

Smart Dairy Farming (SDF)



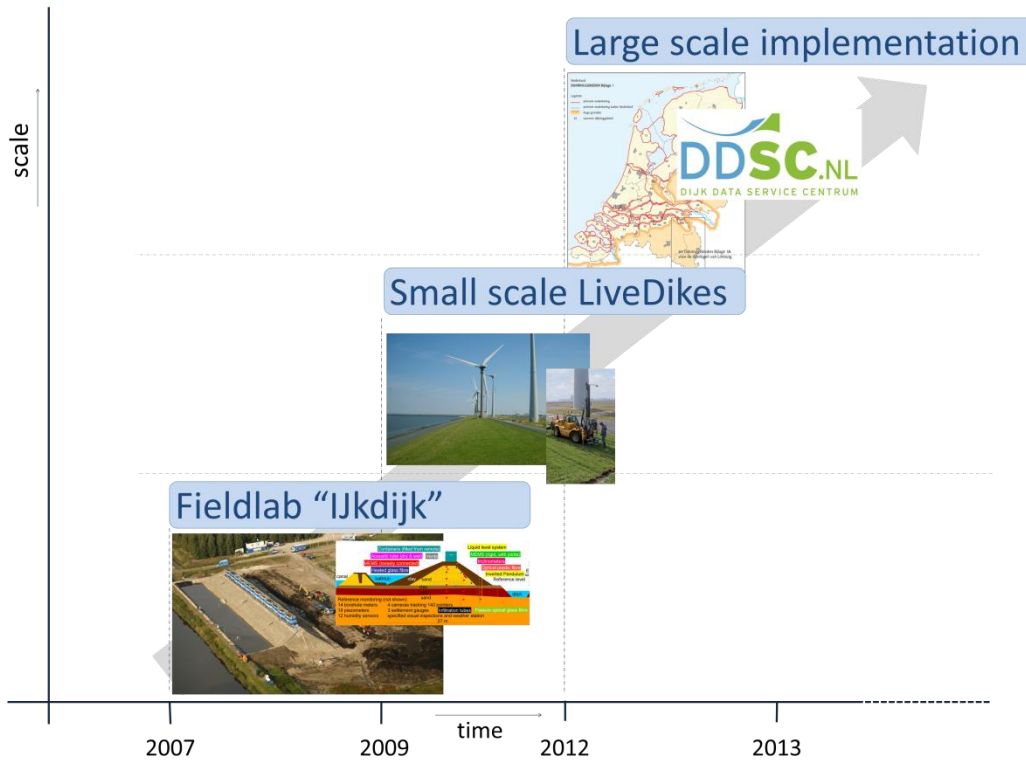
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Caroline van der Weerd (TNO)
Matthijs Vonder (TNO)

Smart Dairy Farming (SDF)

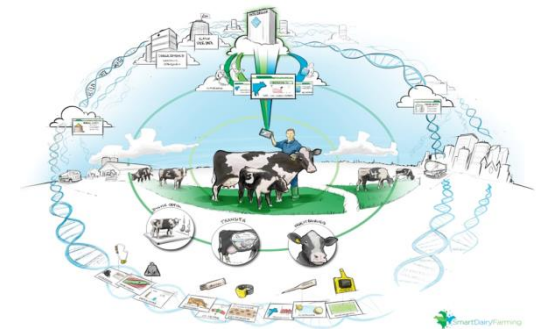
Contents

- › History: from dikes to cows (and more)
- › SDF: explanation
- › InfoBroker Concept
- › SDF in practice
- › Next steps

From dikes to cows (and more)



IJknet / STOOP



Smart Dairy Farming



SDF 1.0 (2011 – 2014)

› Collaboration project

- › 3 Cooperations
- › 7 SME's
- › 5 Research institutes
- › 7 Real farmers

› Timeline:

- › SDF1: 2011 – 2014
- › Northern part of the Netherlands
- › Website (in Dutch):
 - › <http://www.smartdairyfarming.nl/nl/>

› Goal of SDF:

- › to support dairy farmers in the care of **individual animals**.
- › with the specific goal of a **longer productive stay** at the farm due to **improvement of individual health**.

