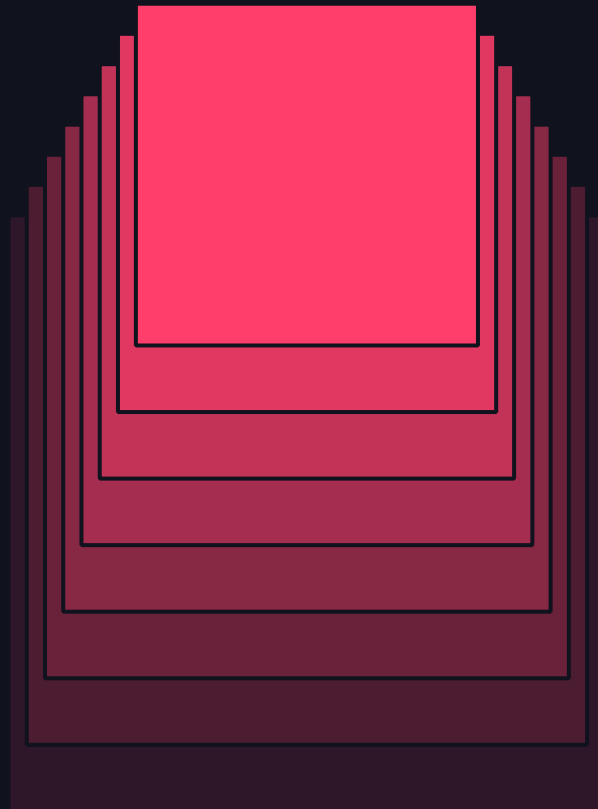


Data Platform Modernization With a Data Mesh Architecture

Laiguiston “Calazans”
2024





Who am I?

- _ + 20 year of IT focused on Data & AI projects
- _ Arthur's Father;
- _ Passioned about Soccer and Barbecue;
- _ Data Engineering and Data Quality Sr Manager



About Bradesco

One of the largest financial groups in Latin America



80

Years of history

38

(Million)
Account Holders

69

(Million)
Saving Accounts

86,222

Employees

CONSOLIDATED GROUP

US\$ **3.28**
(Billion)

Recurring Net
Income

10.0%

ROE-accumulated

US\$ **402.2**
(Billion)

Total
Assets

US\$ **176.4**
(Billion)

Expanded Loan
Portfolio

13.2%

Tier 1
Capital

71.1

Million Clients
(38.1 million
account holders)

7,388

Branches +
Service Centers
(PAs/PAEs) + BUs

38,264

Banking
Correspondents

INSURANCE OPERATIONS

US\$ **1.8**
(Billion)

Net Income

US\$ **72.6**
(Billion)

Technical
Provisions

US\$ **82.6**
(Billion)

Total
Assets

US\$ **12.1**
(Billion)

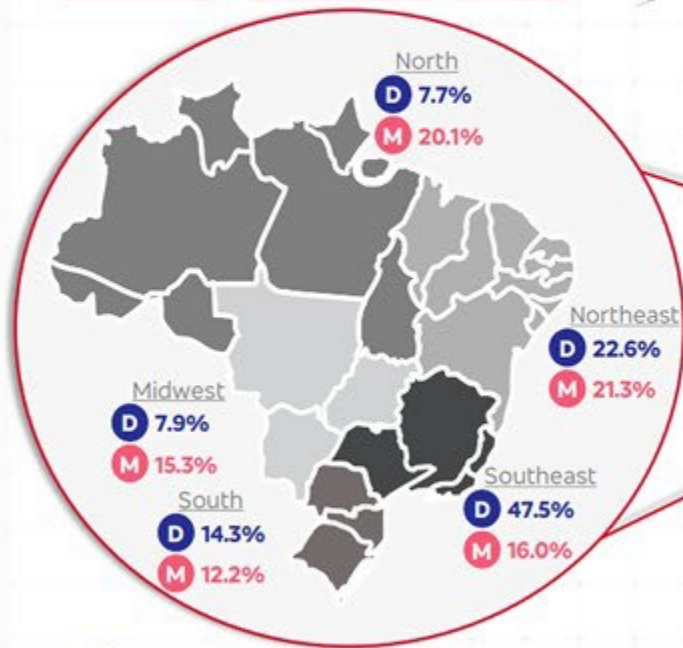
Premiums and
Contributions

Large distribution network in Brazil and abroad

2,695
Branches

4,693
Service
Centers

38,264
Bradesco
Expresso



● Branches ● Subsidiaries ● Rep. Office

D % Network Distribution
M % Market share

Physical and Digital presence

Broadly diversified portfolio

Products and services in all modalities, **with digital journeys and artificial intelligence (BIA):**

Commercial, Personal and Real Estate Credit

Credit for Investment and Financing

International Account

Leasing

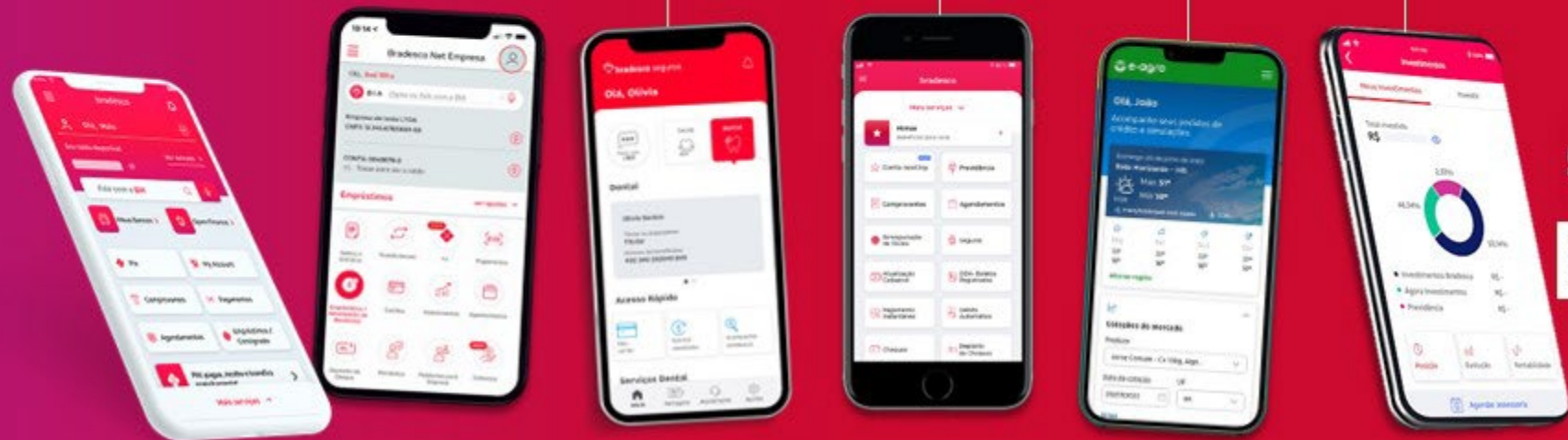
Foreign Exchange and Capital Management

Insurance and Pension

Financial & Non-Financial Services

Agribusiness

Investments



invest+
bradesco

The Banker
INNOVATION IN
DIGITAL BANKING
AWARDS 2023

Technological and innovative

SERVICES CHANNELS

Serving customers the way they want

Digital Channels



Internet Banking



Bradesco Apps

98%

of transactions are made through digital channels



Fone Fácil



ATMs

94%

are concentrated in mobile and the internet

In the 2023:
App Individuals + Companies:
3.6 billion
financial transactions
18 million
accesses per day to the App
(23 monthly accesses per client)

INNOVATION

Complete innovation ecosystem



research

AI and other technologies

international
NY & London

lab
Prototyping,
PoCs and
certification

polos
Open
innovation

**INTERNAL
INNOVATION**

Technologies



Artificial
Intelligence
algorithms



Big
Data



Biometrics



Blockchain



API

**OPEN
INNOVATION**

hub
Open
innovation
portal

startups
Open
innovation

habitat
Space for
co-innovation

ventures
Investments
in startups

Why Modernize?

