

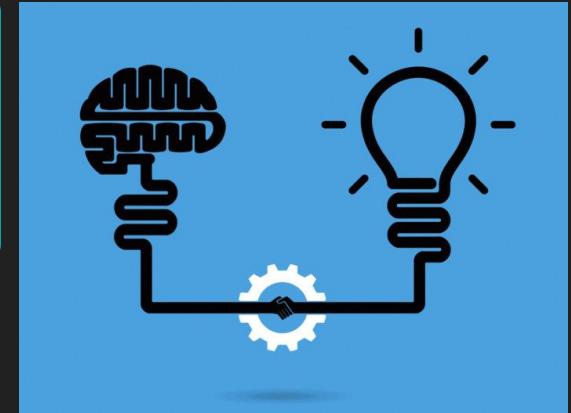
# Three real world uses cases of AI operationalization to illustrate AI DevOps challenge

*DevOps at Models Workskop Series, September 1 2021*

Eric Charton, Ph.D. October 11 2021

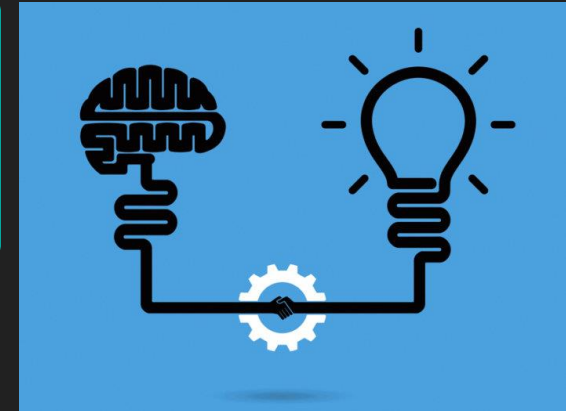
# What I do

- Short bio:
- Computer scientist, former academic,
  - Build labs in organizations to deploy innovative technologies.
  - Hire highly skilled scientists to create products and solve problems
  - Try to bridge the gap between business and technology to deploy all this in prod ...



# What I do

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Change management is a collaboration and cultural problem, not a technological issue.





- *In commerce, **time to market (TTM)** is the length of time it takes from a product being conceived until its being available for sale [WP]*
- *A common assumption is that TTM matters most for first-of-a-kind products, but actually a late product launch in any industry can negatively impact revenues—from reducing the window of opportunity to generate revenues to causing the product to become obsolete faster [WP]*
- ***In modern economy TTM is not only a business concern: it is also a development issue.***

# Time to market is key

*Performances is another one*

# *Three real world uses cases of AI operationalization*

1. State Of the Art search engine
2. Open Source Dialog platform
3. Machine Learning Risk modeling system

# A state of the art search engine

Case 1

A decorative footer at the bottom of the slide, consisting of a teal-colored area with a diagonal line pattern. A small, solid teal triangle points upwards from the center of this footer towards the text 'Case 1'.





