Using design thinking and data science to create business value

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OMNIA.find

A comprehensive set of ML and UX processes to allow us to maximise returns from our global onshore exploration.

Target 2019: recommend high value investments in Canada.

OMNIA.safe

Natural Language Understanding processes that «understand» the content of activities and match them to incident reports. Generate risk mitigation recommendations.

Target 2019: Optimises activities for efficient and safer operations.

OMNIA.prevent

DL uses data from thounsands of sensor of sensors and detects breakdowns or degradation in performance. Alerts engineers who intervene early.

Targets 2019: automatically monitor 10s of thousands of machines, wells, turbines and processes.

OMNIA.optimise

Supports production management of 1200 wells in US onshore.

Target 2019: robot production engineer. PoC autonomous turbines and one topside process.

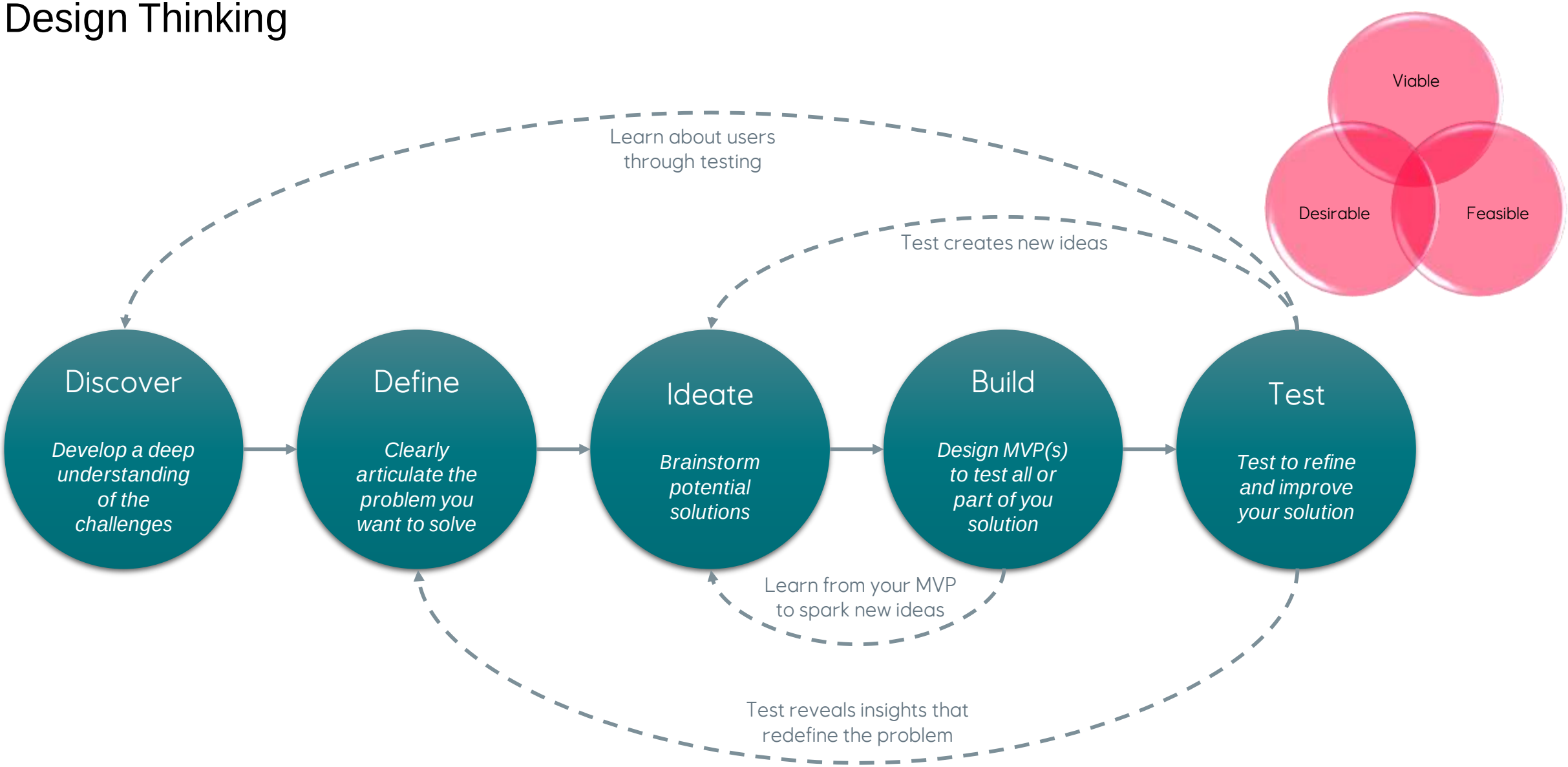
Human Centred Design

We are building a design capability to deliver human centred ML. Design thinking is a methodology that enables us to identify value propositions and deliver them in a user friendly way.