WHY MODERNIZATION?

Business Goals

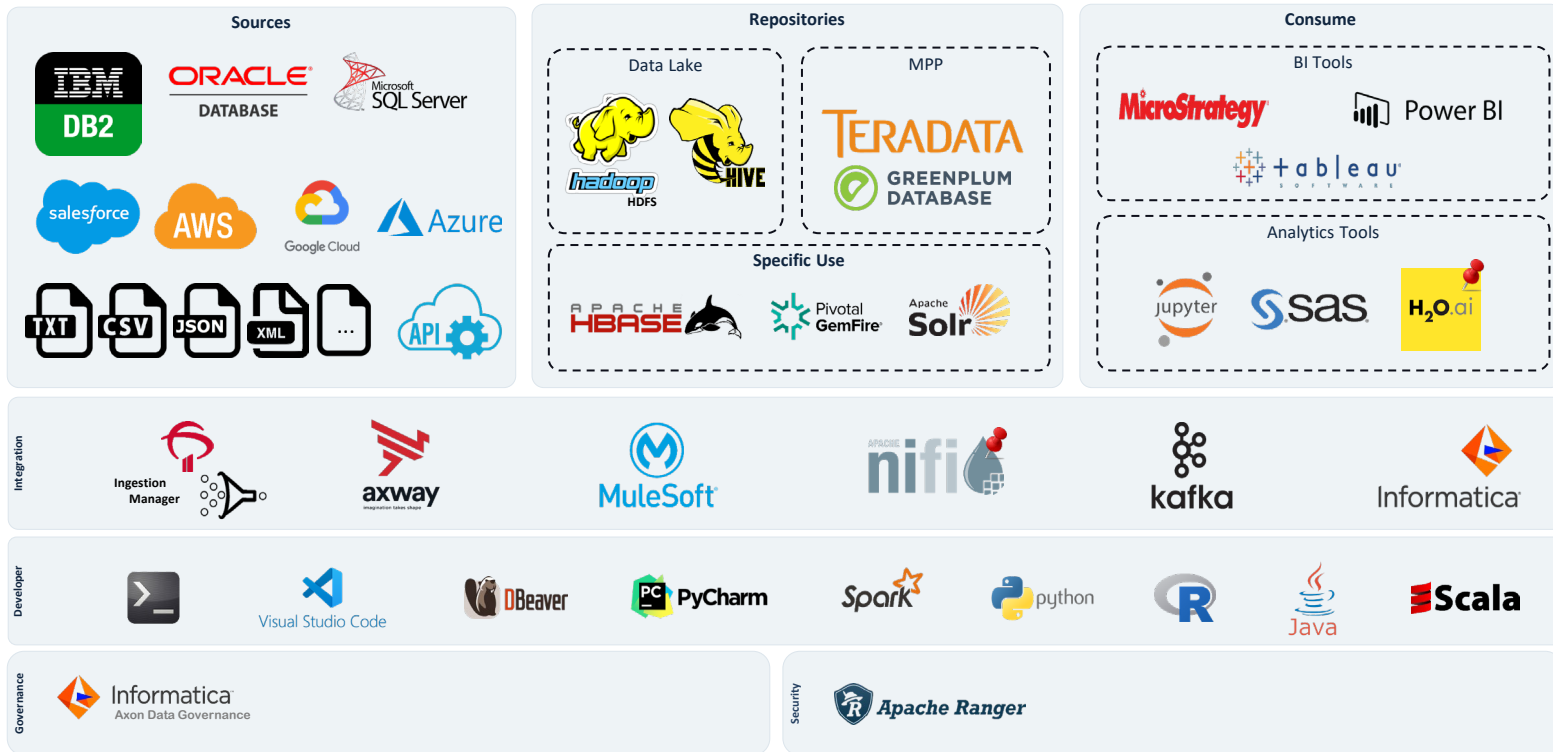
- Improve Customer Experience;
- The focus is on delivering value to the business and not only technology;
- Time to Market;
- Reduce Architecture Complexity;



Where we came from

TECHNOLOGY LANDSCAPE

"As is"



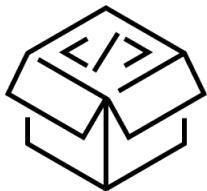
CHALLENGES

Main challenges in the current legacy data ecosystem



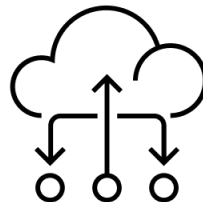
Cost

- High cost to scale and upgrade environments.



Growth

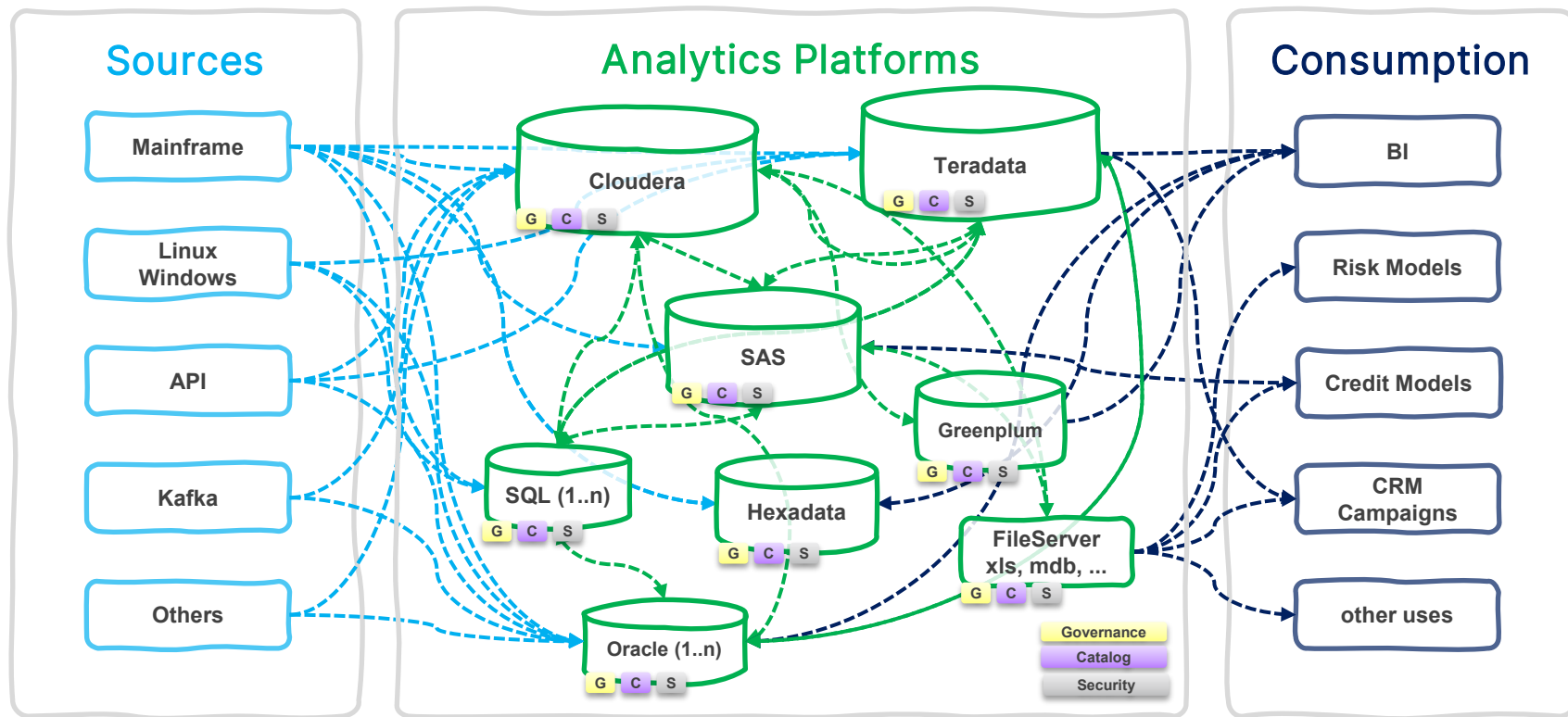
- Period of idleness and inability to grow on demand.



