



Credit Risk in Distribution Network



DATAATHON

- solving real **industry problems**
- gaining **valuable insights** from anonymised data
- 24h hard-coding competition between **data scientist** that creates „**Proof-of-Concept**“ solution

Deep Vortex TEAM



[Aleksa Radosavčević]

ComTrade Digital Service, Kragujevac

Data Scientist

Team role: Team lead / Statistician



[Branko Arsić]

Teaching and Research Assistant at
Faculty of Science Kragujevac

Team role: Data Scientist / Mathematician



[Marko Stojanović]

LogiSpin, Kragujevac

Data Scientist

Team role: Data Scientist / Developer



[Lazar Krstić]

Teaching and Research Assistant at
Faculty of Science Kragujevac

Team role: Data Scientist / Developer

ABOUT NELT

2
CONTINENTS

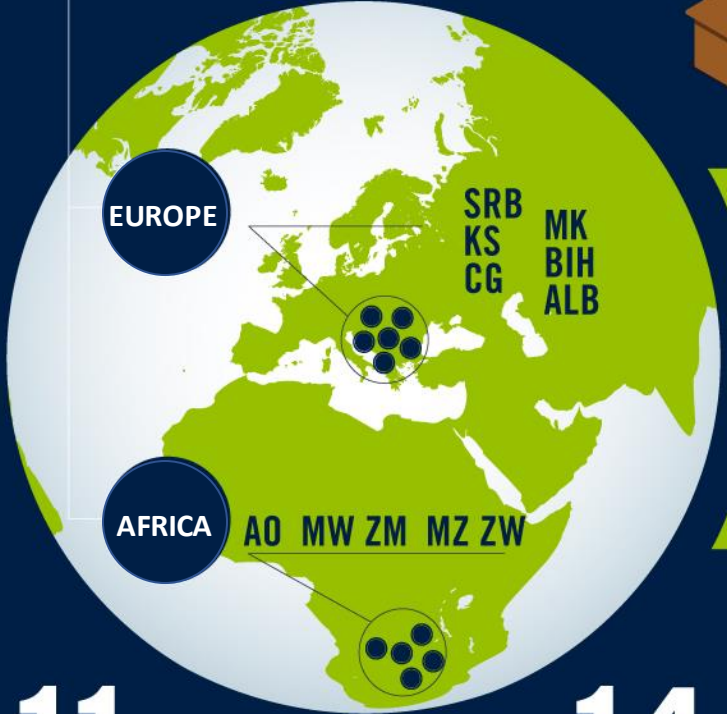
55.000
POINT OF SALES

26.000
CUSTOMERS



80+
PRINCIPALS

450 DELIVERY
VEHICLES
1.330
VEHICLES



3.900
EMPLOYEES



150.000m²
WAREHOUSE

11
MARKETS