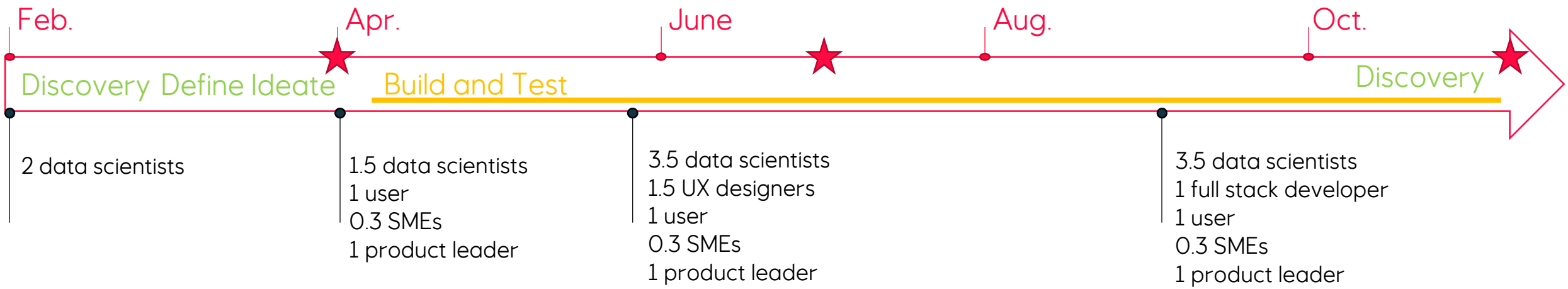
Omnia.aurora

Scale and platform work can only be delivered with the right technology. We are building a cutting edge technology platform that allows a Googlesque scale.

Design Thinking



The Team: Diversity!



We look to create value through a human-centered approach: people/users first, positive attitude

We are self-organized team with distributed leadership

We prefer **action** over documentation: we move fast, start delivering and learn as we progress.

We promote transparency and collaboration to allow co-creation with the business

Nobody less than 60% & available at the same time

Discovery

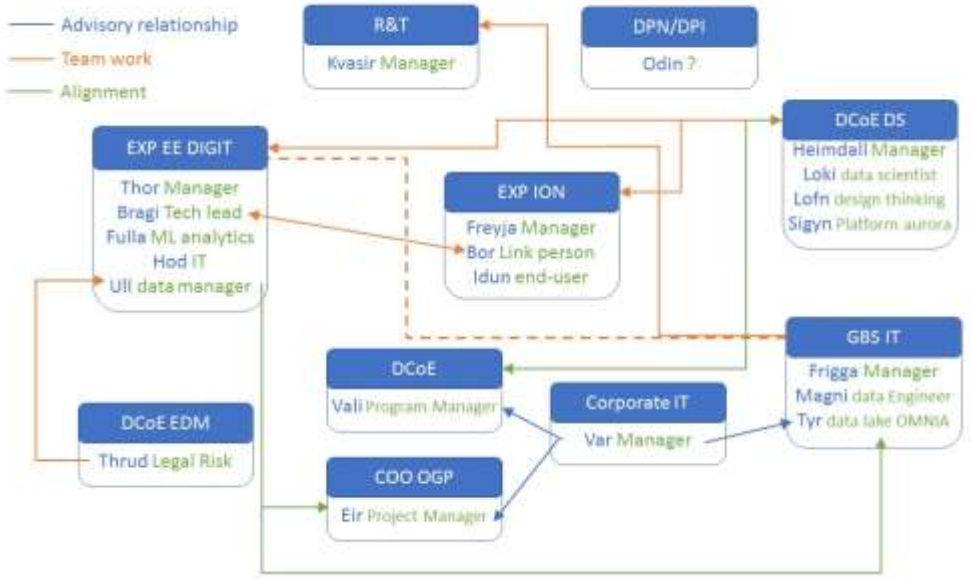
This involves consulting experts to find out more about the area of concern through observing, engaging and empathizing with people to understand their experiences and motivations, as well as immersing yourself in the physical environment so you can gain a deeper personal understanding of the issues involved.