# Let's brake the status-quo

When everybody is in trenches



# Case 1 : A state of the art search engine

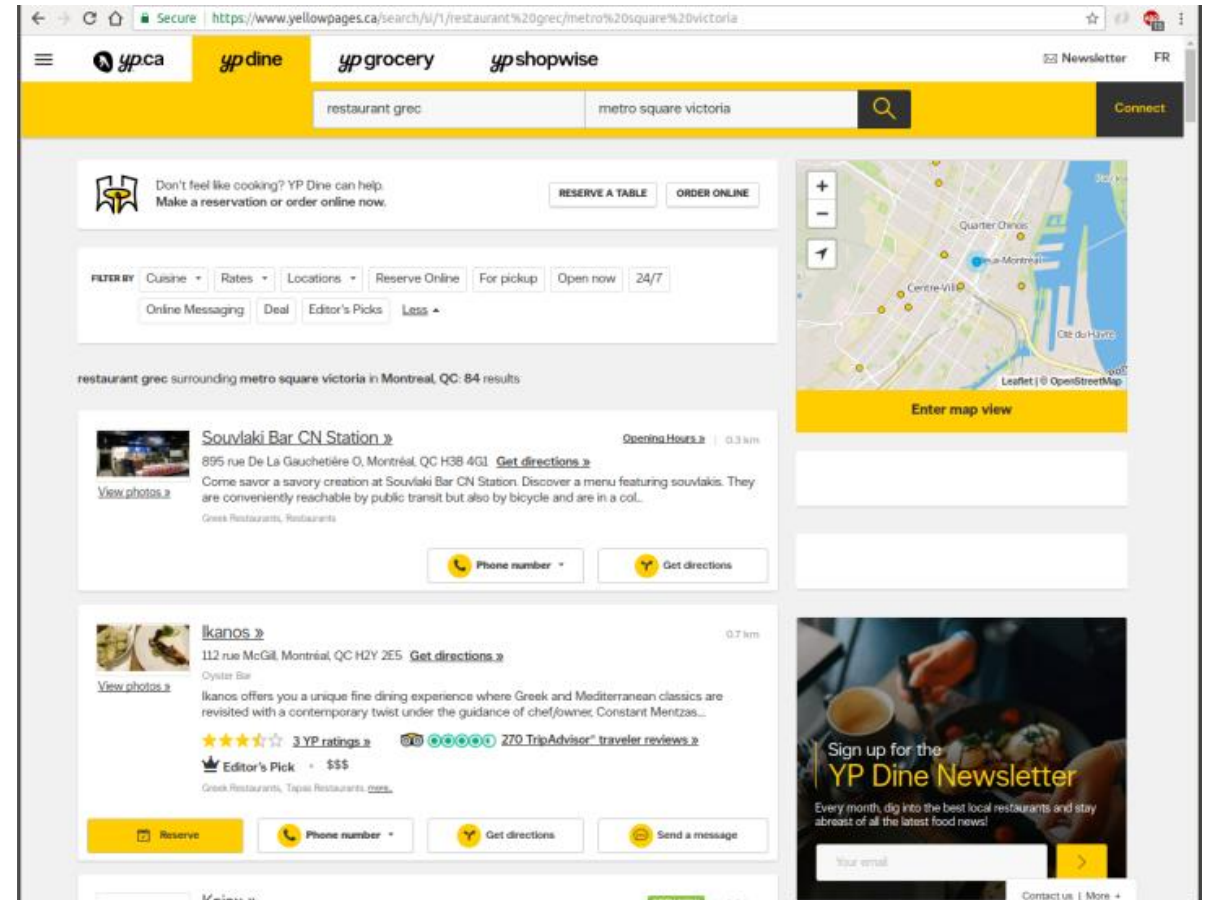
## ○ Characteristics

- New technology from scratch (SoIR)
- Full DeVops practices
- Git / Java / Spring
- Agile Dev Teams
- 2 Linux Data center
- 2 weeks iterations & scrums

## ○ Needs

- Make it work ...
- Relevance not measured
- Performances unknown
- Bad blood between IT and Business

Everything goes smooth, deployment are clean, every two weeks, scalability is perfect (600 M queries a year), uptime is industry standard (over 99.99%) ... **but big quality issues**