14
COMPANIES



DISTRIBUTION

SRB	Nelt	DWAY
CG	Neregella	MK Nelt
AFR	NeltAfrica	
BIH	Nelt	KS Nelt
		ALB

OTHER BUSINESS

SRB	banim REKLAME
	Neoplanta
	A Alkemy



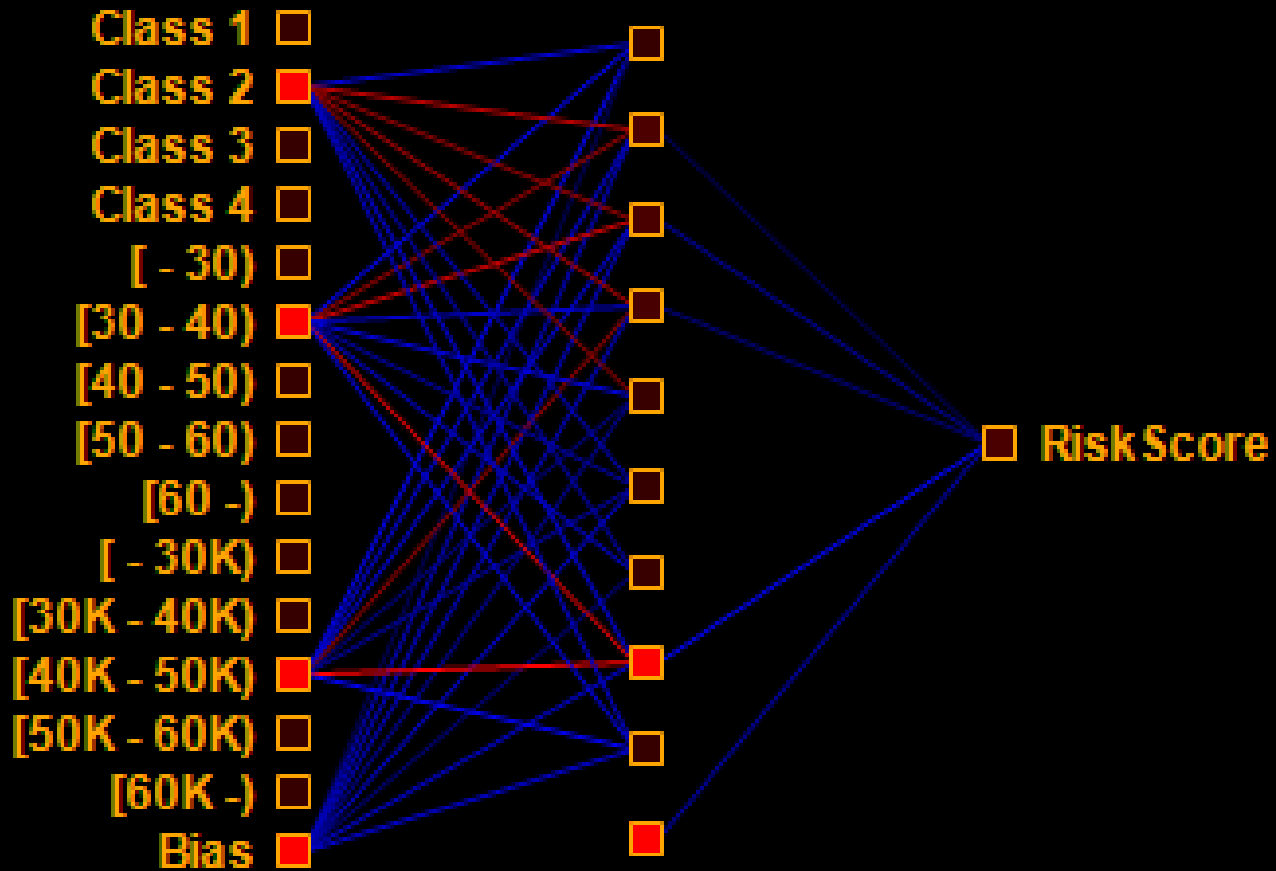
Explainable **Credit Limit** system that is powered by **ML & AI**

Different stakeholders have different goals:

- Finance needs to control risk and decrease it
- Sales needs to sell more goods

... also, predicting **probability** that customer will **delay payment** due date & creating equilibrium between **finance** and **sales**.

[INPUT]



Question:

What is the **risk** to do upsell for **amount X** to the **company Y**?

Answer:

It is „No risk“, „Low Risk“, „Medium Risk“ or „High Risk“

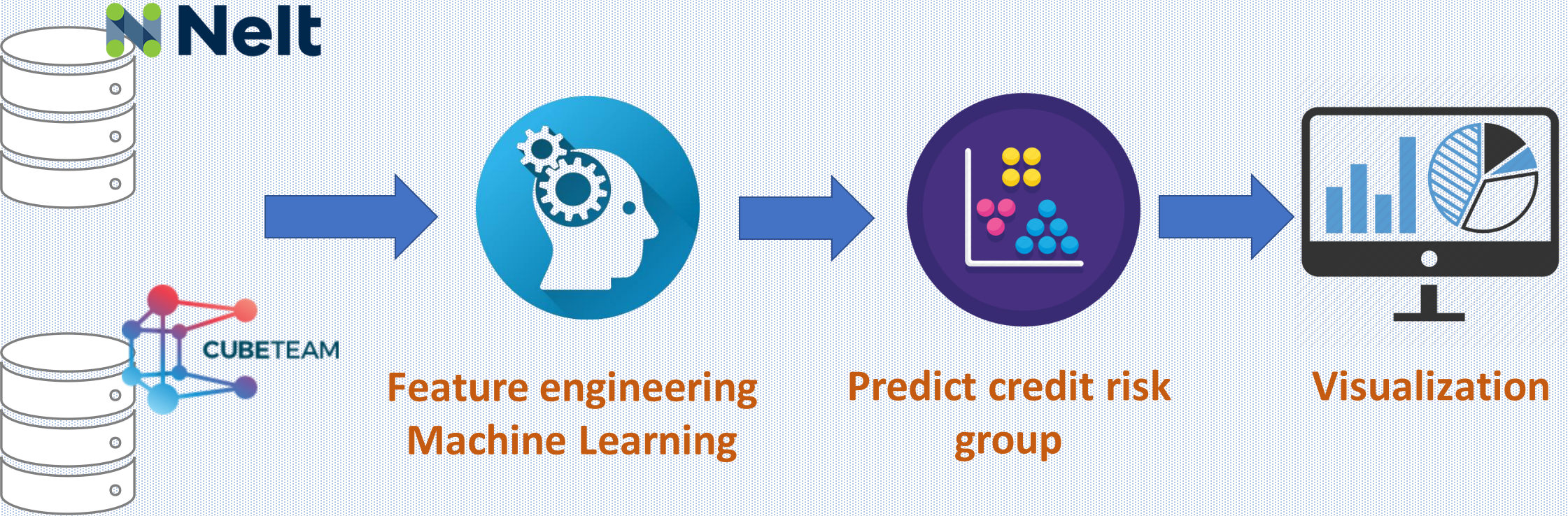
Taking into account:

- previous history with Nelt group
- financial data from Cube team
- various features, such as:
geolocation, company type, product groups, external credit risk scores and etc.