› Challenge:

- › make it possible for the whole sector
- › in SDF2 (2015-2017):
 - › more farmers: from 7 to 60 (and prepare for 2500)
 - › more sensor suppliers and more data consumers



Numbers for the Dutch situation:

- 15000+ farmers
- in total more than 1.5 million milk cows
- 20 to 200+ datafields per cow
- many different stakeholders in the chain

Chain integration

Other data sources

InfoBroker: Open platform for (sensor) data producers and consumers

Real time models (at different organisations)

Cow specific workinstruction (SOP)

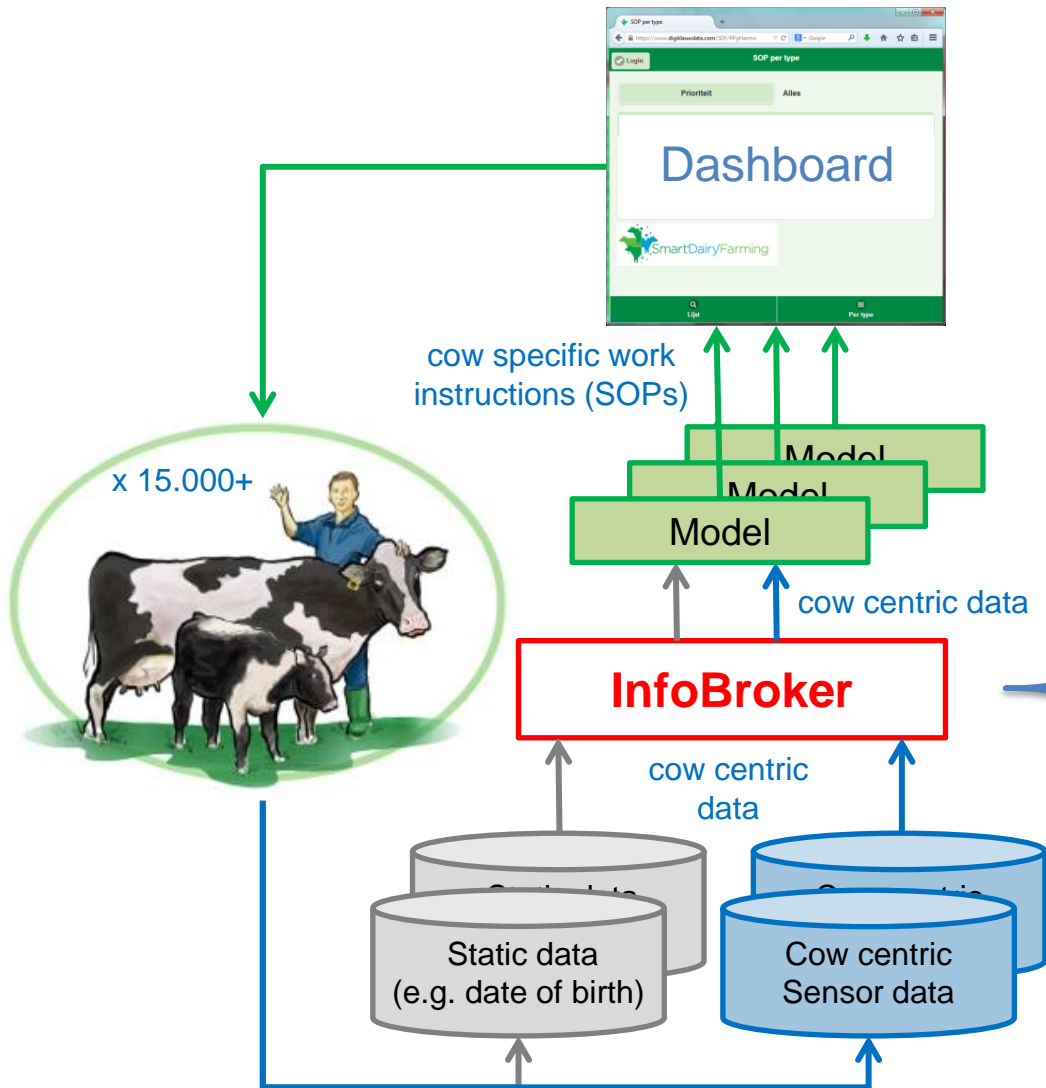
Starting point: Farmer in control "De boer aan het roer"