Opening workshop and stakeholder map

First discovery workshop:

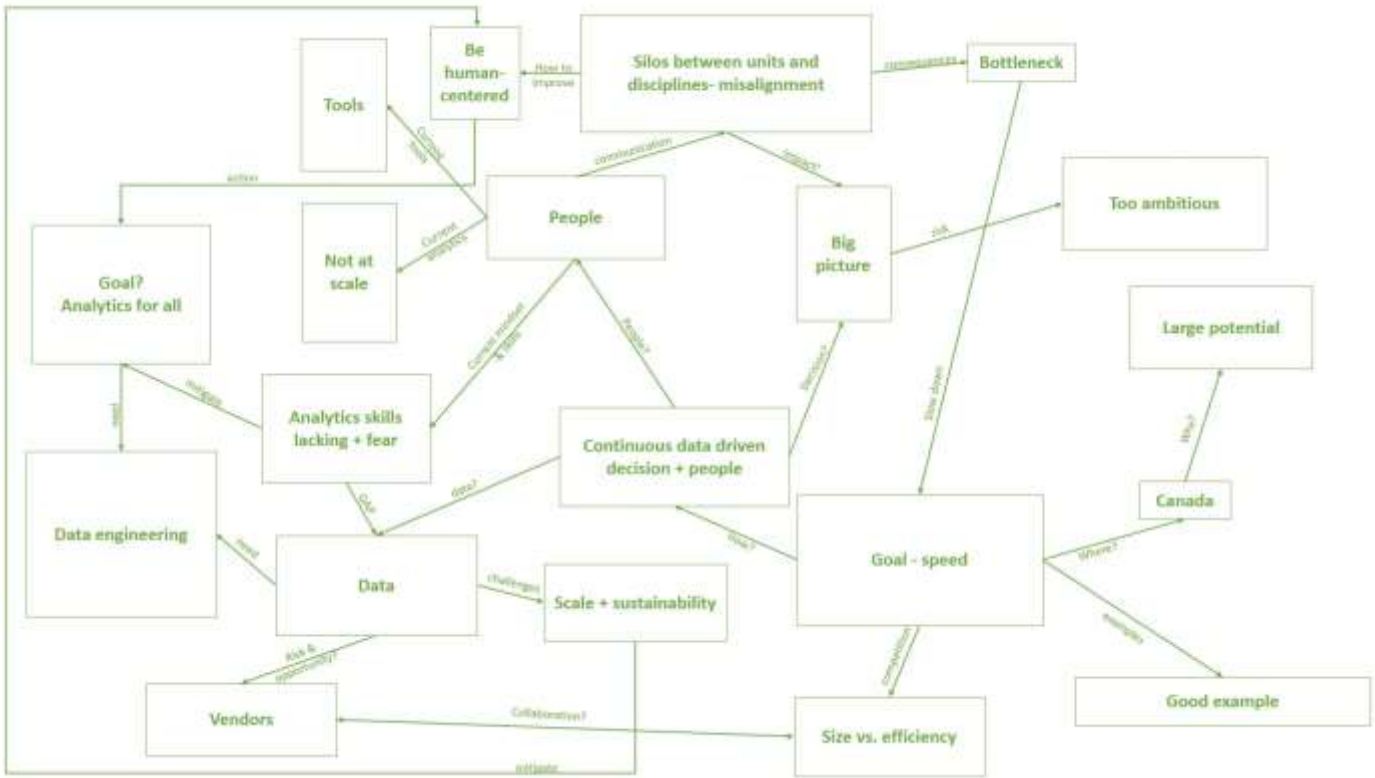
1. introduction of the business case,
2. group work on our understandings of the context, the challenges and the goals.

- ➢ align on project aspirations
- ➢ distill and describe the opportunities.