Time

- Long time to purchase and implement new workloads (between 1 and 2 years).

ARCHITECTURE "AS IS"



SOME NUMBERS



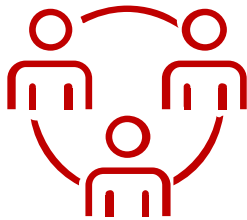
+5 Pb

of data

+11 K

of Active Jobs

(Lake, SAS, Teradata)



+1,400

Careers

Data Architect
Data Engineer
Data Scientist
Data Analyst
Data Governance



±7,500

Users

Journey to C1oud/Mesh

LEAP TIMELINE



September, 2022

**Contract signing
with Microsoft**

August, 2023

**Technical Enablement
and +2500 stories
delivered**

December, 2022

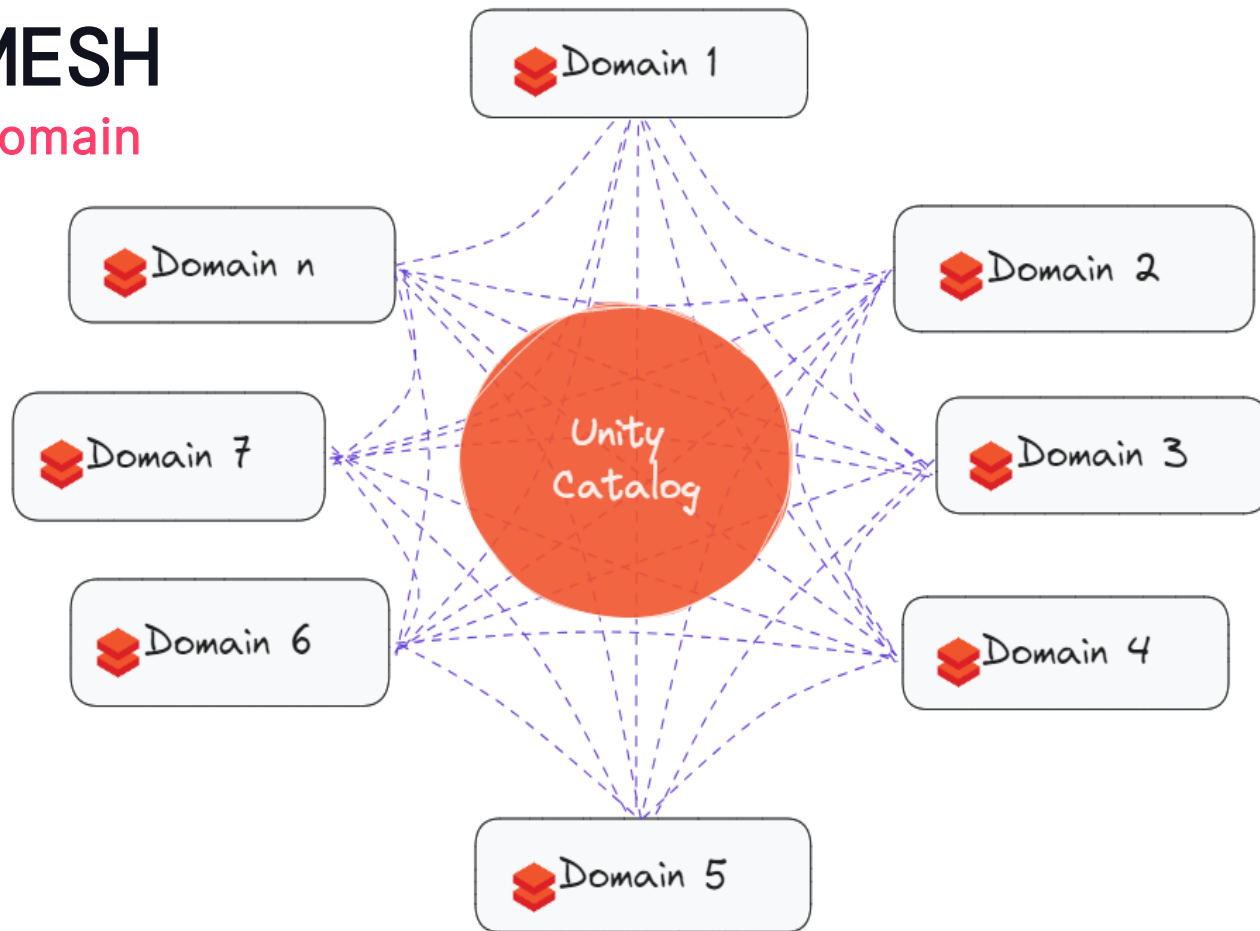
**Landing Zone
provided, including
network and security
architecture**

September, 2023

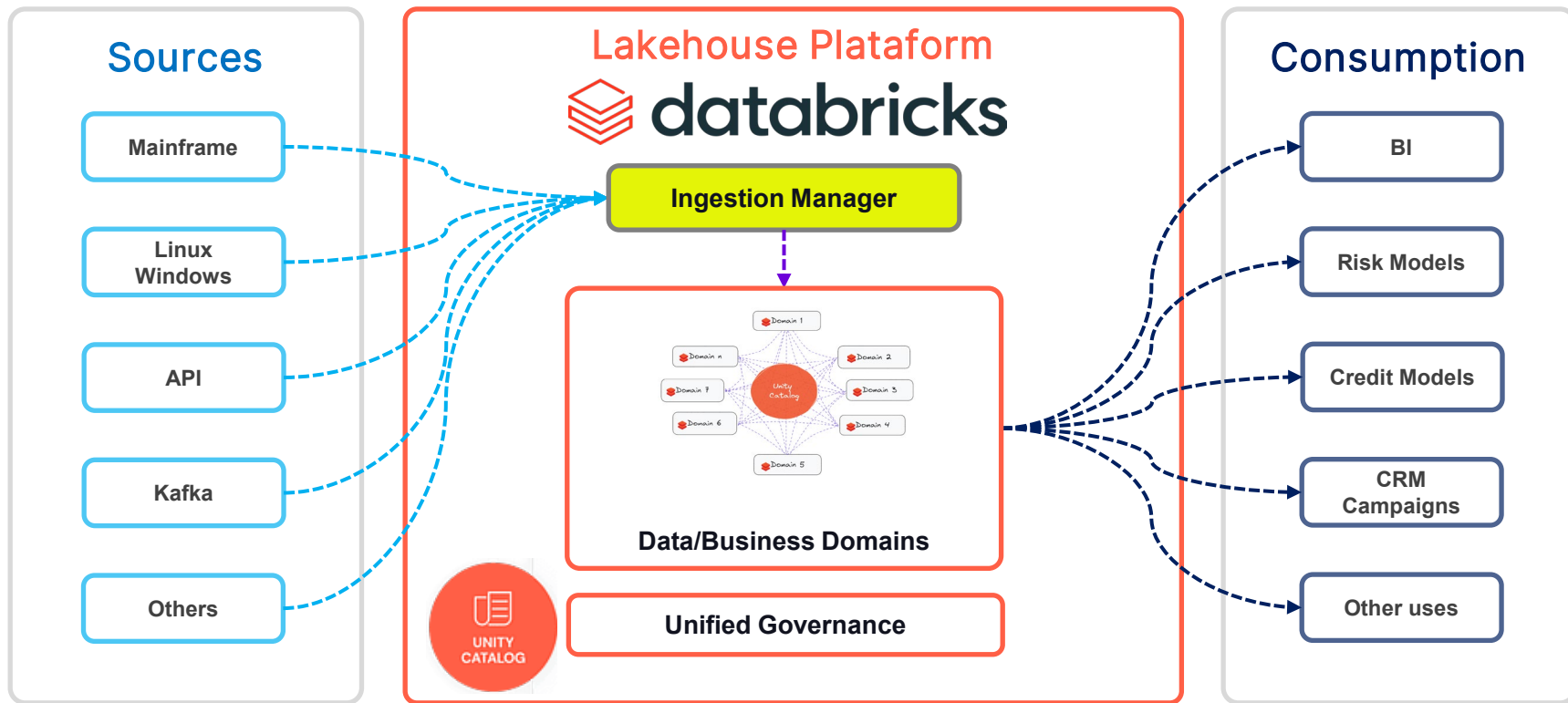
**Cloud First Orientation,
allowing new projects
to be delivered directly
in new architecture**