Starting point: Cow centric thinking

Sensors from different suppliers

Think big, start small

This project is made possible by:



InfoBroker functionalities:

- Open interfaces for data exchange (API)
- Authentication
 - who are you (are you allowed to login)
- Permissions
 - which data may be used by whom
 - to be set by the farmers
- Namingservice
 - location where the data can be found
 - static data
 - cow-centric sensor data
- Integration
 - combining info from different sources
- Pay-per-use
 - fixed costs (connections)
 - variable costs (used data)

So:

- no central datastore for (sensor)data!
- but indeed a broker
- and reduces/prevents duplication

SDF in practice

Farmer: Dairy Campus



Dashboard

Login

Gebuiikersnaar: CRD00289728

Wachtwoord:

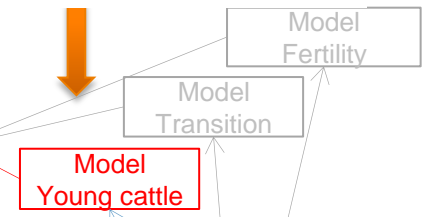
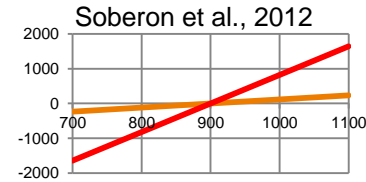
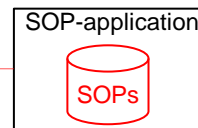
UBN: 289728

Log in

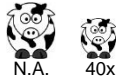


SOP-generation by models

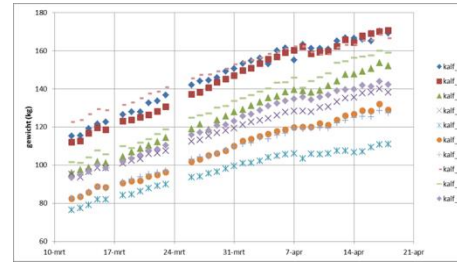
- Speenschema aanpassen
- Krachtvoer aanpassen
- Ruwvoer aanpassen
- Pink insemineren
- Kalf/pink behandelen
- Voeradvies inwinnen
- Selecteren voor afvoer



Datacollection on the farm

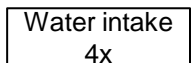
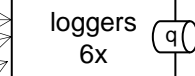
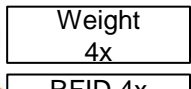
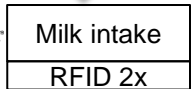


Sensor data logistics

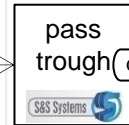


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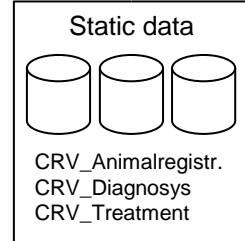
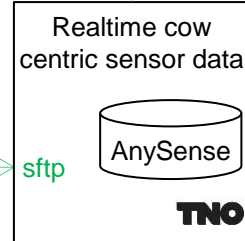


Forster.csv



milkintake.csv
weight.csv
waterintake.csv

RFID -> lifenr



Farmer: Da

SOP per type

Login

Prioriteit

- + Kalf behandelen
- Speenschema aanpassen
- 487, Theuntje
- Ga over op speenschema 6
- + Vruchtbaarheidsonderzoek