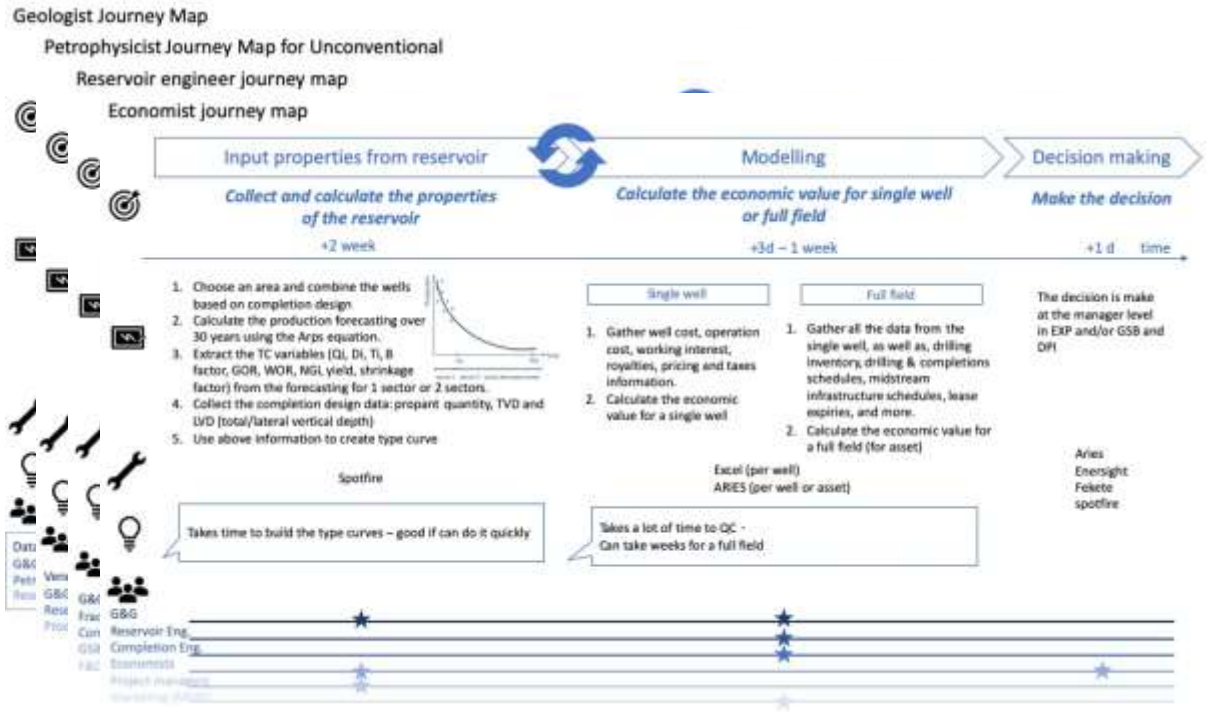
Stakeholder interviews

Who are you? Can you tell us more about you? Your role? Background?



More paper!

Journey map and data discovery



Which data do we need? Where are the data? Which format?

- DB = files
- Different .ext – some proprietary
- Different formats for a same extension
- "intentional" errors
- Not able to track changes
- Mixed of several vendors/contracts → legal mess

Define

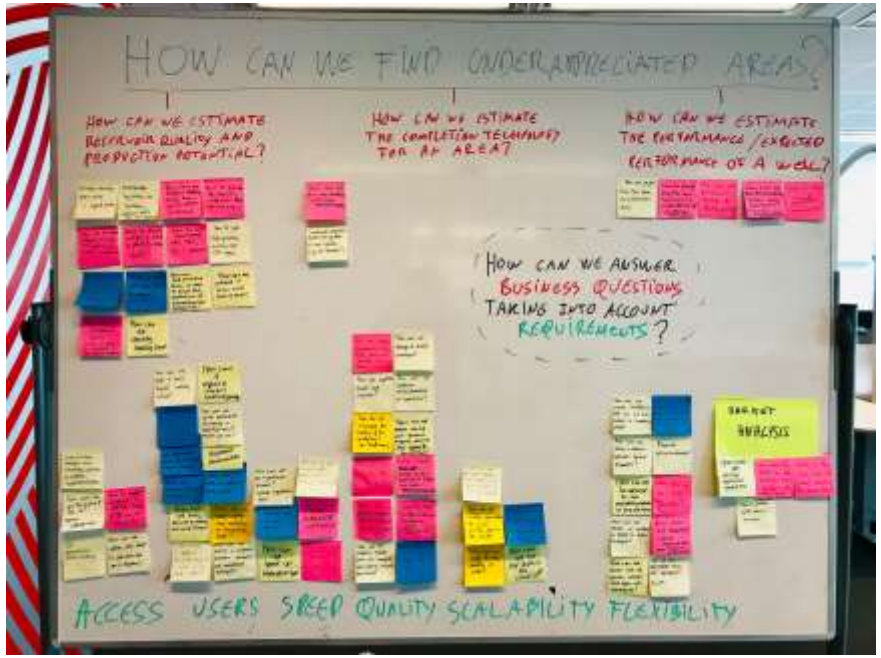
You put together the information you have created and gathered during the Discovery stage. This is where you will analyze your observations and synthesize them in order to define the core problems that you and your team have identified up to this point. You should seek to define the problem as a problem statement in a human-centred manner.

Point of view

How might we?

"***How***" suggests that we do not yet have the answer.
"***Might***" emphasises that our responses may only be possible solutions, not the only solution.
"***We***" immediately brings in the element of a collaborative effort.

Need to be user and business oriented!



The post-it best practices

Ideate

Start to "think outside the box" to identify new solutions to the problem statement you've created. There are hundreds of Ideation techniques. It is important to get as many ideas or problem solutions as possible at the beginning of the Ideation phase.