DATA MESH

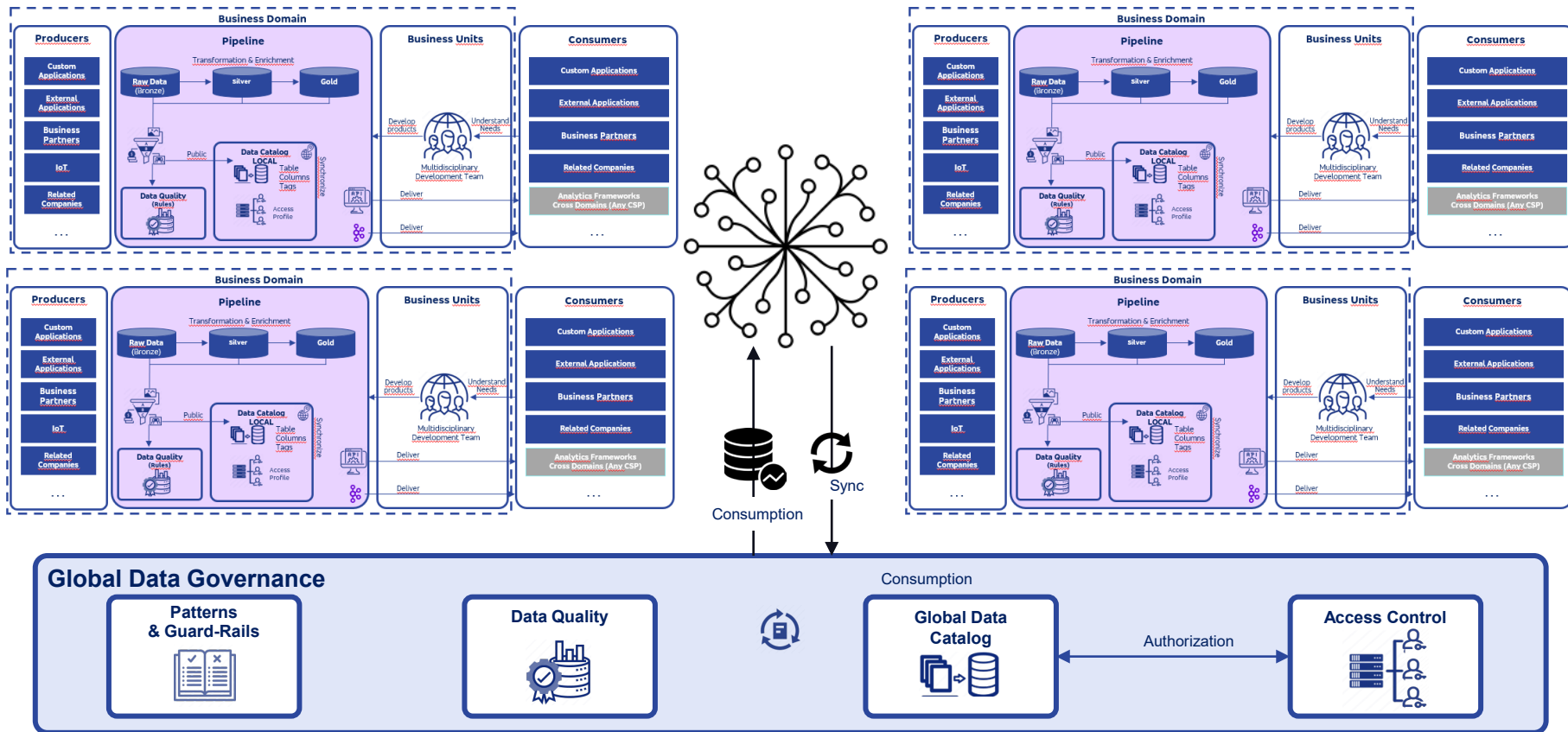
Business Domain



NEW ARCHITECTURE



DATA MESH

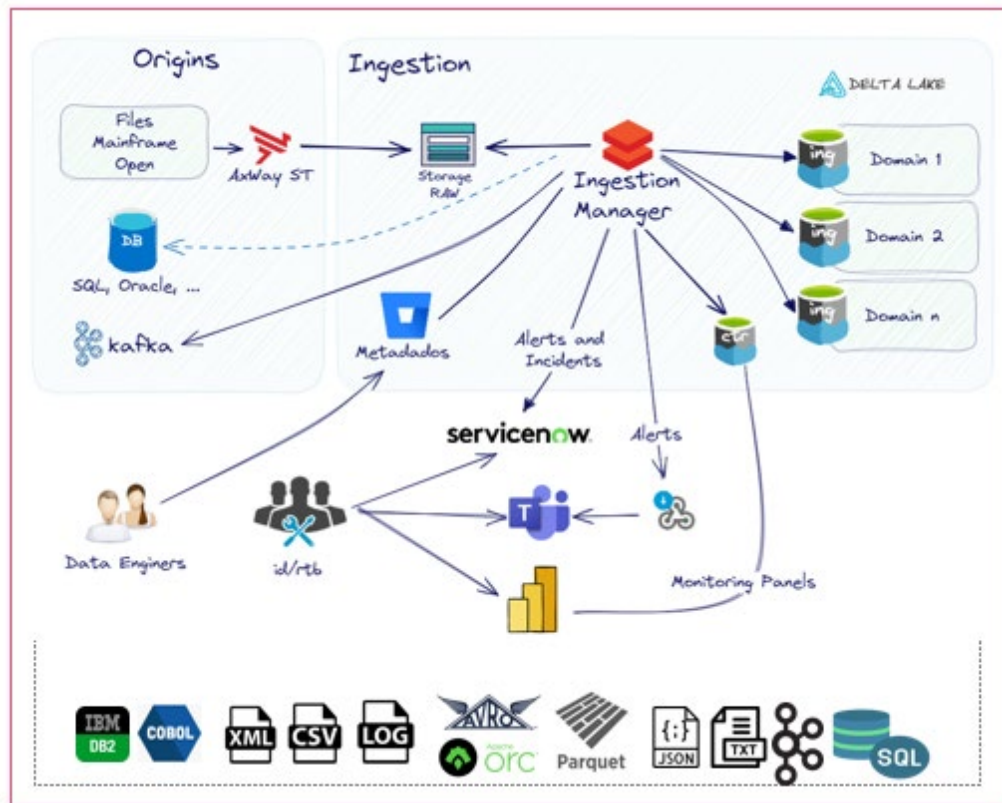


Ingestion Manager

INGESTION MANAGER

Macro Features

- Pareto Principle
- Usage Templates
- Standardization
- Monitoring



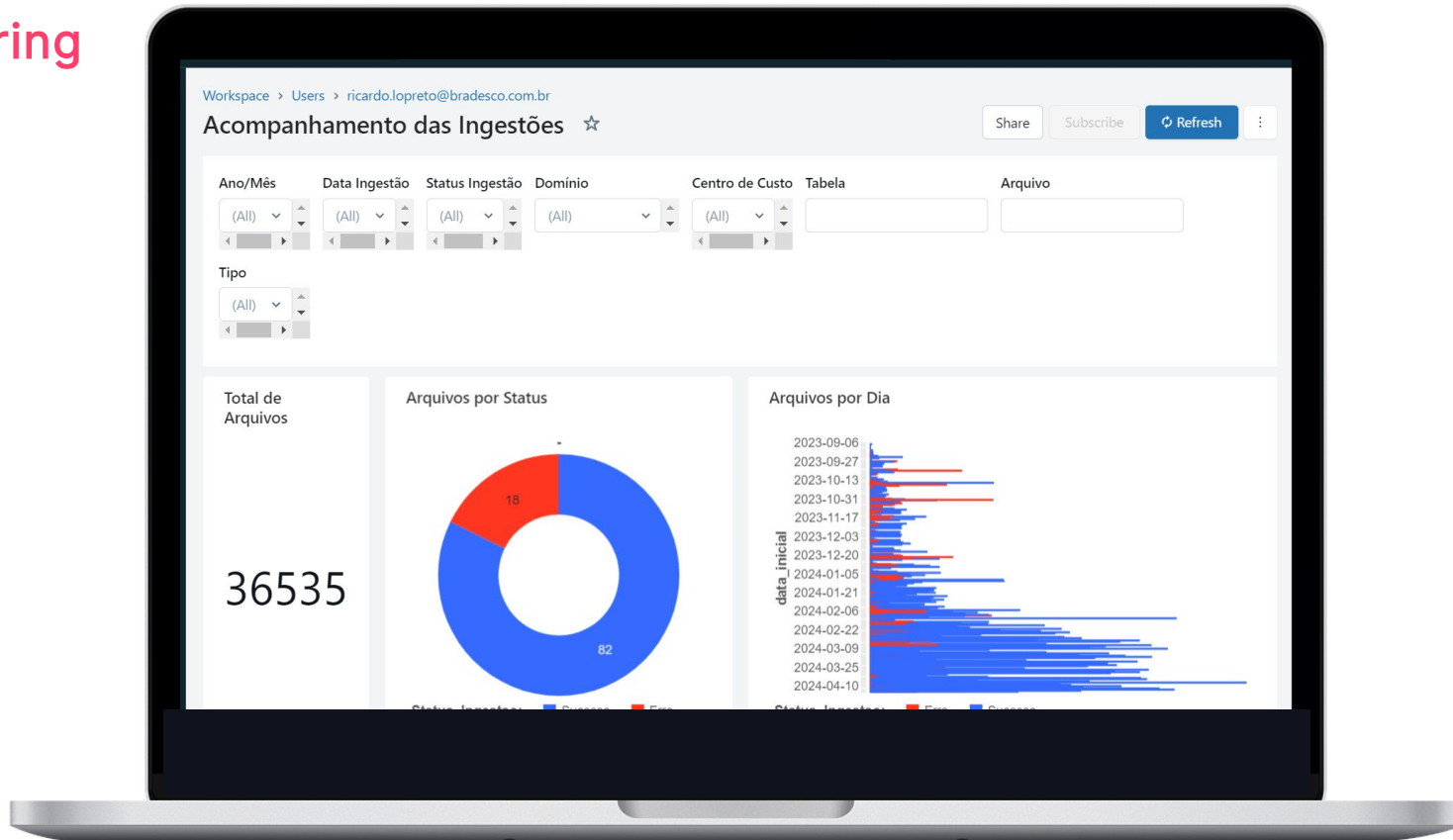
CODE SAMPLE

Sample of Template

Source	Lay-Out
<pre>[{ "cdEntidade": "test_0001", "cdIdentificadorIngestaoAtiva": true, "cdServicoEntidade": "platfun-ingestion", "nmCaminhoEntidade": "/mainframe/landing", "nmEntidade": "test_MainframeBin_v01_{0-9}{8}_{0-9}{6}.bin", "cdTipoIngestao": "MainframeBin", "dsTipoInformacao": "Cadastro", "dsPeriodicidadeInformacao": "Diária (dias úteis)", "dsTipoCarga": "Full (Completa)", "cdTempoDecorridoCarga": "D-1", "qtDiasRetencao": 730, "dsJustificativaRetencao": "Testes ingestão", "cdIndicadorDadosMenorIdade": false, "cdIndicadorDadosAgenciaUm": false, ... }]</pre>	<pre>{ "cdLayout": "test_ing__teste_OpenPosicional", "dsLayout": "Teste Arquivo Posicional/Texto, tabela gerada para testes do processo de ingestão no formato Posicional/Texto", "fields": [{ "nuPosicaoCampo": 1, "nmCampo": "CIDTFD_REG", "dsCampo": "Campo tipo Integer, gerado para teste do processo de ingestão", "cdTipoCampo": "Integer", "qtInteiroCampo": null, "qtDecimalCampo": null, "cdIdentificadorPermitidoVazio": true, "cdIdentificadorDadosSensivel": false, "nuSequenciaCampoPk": 1, ... }] }</pre>