SmartDairyFarming

Lijst

Details

Terug

Toelichting: Dag 42: gewicht (50 kg; afwijking -15 kg) en groei (0.4 g/dag; afwijking 0.2 g/dag)

Melding: Speenschema aanpassen

Instructie: Ga over op speenschema 65 dagen

Diernr: 487

Naam: Theuntje

Werknr: 3411

Levensnr: NL 423534117

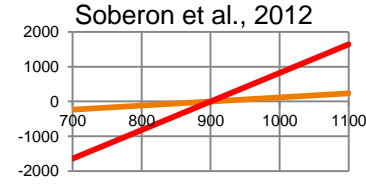
Prioriteit: 2

Databron: Stallijst CRV

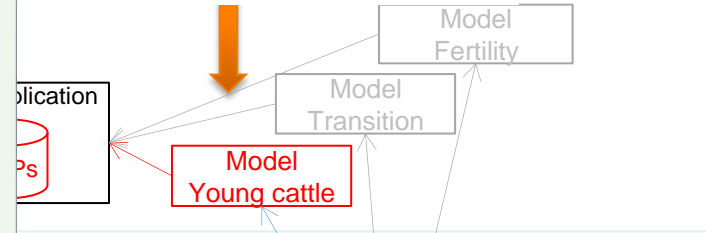
Geldig tot: 15-6; 13 uur

Status: Open

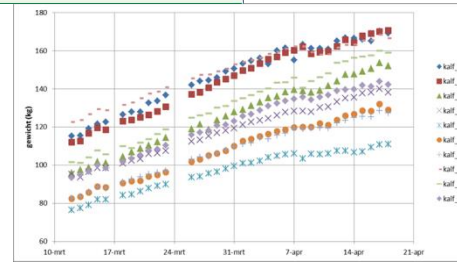
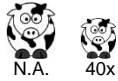
Dashboard



Models



Datacollection on the farm



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life_number, sensor, date_time, wcorr, wstable, wzero, wavg, wavgmin, wavgmax, werrors, wnousecount, wnosetime, wusetime
NL 916075572, dc_roostervloerhok1_weegschaal1, 2013-11-04 04:18:35 UTC, 129.0, 129.0, 0.0, 129.3, 30.8, 129.0, 0.0, 470, 18590
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```

InfoBroker



Milk intake
RFID 2x



Weight
4x



RFID 4x

Water intake
4x

Now a temporary route and storage in SDF2 project

- to make it possible with existing/new sensor systems

Direct coupling with InfoBroker in SDF2

- storage at the sensor system/provider
- and registration at the InfoBroker

Static data

CRV_Animalregistr.
CRV_Diagnosys
CRV_Treatment

Next steps a.o.

› **SDF 2.0: “From Proof of Concept to Proof of Practice”**

- › more farmers, more sensors
 - › from 7 to 60 farmers in SDF2 (and be ready for 2500 farmers in 2018)
- › additional InfoBroker functionalities (e.g. permissions, billing)
- › SDF 2.0 is 1 of the 10 Fieldlabs of Smart Industry
 - › the “Actieagenda” was presented to minister Kamp (11-11-2014)
 - › Actieagenda contains vision/lessons learned from SDF (p.44/45)
 - › see: <http://www.smartindustry.nl/wp-content/uploads/2014/11/Smart-Industry-actieagenda-LR.pdf>