Ideation sessions

Obstacles to problem solving:

- Groupthink
- Beliefs
- Man with a hammer syndrome
- Location

Methodes
…to Spark Innovative Ideas

- Brainstorm
- Braindump
- Brainwrite
- Brainwalk
- SCAMPER
- Worst Possible Idea
- Mindmap
- Sketch or Sketchstorm
- Storyboard
- Analogies
- Provocation
- Challenge Assumptions
- …

…to Select Ideas

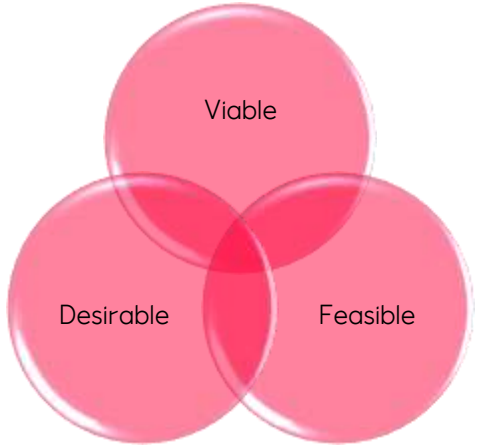
- Post-it Voting or Dot Voting.
- Four Categories Method
- Bingo Selection
- Idea Affinity Maps
- Now Wow How Matrix
- Six Thinking Hats
- …

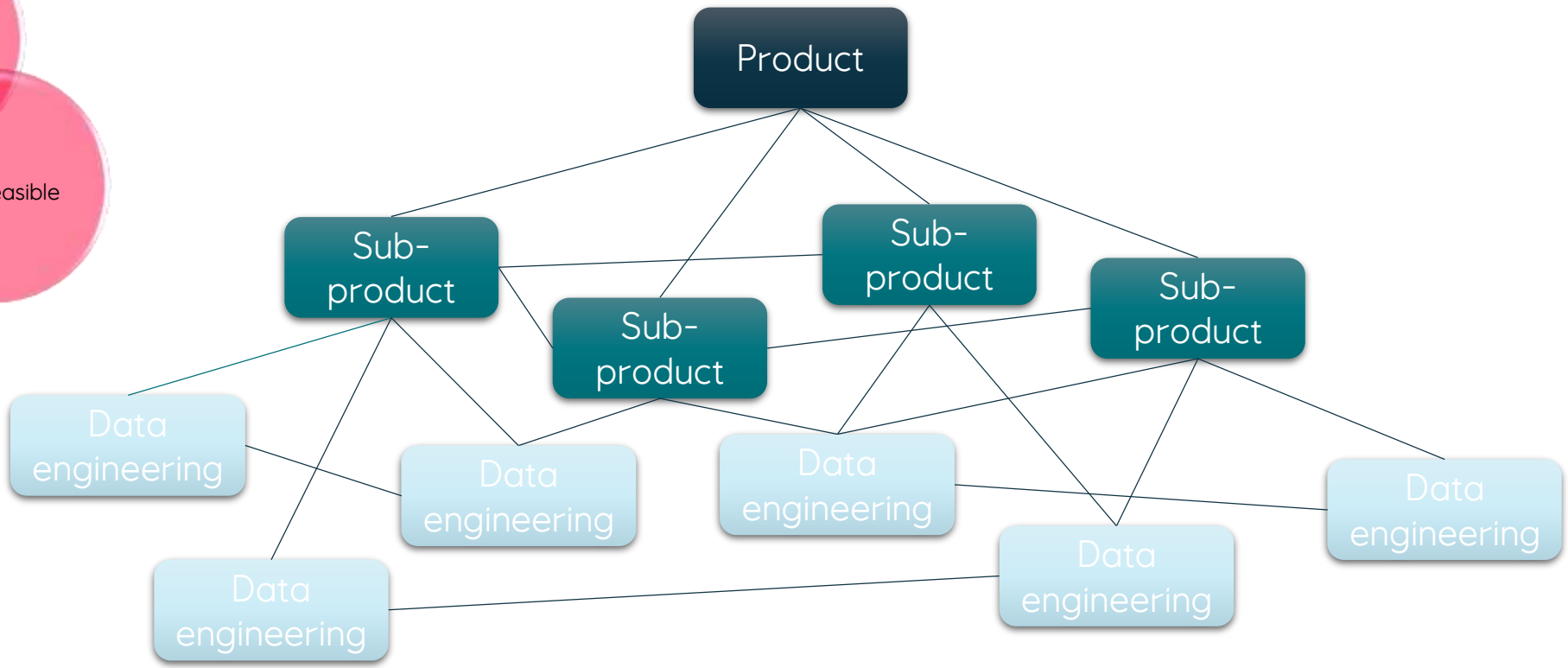
Good balance between introvert vs. extravert methods