# Case 1 : A state of the art search engine

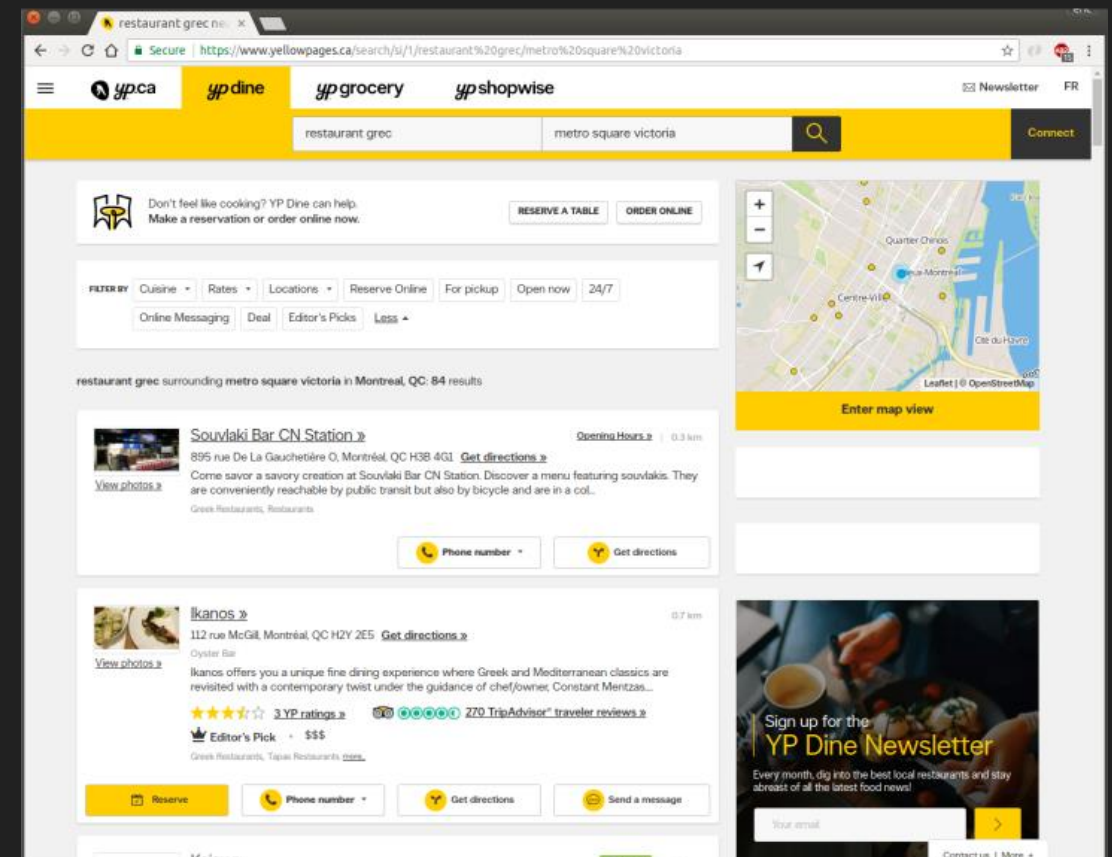
Solving the quality problem

- **Two teams – Two product owners**

- 1 R&D Team
  - With computer scientists and linguists
- 1 Development Team
  - With architect
- 1 scrum master for the 2 teams

- Needs

- Make it work ...



# Case 1 : A state of the art search engine

## ○ Issues

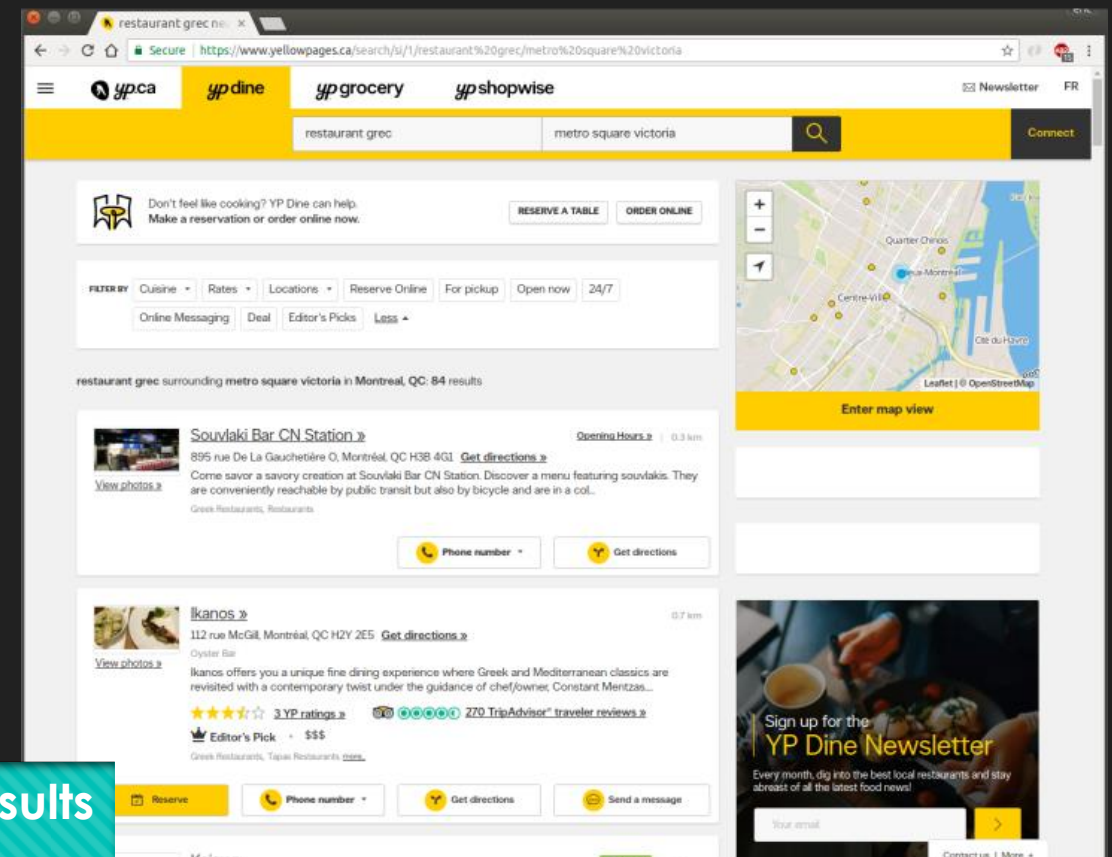
### ○ R&D Team

- improve code with relevant science
- build metrics
- team suggest modifications