INGESTION MANAGER

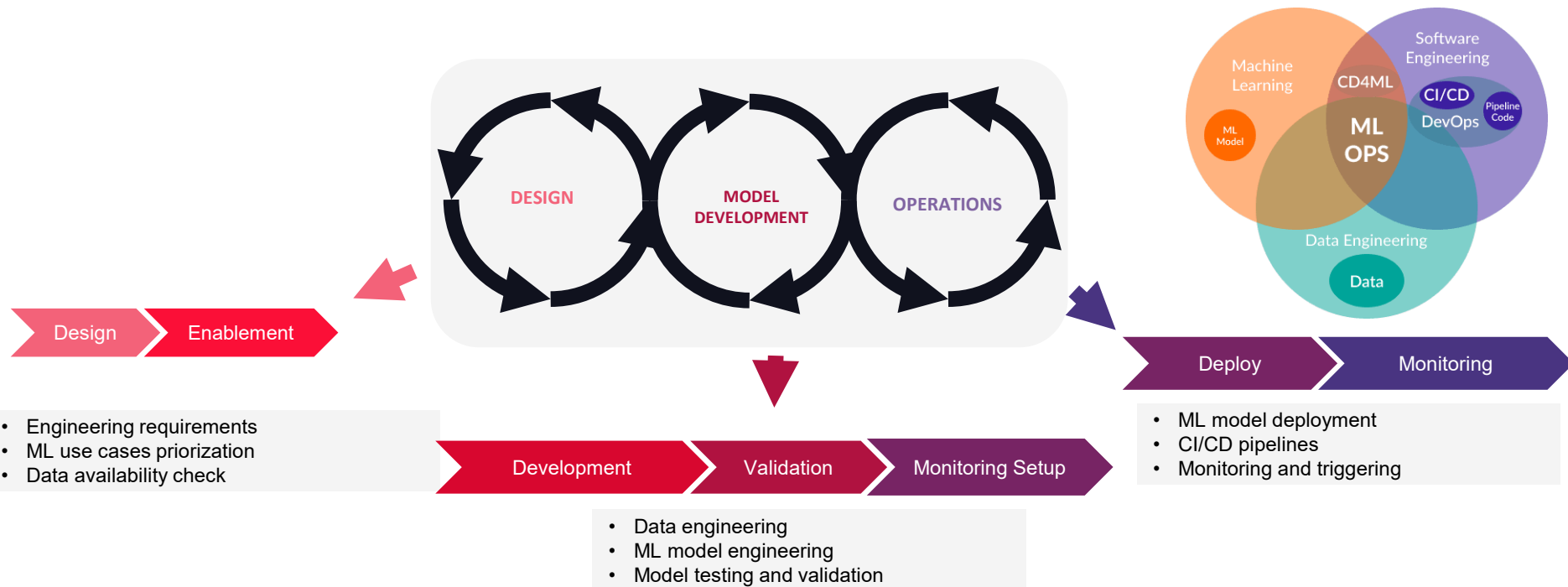
BI Monitoring



Pipelines ML Ops & Data Engineering

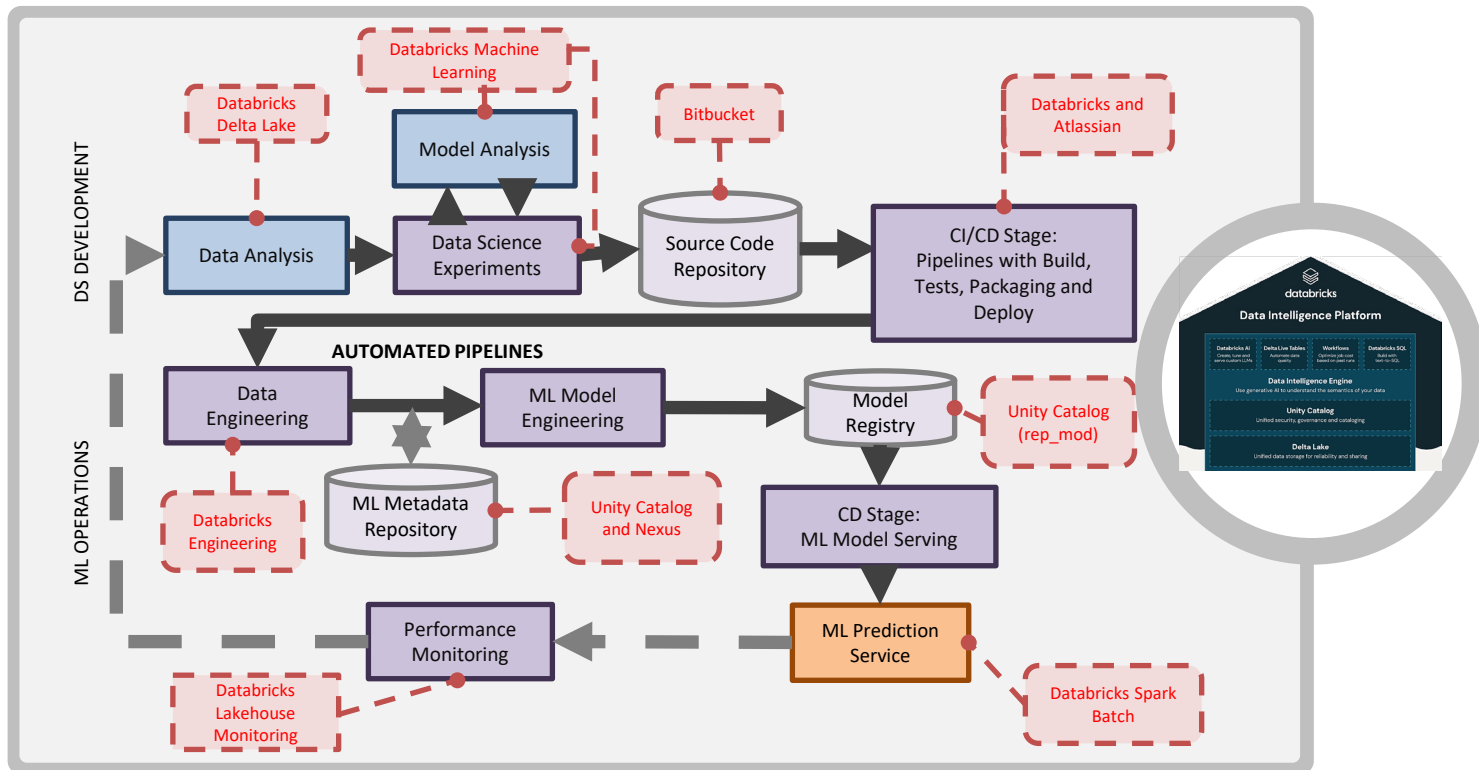
OVERVIEW

MLOps



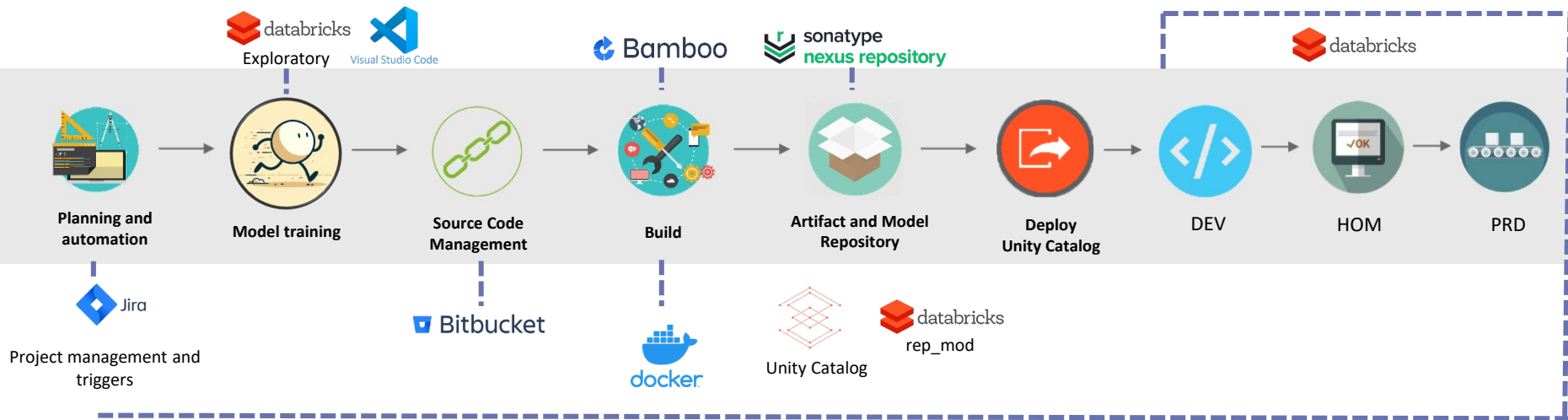
OVERVIEW

Databricks and Atlassian



ARCHITECTURE

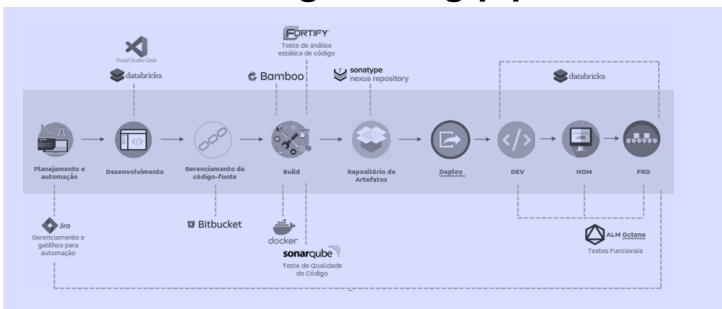
DevSecOps Components



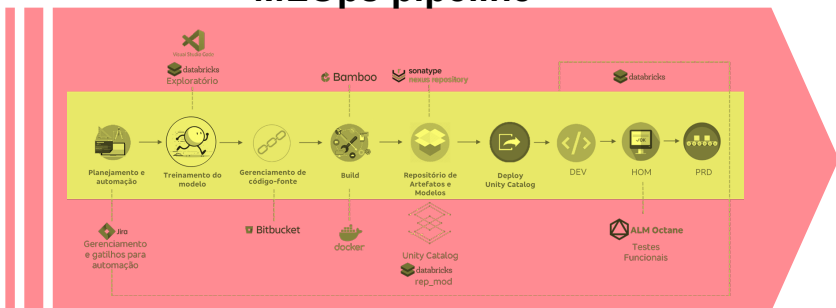
DEVSECOPS, MLOPS

1

Data Engineering pipeline



MLOps pipeline



Application



Notebooks, scripts



Data prep



Jobs



databricks



ML model

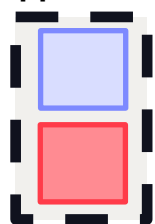


Monitoring

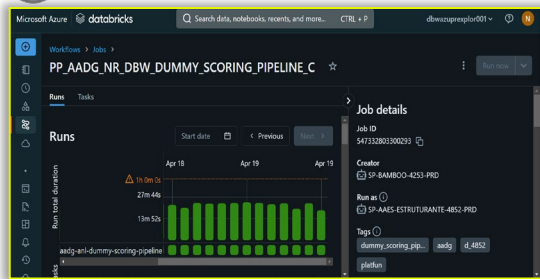
v0.0.1

DEVSECOPS,MLOPS