First quantity then quality

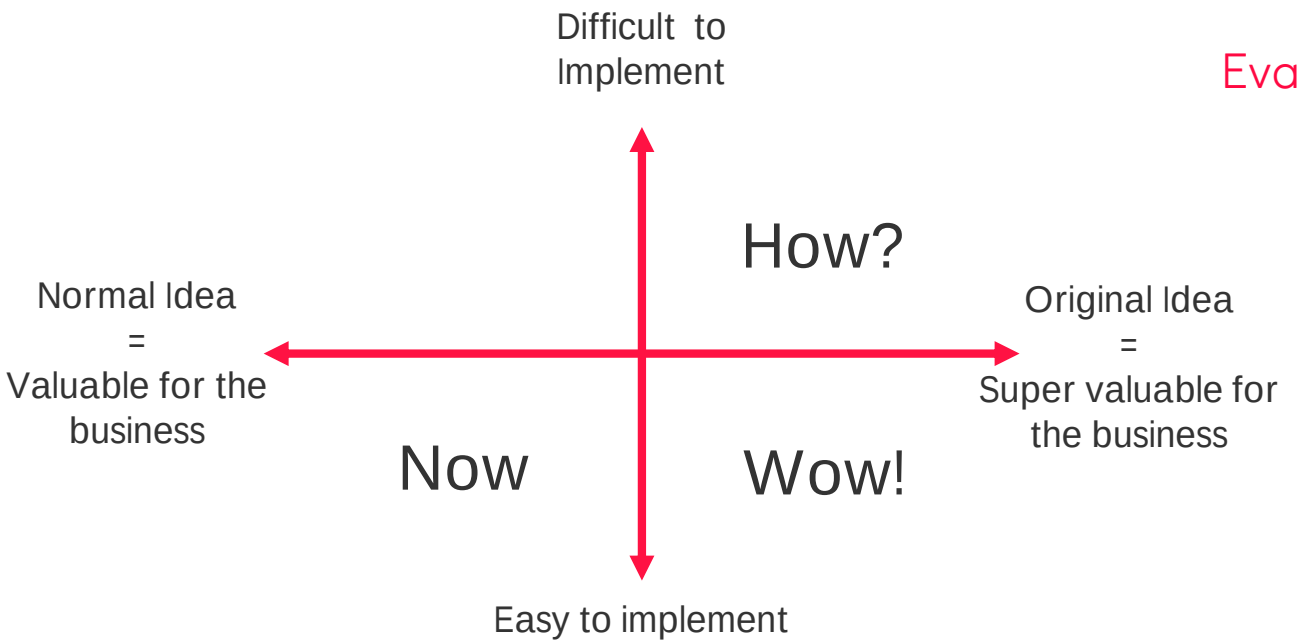
From ideas to Product vision:

→ find how your ideas are related to each others



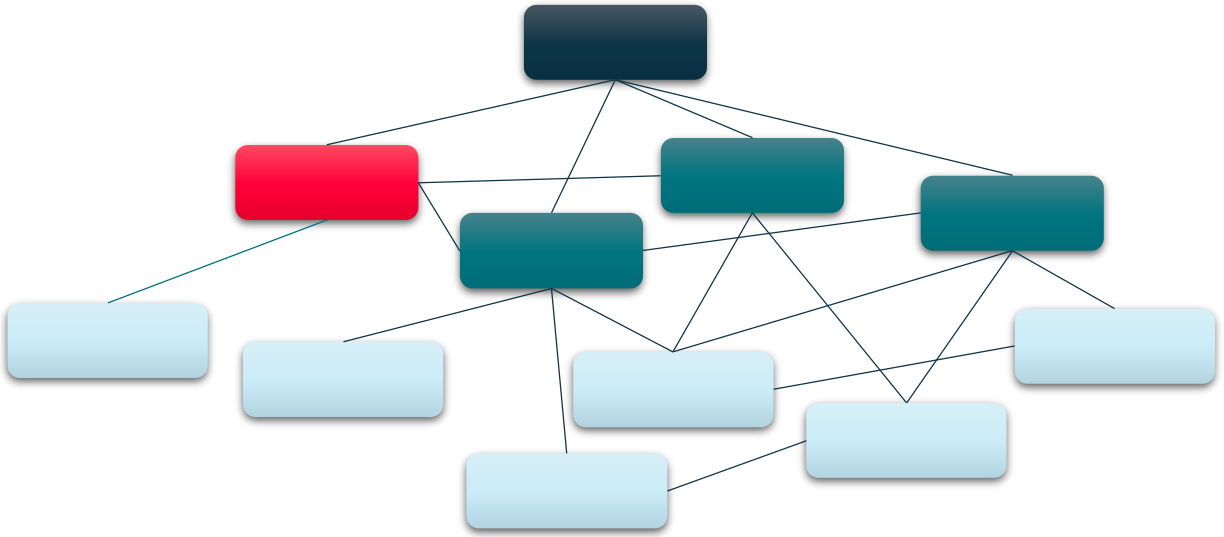


Where to start?



Evaluate the value for the business is too difficult…

…start with the cleanest data!