### ○ Roadblocks

- Dev teams refuse R&D code
- Architect make design that do not fit with current technology (example: index in memory)
- PO do not prioritize and trust R&D improvements
- QA do not understand concept of IR metrics

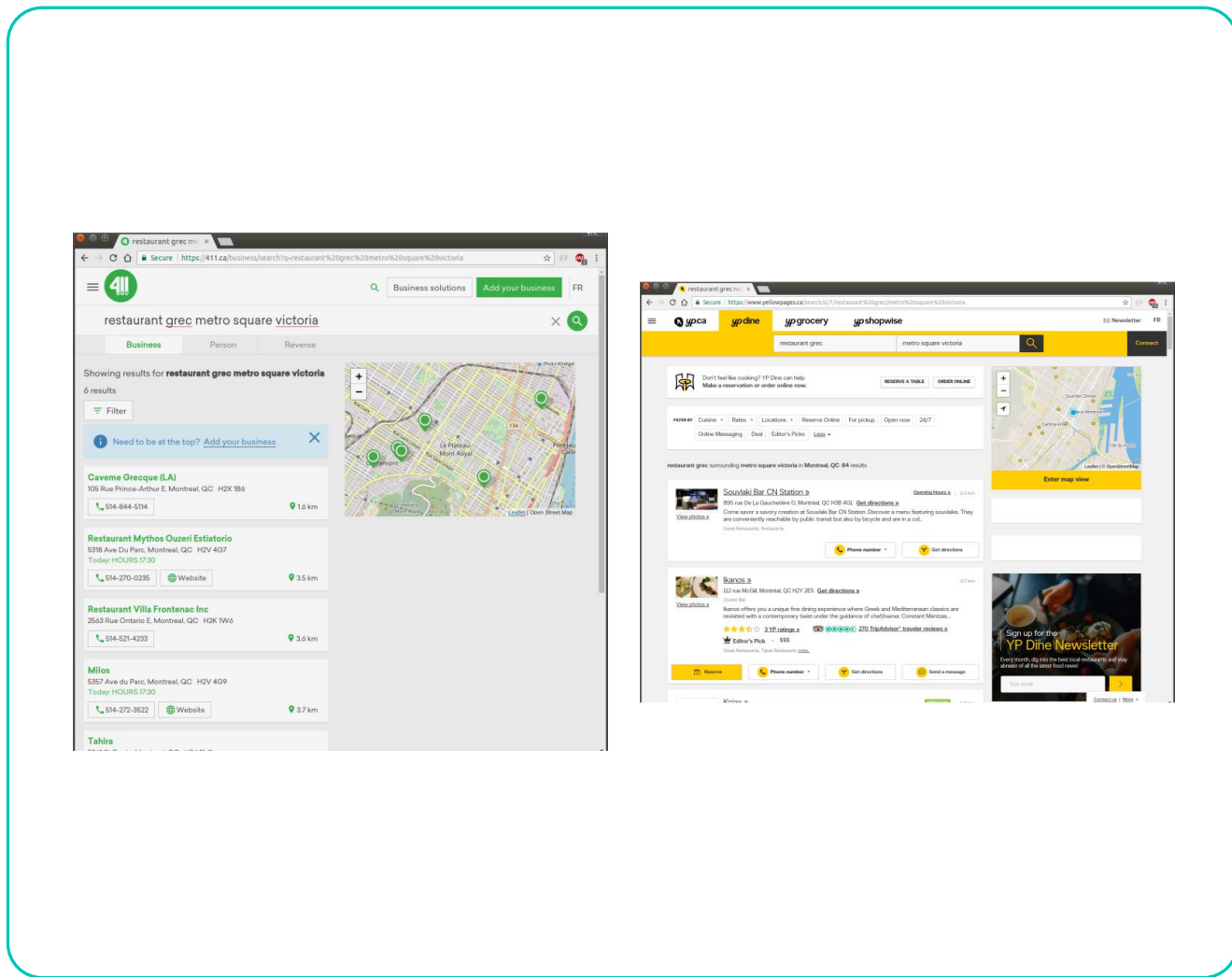
**Consequences: client complaints about poor quality of results**  
– Time to market of 1 year (instead of 3 weeks sprints) –  
backlog of technologies that do not goes in prod



