HAMSTER1

Date de début du Soin / Traitement : 2024-10-08

Durée du traitement (j) : 5

- 2024-10-08
- 2024-10-09
- 2024-10-10
- 2024-10-11
- 2024-10-12

[Mettre à jour](#)

Perspectives & sharing



RELATIONAL SQL DATABASE :

- ~ Audit (insert, delete, update queries)
- ✗ Skills booklet with expiry dates



CyBaDe WEB INTERFACE :

- ~ Beta-test since 2024-10-01 !
- ✗ Symfony framework
- ✗ UX / UI evolution (mobile device, ...)
- ✗ Interactive structural view from the facility (rooms, birdcages, ...)
- ✗ Animal PDF logbook



Make things different ?

UML conception (use case / activity / sequence) as a 1st important step
« Ah, but I didn't tell you that ... » syndrom



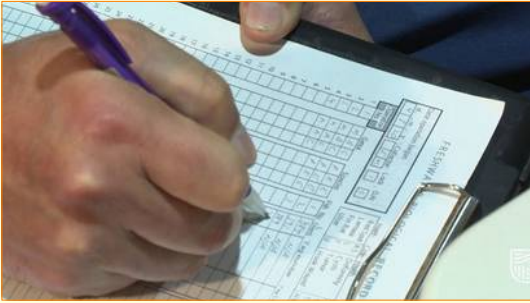
Open Science / FAIR :

- ✓ Production & test servers
- ✓ Use of Git and IN2P3 GitLab
- ~ Will be released under GNU GPL v3 licence
- ✗ Move to a public repository

Data collection in the field with digital tools

By hand

In the field:



Back to the lab: re-writing in xls



*Global view on all parameters
Double backup (hand + numeric)
Cheap*



*Time-consuming (re-writing)
Notepad, pencils ...
Weather / night conditions ...
Multiple instruments (GPS, ...)*

Mix hand / digital tools



Using digital tools

In the field:



Back to the lab: csv/xls export



*Data structure & quality
All-inclusive (GPS, pictures, ...)
No need to re-write
Easy to handle / transport*



*Segmentation in several screens
Data sending errors
Training
More expensive (material)*

Data collection in the field with digital tools



Best practices for data collection:



- Don't do it on paper
- Make it location smart
- Plan it on a map
- Make it easier for the field team
- Do it in real-time
- Referenced in a DMP



Some tools dedicated to collect data:



<https://cybertracker.org/>



Cyber Tracker



SMART



Earth Ranger



QGIS QField



ESRI



KoBo ToolBox



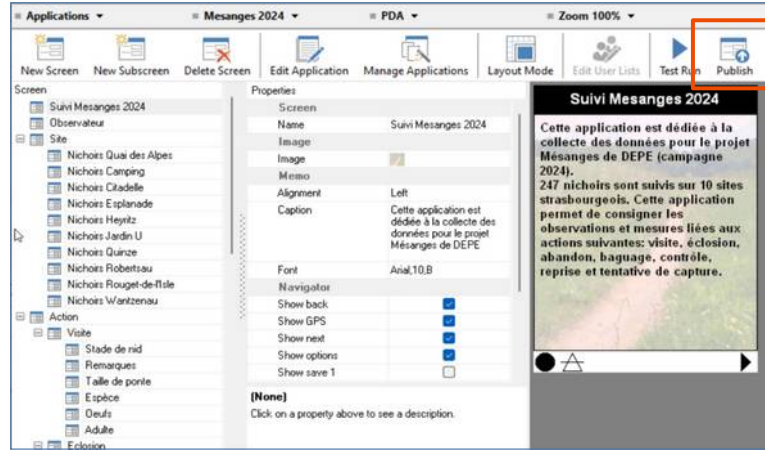
ODK

Data collection in the field with digital tools

1. Install CyberTracker from the App store



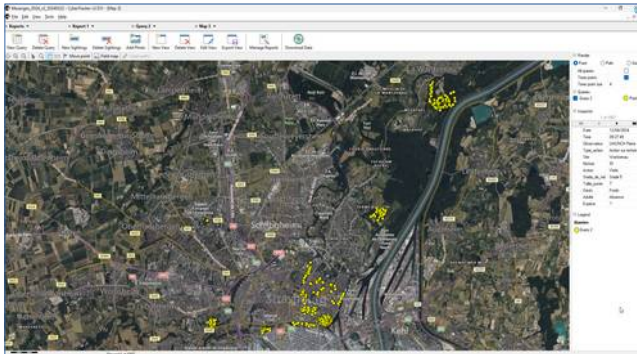
2. Design the different screens from the App



3. Flash the QR code with the mobile device



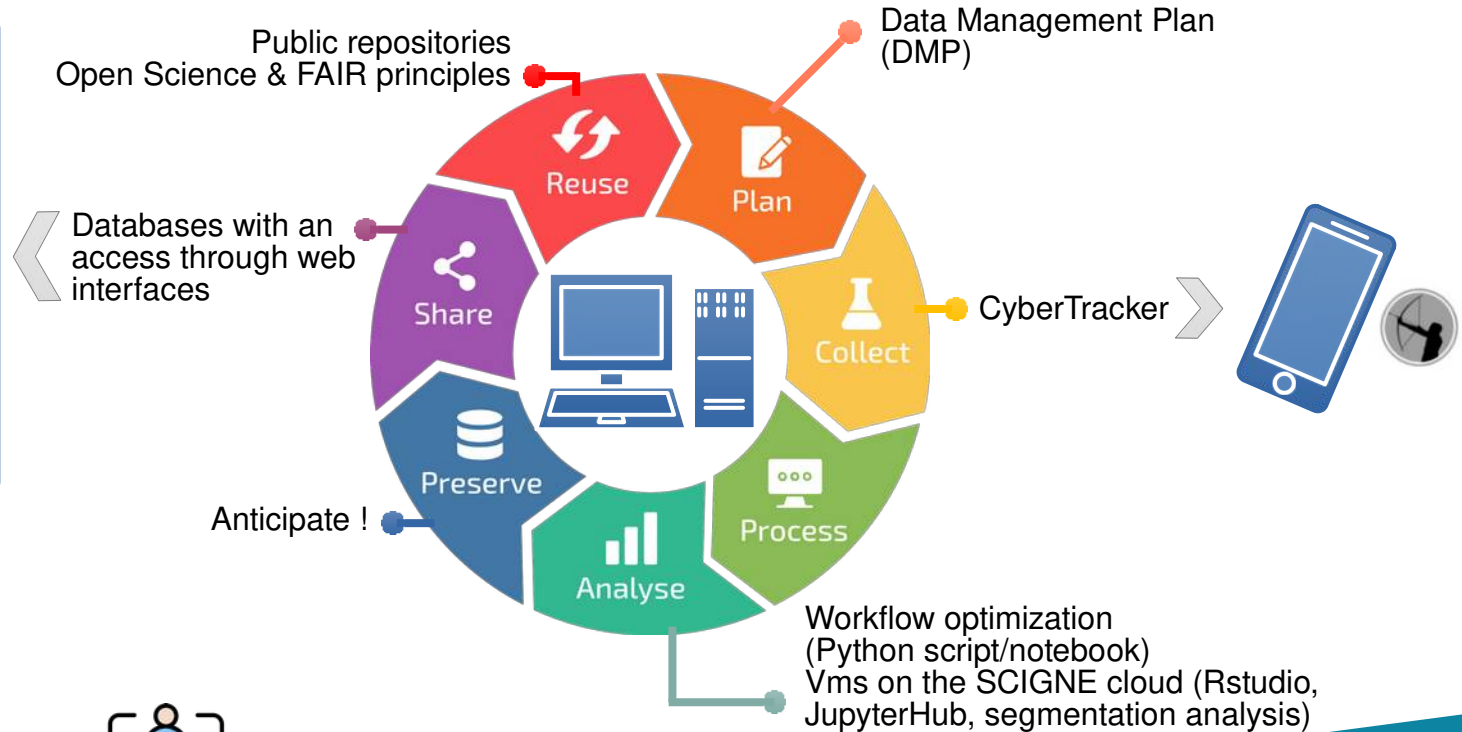
5. View the field observations in the MySQL database and use GPS coordinates to build maps



4. Collect your data in the field and send them to the database (here tits and hamsters)



To summarize ...



Acknowledgments :

All the DEPE beta-testers :-)

The great SCIGNE and IPHC-IT teams !