Start small means less data

Build & Test

You will now produce a number of inexpensive, scaled down versions of the product or specific features found within the product, so they can investigate the problem solutions generated in the previous stage.

You rigorously test the complete product using the best solutions identified during the prototyping phase.

MVP #1 – end of June

1. Build the team and find our way of working. Developers, data scientists and designers do not have the same needs and the same pace.
2. Start build the product:
   - ❖ Data Science: access the data, EDA, cleaning, modelling and evaluation
   - ❖ Design: wireframes, sharpen users needs

MVP in Spotfire (on-premise):

- ➢ Test some functionalities of the design
- ➢ Allow the users to QC our results
- ➢ No training needed

Starting to build does not mean that the organization is ready

Parallel work with parsimony

The whole team needs to have a minimum level in math

MVP #2 – November

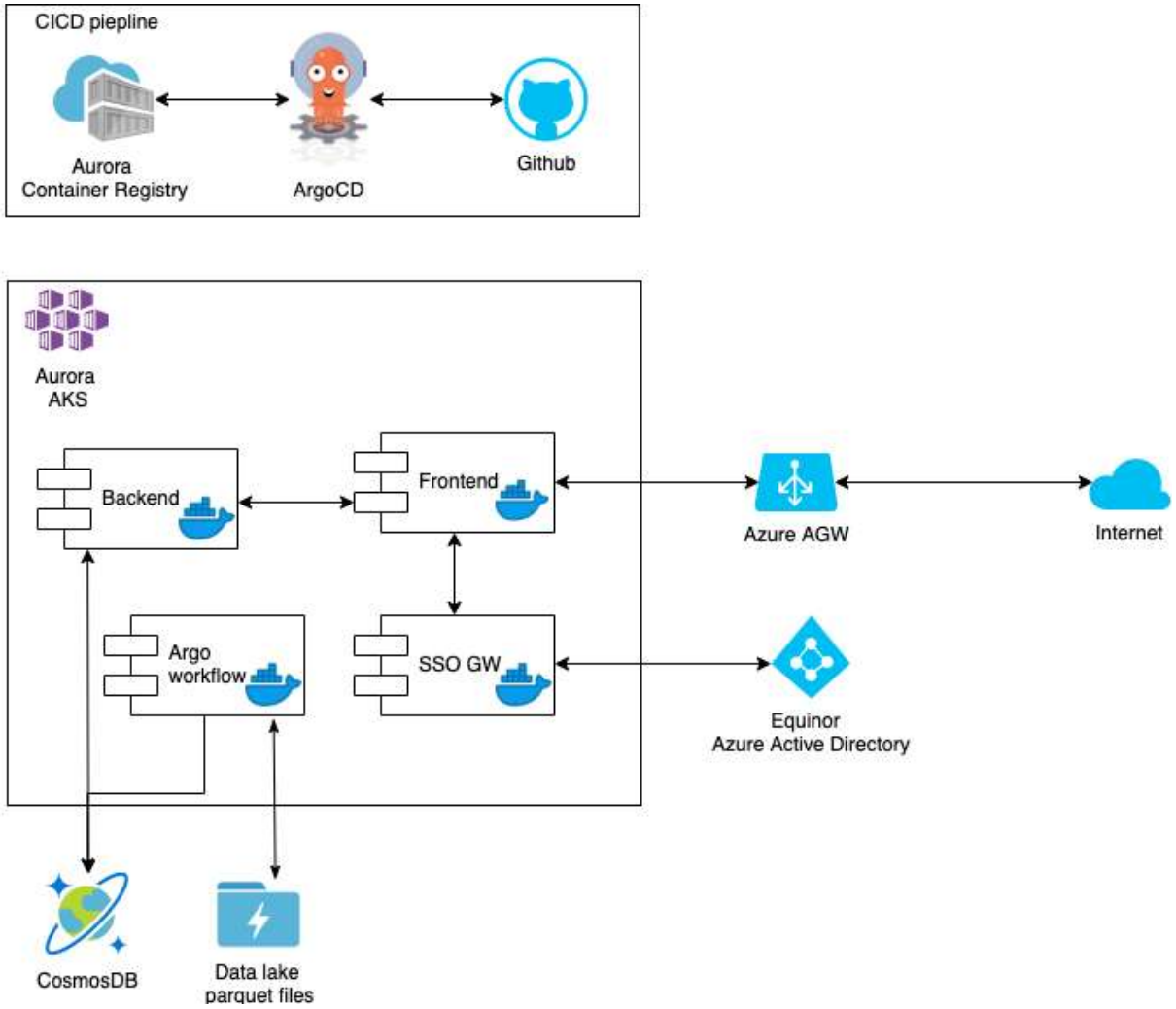
MVP in a web-app

- Test all functionalities of the design
- Allow the users to QC our results
- 3 ML models