# Case 1 : A state of the art search engine

- Deployment of new technology do not come but this is not a dev issue
- Solutions :
  - Change report structure Dev & RD Teams (digital marketing)
  - One Senior PO instead of two for R&D and Dev Team
  - Infra stay in IT but architecture move
- Time to market reduced to 2 weeks for code update and 24h for data upgrade
- From 1 innovation in prod every 6 to 12 months to 3 to 6 every sprint

DevOps is 30% of the solution (30% is R&D, 30% is data and 10% business)



After organisational transformation search become an internal product with a F-Score of 0.8 (Google at 0.9, Yelp at 0.65). Product is generalized company wide (including in subsidiaries)

# ***Deploying successfully and multiple times an open source dialog platform in a bank***

Case 2





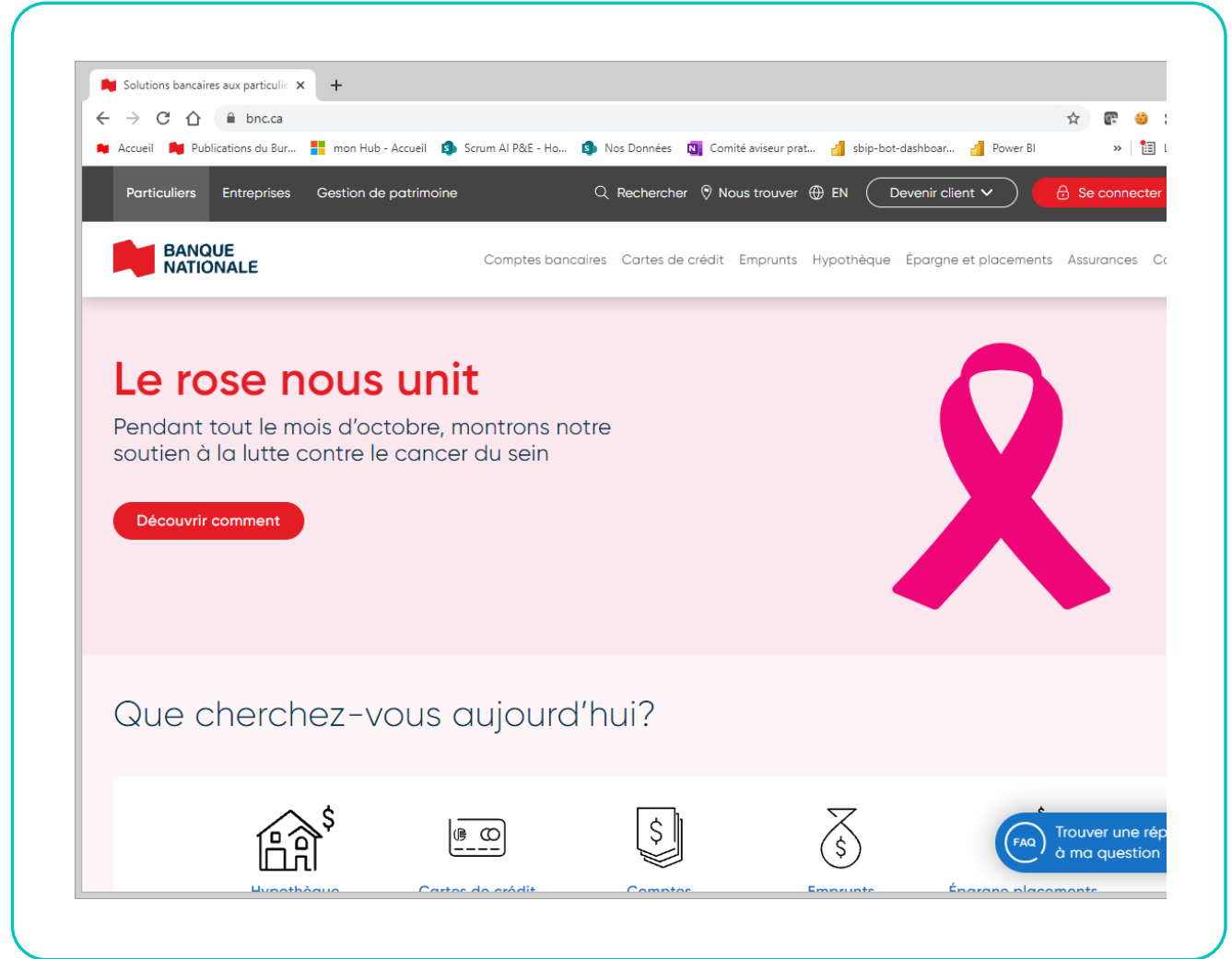


# Going from scratch

○ Build the good structure from start

## Case 2 : *deploying successfully and multiple time an open source dialog platform in a bank*

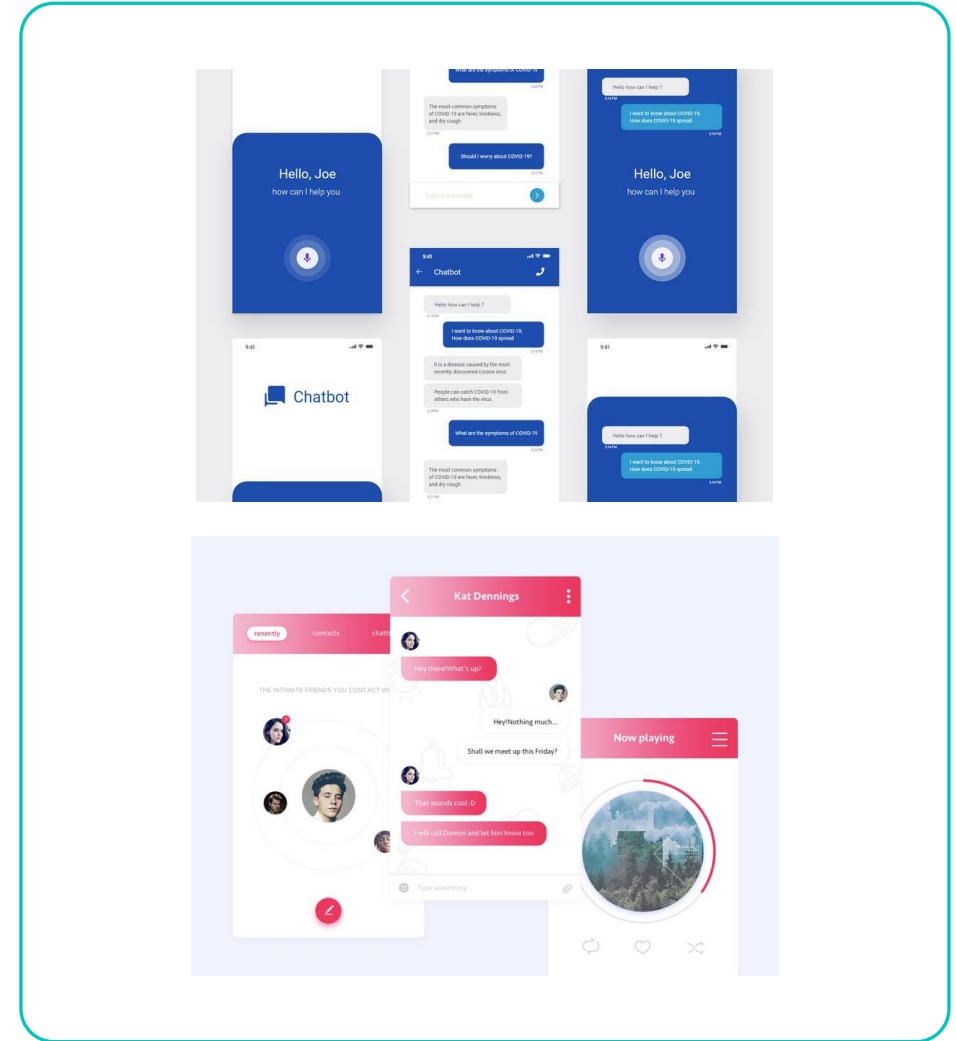
- A banking organization
- Need to deploy technology to minimize pression on call centers
- Solution : dialog systems



**Case 2** : *deploying successfully and multiple time an open source dialog platform in a bank*

## Environment

- Multiple technologies
  - 9 projects, 9 vendors
- Strict roles separation (Business vs IT)
- lack of internal knowledge of dialog system
- Poor quality, high price
  - Example
    - chat with nobody to answer
    - FB bot with no upgrades in months and no data collection