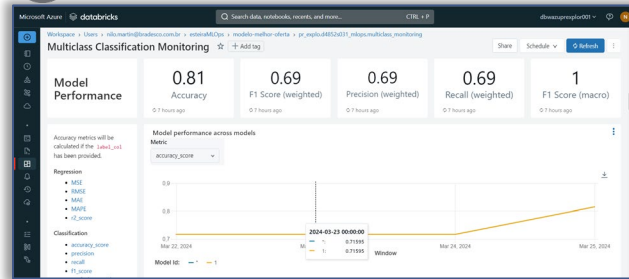
Application



③ Scheduled application run

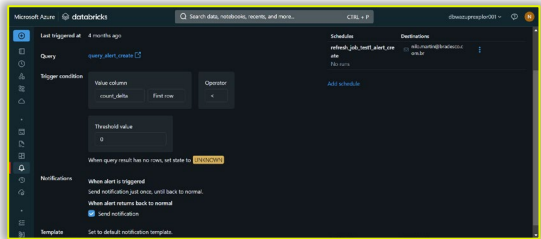


④ Monitoring

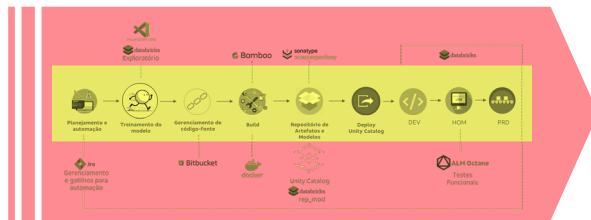


DEVSECOPS, MLOPS

⑤ Model retraining alert

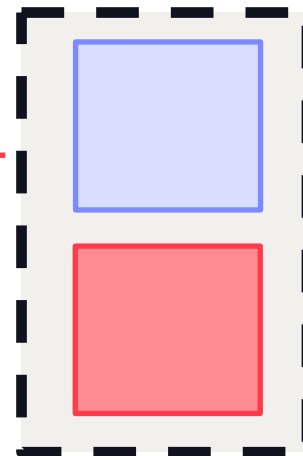


⑥ Model retraining and new version deploy



MLOps pipeline

Application v2



Data Products

DATA PRODUCT

CHANGING MINDSET – As Is



CUSTOMER RECORD

LOAN

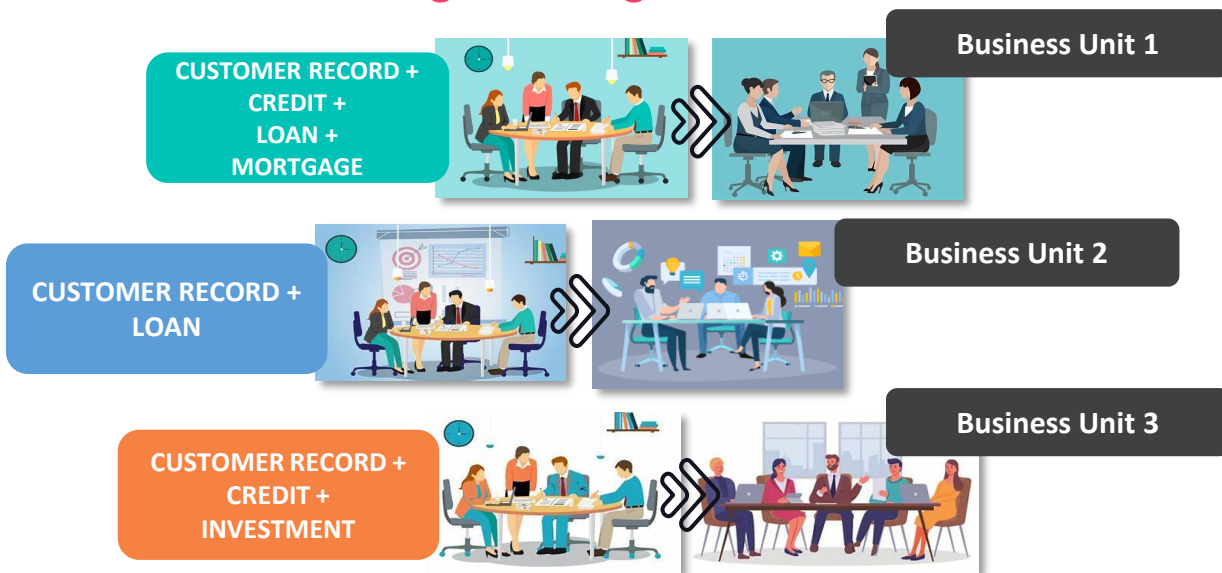
MORTGAGE

INVESTMENT

CREDIT

...

Data Engineering Process



DATA PRODUCT

CHANGING MINDSET – To Be



CUSTOMER RECORD

LOAN

MORTGAGE

INVESTMENT

CREDIT

...