Using latest **ML & AI** models.



Solution Flow



Data Preparation

Data preparation was one of the most time consuming tasks.

Feature Engineering

17 Financial ratios developed.

Feature Selection

Determined which features are related to our target “credit score”.

5 Key Features Discovered

Liquidity II, Reduced liquidity, Indebtedness ratio, Profit margin, Cash Flow I.



Machine Learning

Several machine learning techniques were applied to create and determine risk groups.

Clustering

Based on 5 selected features companies were divided into 75 clusters. Each cluster represents risk segment.

Determining clusters for companies with missing data.

75 clusters -> 4 risk groups

Decided based on the level of paid invoices



CREDIT LIMIT DASHBOARD

Dashboard

Invoices

Total invoices

955,457

19% compared to last week

Paid Invoices

919,560

19% compared to last week

Partially paid Invoices

483

19% compared to last week

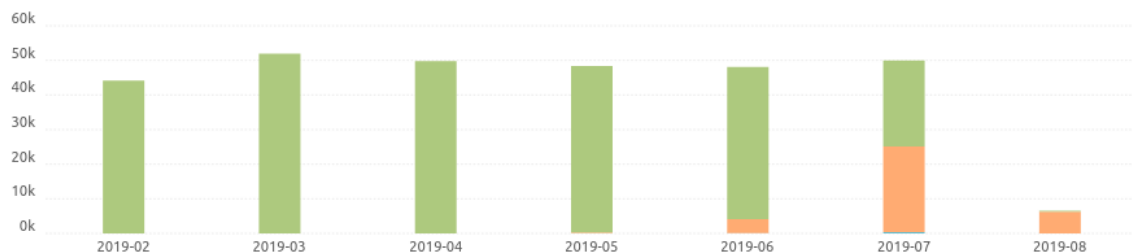
Open invoices

35,413

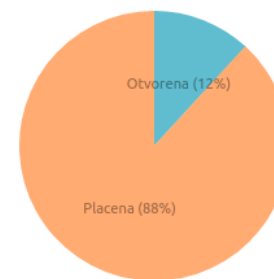
19% compared to last week

Invoice Status

Delimicno Otvorena Placena



Invoice Status



Predict credit risk

10035

550000

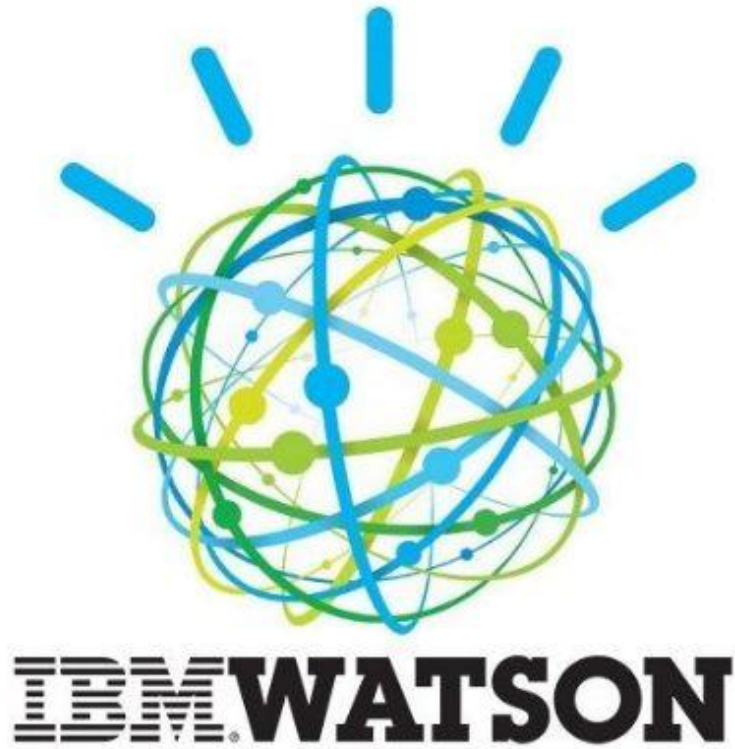
RSD

Predict

Prediction

Customer ID	Customer Name	Amount	Risk Group
10035	Customer 35	550000	Low risk

Visualisation helps **higher management** to make **faster & data-informed** business decisions



What would we do **if** we had **3**
additional months?



Data preparation. Data preparation. Data preparation.

More deep dive. New features. More thorough explanatory data analysis.

Domain knowledge is a key.

Use complex domain knowledge. Better approximation of credit risk.

New modeling techniques.

Try out new machine learning and deep learning

Additional data to enhance accuracy.

- Use additional historical data to look at the problem from time series perspective.
- Product seasonality, geolocation, bankruptcy indicators.





Thank you!