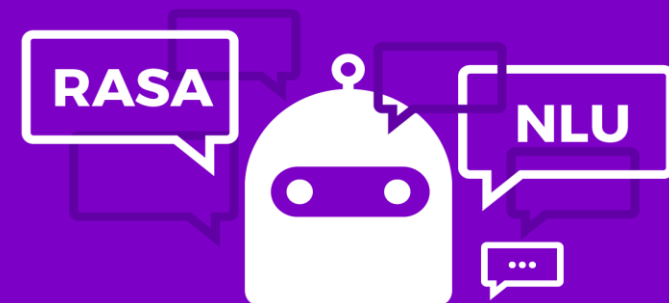
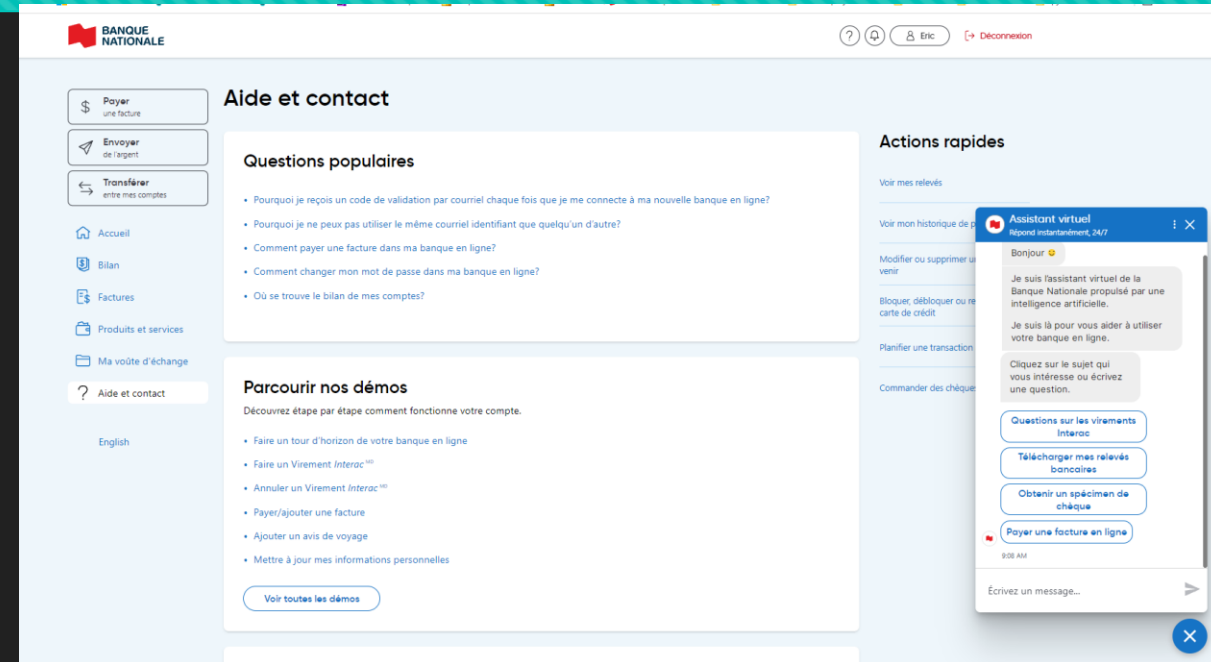