Data Products



Data Governance and Data Quality

FinOps, DataOps, MLOps



Business Unit 1

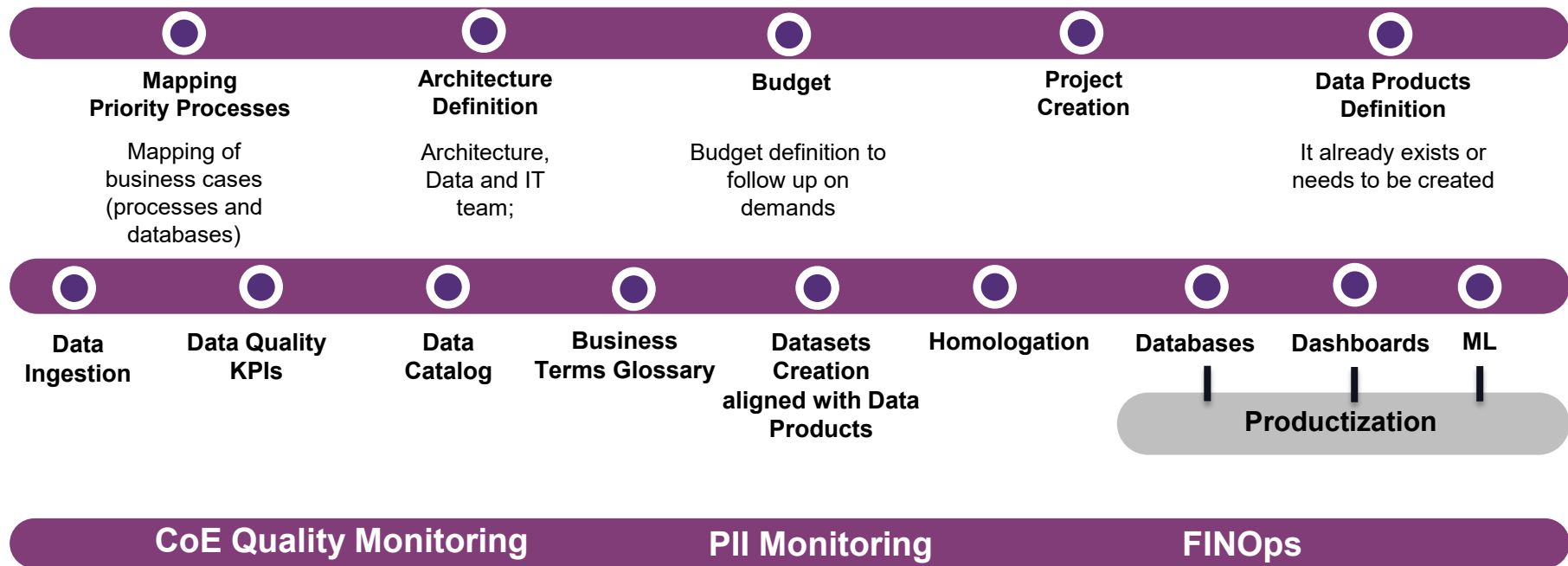
Business Unit 2

Business Unit 3

Business Unit n

DATA PRODUCT

MATURITY CYCLE



Achievements

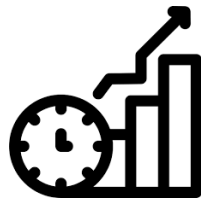
ACHIEVEMENTS



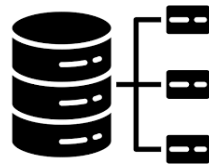
Improve Customer Experience with more assertive Credit Offers for each customer in a digital journey.



Focus on delivering value to the business and not only technology: Provide better offers with low latency data.



Time to Market: Less time for data pipelines and model delivery.



Reduce Architecture Complexity: Components reduction for some workloads (until 75%).

ACHIEVEMENTS



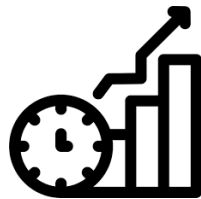
SAFER (Fraud) and BRAIN (Credit Offer)

Low Latency Data

Joins data from Data Platform and transactional in the FICO decision Engine;

SAFER: ↓ 50% retentions and rejections in the PIX journey (*Customer friction reduction*);

BRAIN (*forecast*): R\$ 2bi per product credit offer (*swap-in and swap-out*);



Auto Loans

Data Pipelines and Model Faster (Dev. and exec.)

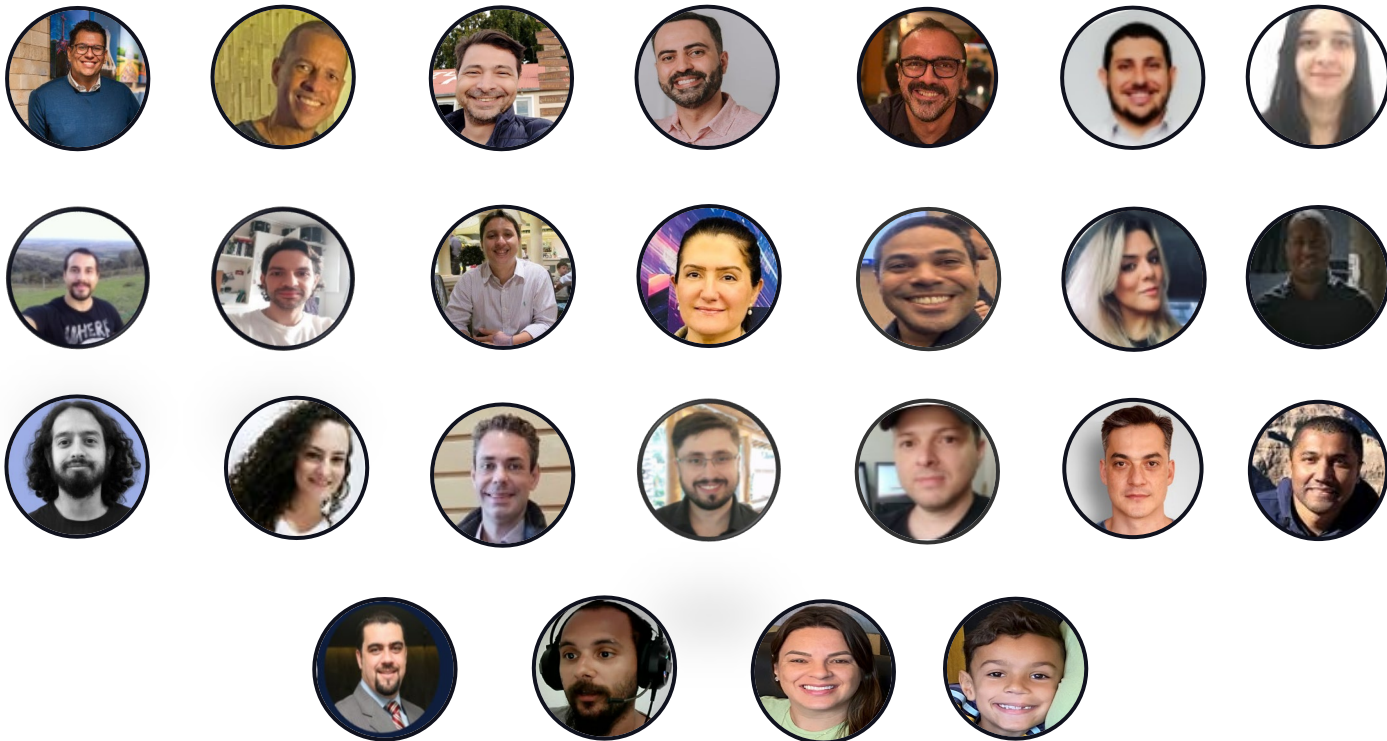
For 200 million people;

Features generation pipelines: execution in 12 hours;
Model inference pipeline: execution in 40 minutes;

Unable to run in on-prem environment.

Acknowledgment

ACKNOWLEDGMENT



Thank you!