Front-end

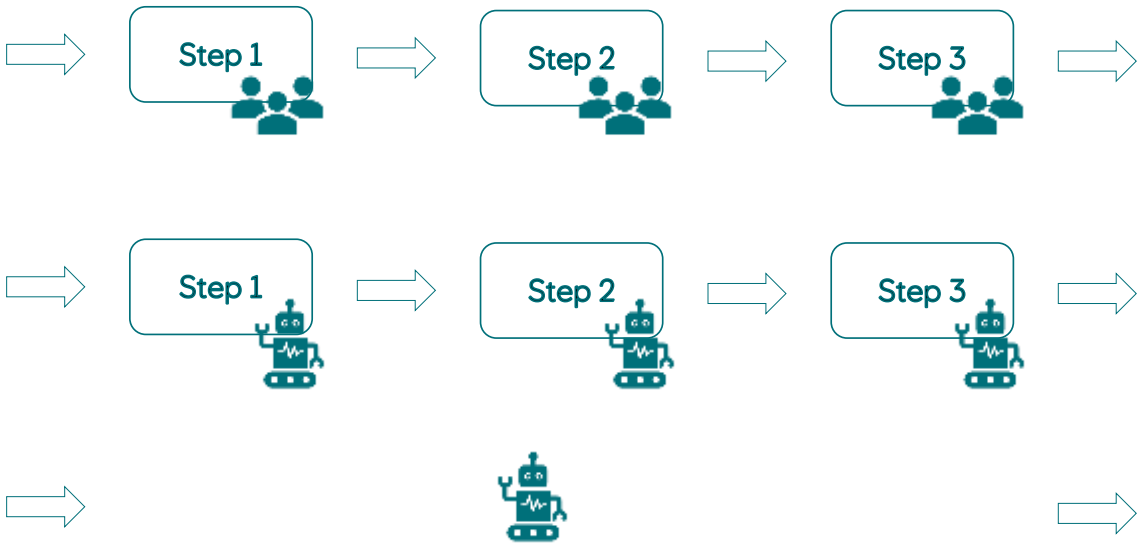
Machine Learning

Back-end



Before going into production – QC

Black box



How to propagate all the uncertainties?

How to explain our results?

How to put a risk on our results?

Manage the lifecycle of our model training & deployment workflows

How to version data sets? the schema and origin of the data can change (data and model versioning is very different than code versioning)

How do we track changes that affets the legal part?

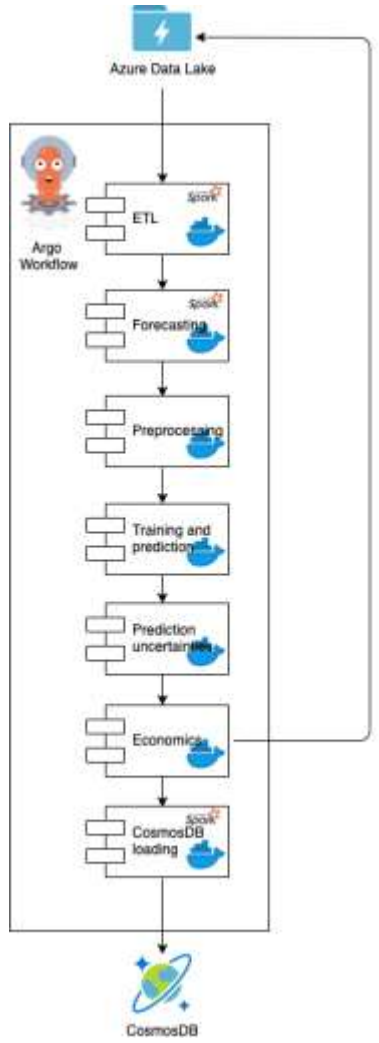
How do we reuse model? models must be tuned based on input data, scenario, etc

How to retrain a model and make sure it remains good for production?

2009: first conference named DevOpsDays

2014: the word DataOps is introduced for the first time

2015: need for MLOps https://papers.nips.cc/paper/5656-hidden-technical-debt-in-machine-learning-systems.pdf



Discovery phase #2: Extracting Value on Current Investment

We have put in the effort.

We have completed the hard part.

Now we want to learn: Will our tool deliver?

We have discussed a lot of options

- Add new features
- Add new users
- Improve an existing feature
- ....
- End

Communication

- With the users
  - Daily with the user in the micro team,
  - weekly with the users in the macro team
  - and one day after each workshop to get the feedback
- Between the micro and the macro team
  - …still in discussion
  - Weekly status meeting
- To the validation board → monthly newsletter + Demos + validation board
- To the company → monthly newsletter published on Slack, Yammer and Teams

Feedback is Your Way to Learn and Improve

Thank you!

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