# Solution

## Case 2 : *deploying successfully and multiple time an open source dialog platform in a bank*

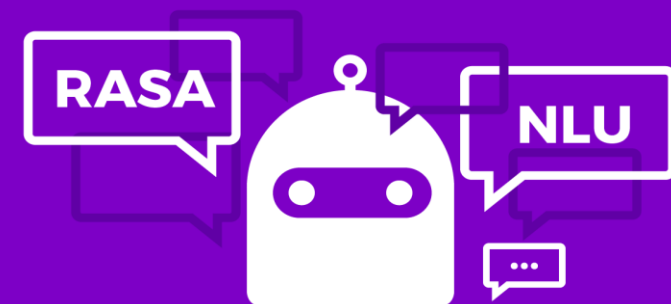
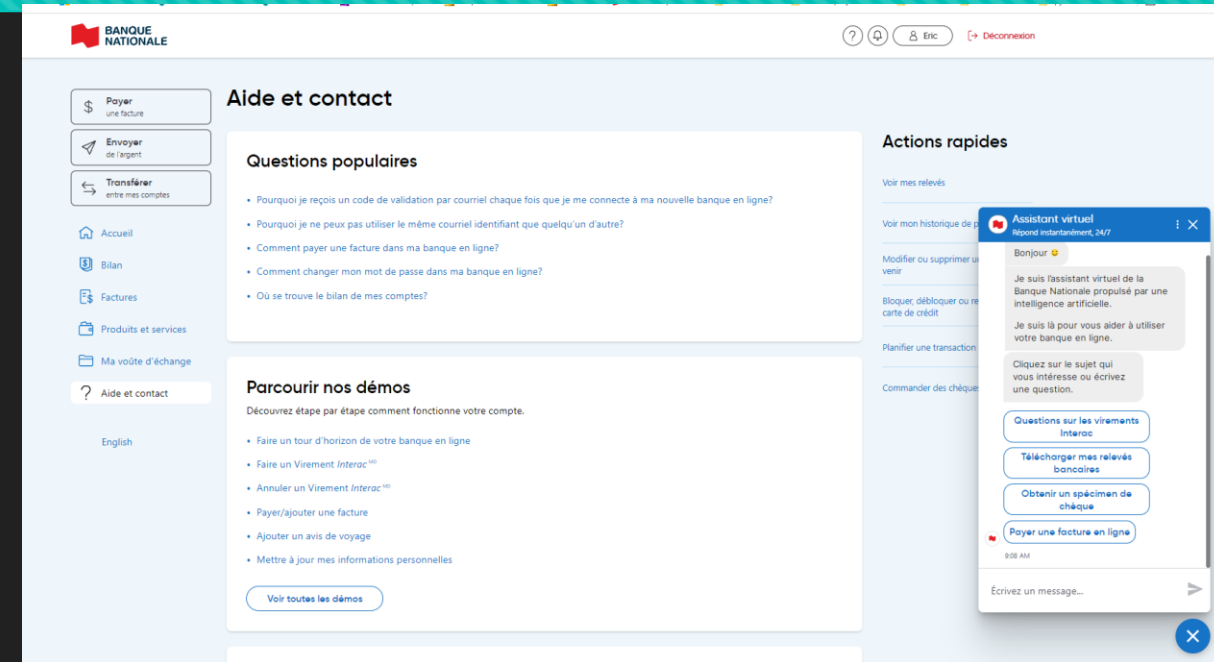
- Adopt and integrate an open source framework (Rasa)
- Define an organization that can handle in the best possible way
  - Operationalization
  - Operational Quality
  - End user quality



# Solution

## Case 2 : *deploying successfully and multiple time an open source dialog platform in a bank*

- Adopt and integrate an open source framework (Rasa)
- Define an organization that can handle in the best possible way
  - Operationalization
  - Operational Quality
  - End user quality
- Building an AI Team on business side to design a solution
- Building an IT AI Factory Team to operationalize using standard DevOps techniques
- Establish collaboration between AI Team with AI Factory for roadmap





# Resulting organisational structure

**Case 2** : *deploying successfully and multiple time an open source dialog platform in a bank*

## AI Science Team

- In charge of solution design and model maintenance
  - Open source framework selection
  - Functionality design (including patents and comp-sci communications)
  - Model performance (accuracy)
  - Model improvement
  - Data ownership

## AI Factory Team

- In charge of solution integration
  - Choice of technology (Kubernetes, cloud ...)
  - Deployment
  - Monitoring
  - Upgrading open source solution
  - Proprietary code development

One **product owner** for the project on business side : in charge of **backlog** and scrums for all involved teams.

Success: from 1 bot in operation to 8 in 3 years – time to market of 3 to 6 months – models upgrades every 2 days

DevOps is 30% of the solution (30% is science and 40% is business ownership)

# ***Delivering a new machine learning based risk modelling algorithm***


Case 3



# The art of legacy

The difficulty to innovate when there is a lot of history and regulation

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# Use case : *delivering a new machine learning based risk modelling algorithm*

## Introducing machine learning algorithms in existing environment

- ML models can be developed in few weeks
- Can overperform traditional models by 10 folds
- Can be updated live with new data (during massive crisis like Covid-19)

## Difficulties

- Environment uses traditional models (regression, score cards ...)
- Multiple legacy systems (data access)
- Existing framework not designed for common ML framework
- Design of ML model is conducted with non-IT standard tools (Python, Jupyter notebooks)
- Risk management is not used to ML
- IT do not accept (again) scientist code
- ***Big tech companies are here to challenge you with their own framework...***

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## Solutions

- Develop new deployment pipelines using DevOps framework
- Data Engineers build data pipeline
- Architect build a common development framework and scientists recode
- Upgrade risk management with new rules
- ***Big tech companies go away fast because they understand how it is complex***

The time to market remain poor as transformation involves multiple business units: in this case DevOps techniques are less than 10% of the solution, more than 50% is business and 30% is risk



# Thank you !

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