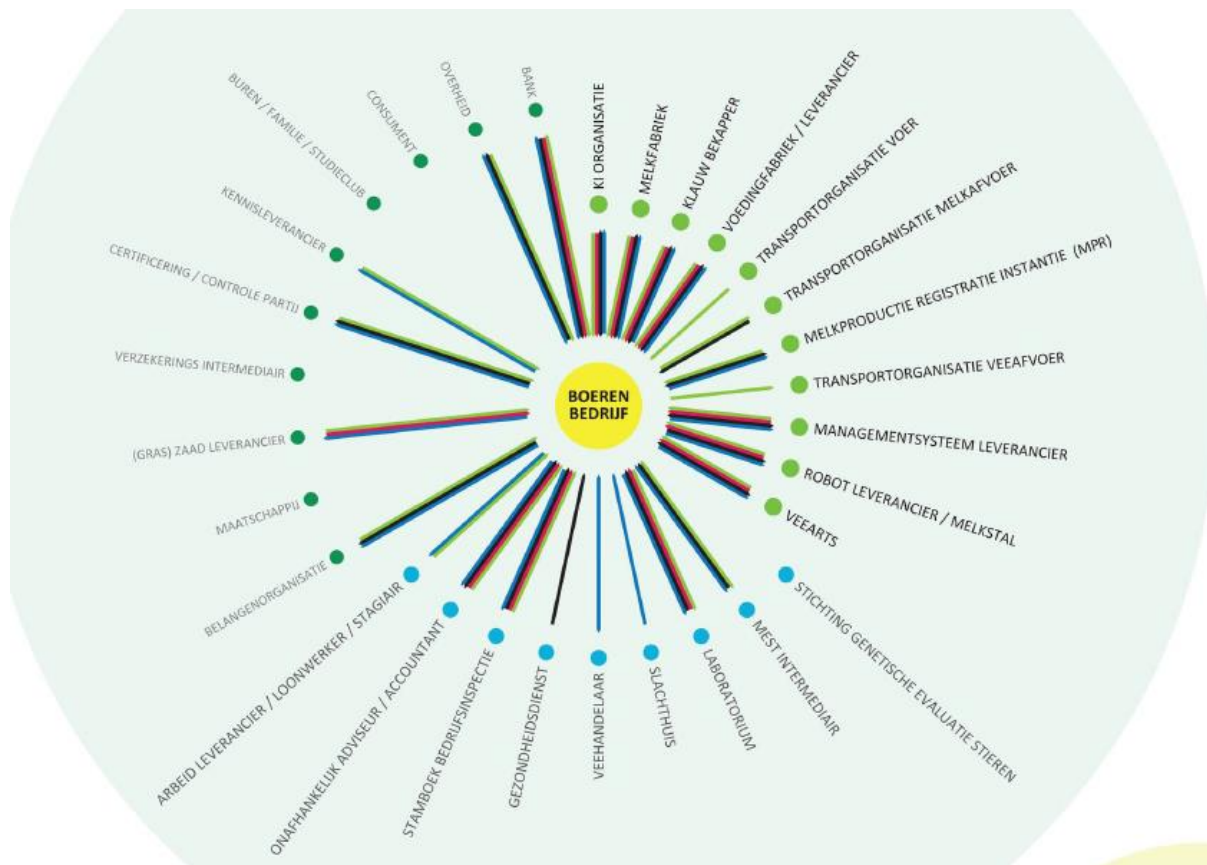
› **TNO is strategic partner in SDF 2.0**

- › Work Package leader “Chain integration”
- › Development of new knowledge:
 - › **IT-perspective**
 - › Data Driven Analysis
 - › Semantic interoperability of sensordata (e.g. Linked Data)
 - › Quality Aware Sensor data Processing
 - › **Economical-perspective**
 - › Value propositions
 - › Distribution of costs and revenues
 - › **Organizational-perspective**
 - › Connection system and behavior
 - › Open innovation and upscaling



Organizational Perspective 1/2

Who is involved: a value network analysis



Organizational Perspective 2/2

Who are we designing for: Persona's

› I would like you to meet:



Douwe
Dairy farmer
Manager, actively involved, not more data but better data, practical, save time



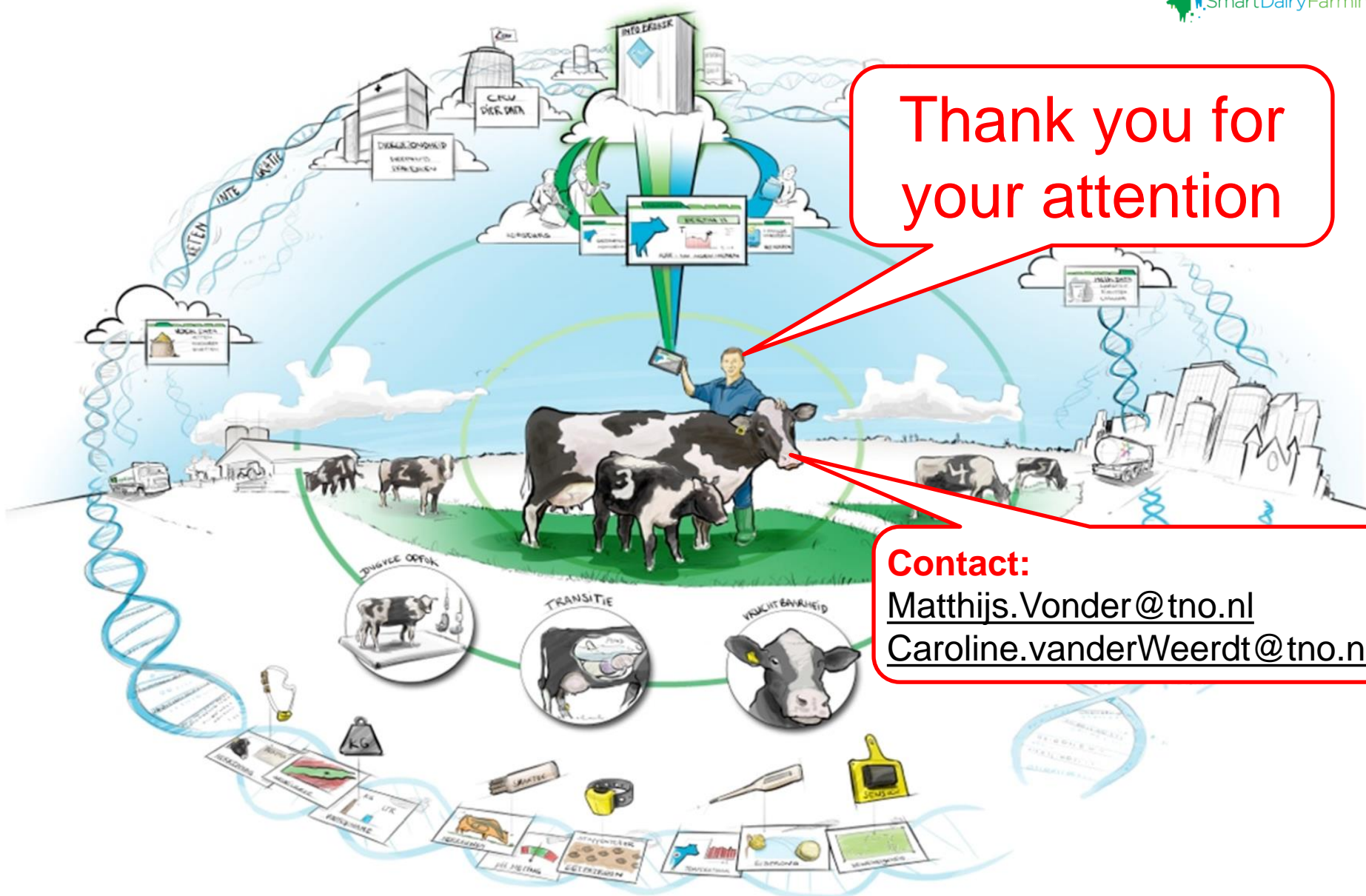
Jan-Willem
Accountmanager
Tactical advice, benchmarks, deliver goods and services, commercial goal



Bob
Developer
Maintenance and support tooling, on demand updates



Paulien
R&D / scientist
Integrate data, statistical analyses and validation, flexibility



Thank you for your attention

Contact:
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Caroline.vanderWeerd@tno.nl

This project is made possible by:

Examples for using the InfoBroker:

