



# LARUS

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## SOLUTIONS

### GALILEO XAI

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@AgileLARUS



[www.larus-ba.it](http://www.larus-ba.it)

# About us

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Headquartered in Venice, **LARUS** is the #1 Neo4j Premier Partner in Italy. Their Certified Professionals support companies around the world designing data-driven platforms based on the most innovative open source technologies, for different areas: government, insurance, finance, industry, commercial and telco.

Headquartered in Pescara, **LARUS LABS** works closely with Neo4j contributing to the development of official components of the Neo4j Platform as the *Neo4j JDBC Driver*, the *Neo4j-Kafka* and *Neo4j-Spark* Connectors, the *APOC Library* and *ETL Components*.

# Skills & Expertise

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Neo4j  
Experts

Graph Data  
Specialist

Business  
Oriented

Devs



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# LARUS NEO4J

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First Spikes  
in Retail for  
Articles'  
Clustering



2011



2014



2015



Neo4j JDBC Driver

2016

Neo4j APOC, ETL, Apache Zeppelin



2018

Neo4j Kafka Connector



2019



Neo4j Spark Connector  
AI Based on Neo4j



2020



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The logo for Galileo XAI features the word "Galileo" in a white, elegant cursive script. To its right, the letters "XAI" are rendered in a bold, red, sans-serif font. The background is a dark blue gradient with a subtle pattern of white hexagons and connecting lines, suggesting a network or graph structure.

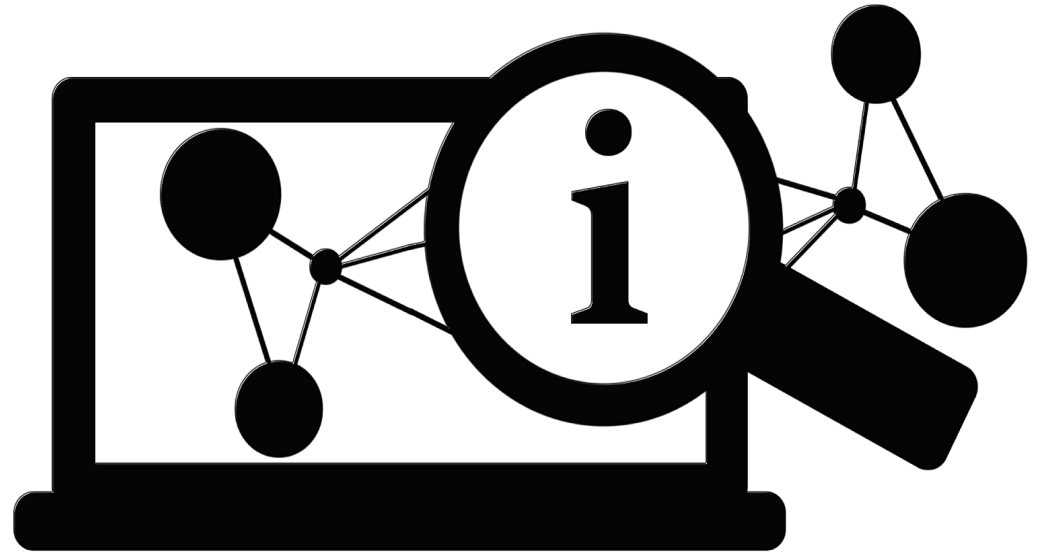
*Galileo***XAI**

**The graph-based platform for eXplainable AI**

# A REVOLUTIONARY APPROACH BASED ON GRAPH ANALYSIS

Graphs are ubiquitous in modern day industries and size of modern day Graph databases have grown exponentially.

On the contrary, doing connected analysis is extremely difficult with traditional technologies other than graph databases.



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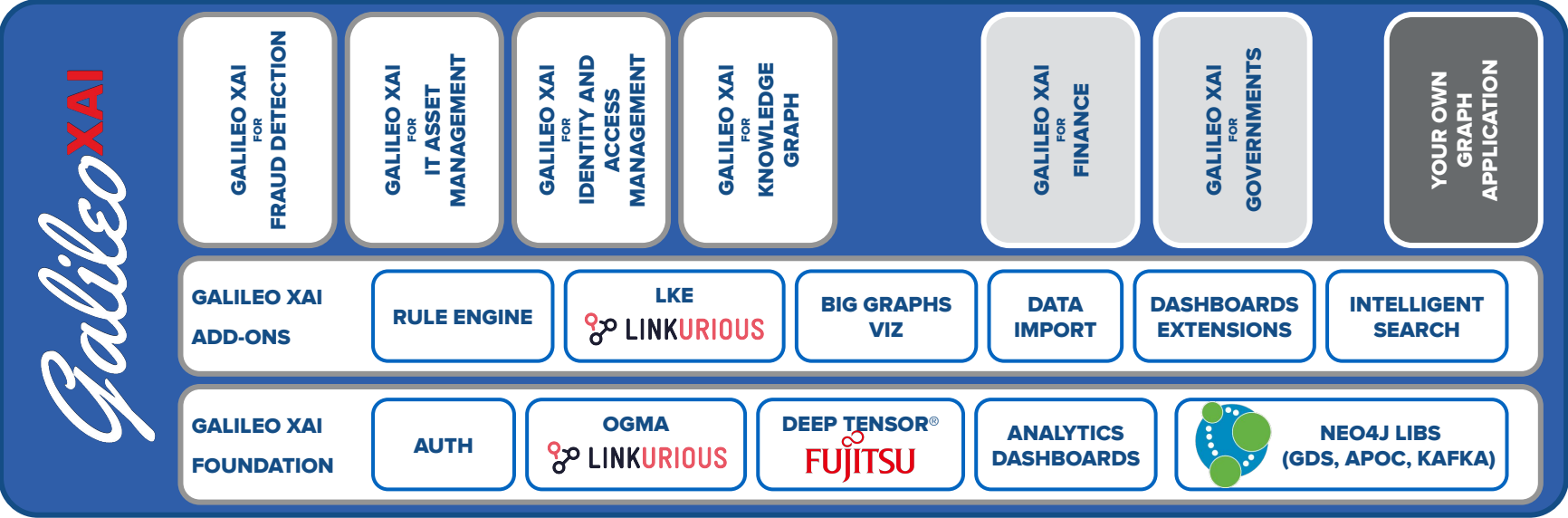
# GALILEO XAI

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Dedicated to the business intelligence teams and decision makers who want to extract new knowledge from their dark data, Galileo XAI is a data analytics framework based on graphs that can be quickly integrated with existing solutions.

Galileo XAI connects data silos and allows the implementation of advanced and predictive analyses on strongly connected data, by using advanced network science algorithms, simple and immediate pattern matching, Graph-AI, native graph visualization to explore the connections between data in an intuitive and immediate way.

# GALILEO XAI: ARCHITECTURE





# Features

## **Flexible**

Data model is built on your needs

## **Graph Exploration**

An innovative way to discover new insights from your data

## **Custom Rules**

Improve the system by adding your own experience

## **Realtime, Fast & Scalable**

The best technologies for the best performances

## **Explainable AI**

Make AI more broadly applicable



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# Flexible

A data model built  
on your needs

The data are stored into a graph database (Neo4j).

The data model is very flexible and can be entirely adapted according to your needs and the information you want to store in.



# Graph Exploration

An innovative way to  
discover new insights  
from your data

Seek your point of  
interest.

See how it's connected  
with others data: people,  
accidents, places, etc...

Discover new insights by  
following the links.



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# Custom Rules

Improve the system adding  
your own experience

**A rule is a pattern.**

“Were people involved in this accident already involved in other ones, with different roles, but all together?”

This is only the simplest rule you can apply in real-time.



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# Fast & Scalable

The best technologies for  
the best performances

## Enterprise ready!

Find frauds when new data  
come in.

Apply a new rule to  
existing data to find,  
test and validate a new  
fraud pattern.

Ready to manage huge data  
volumes.



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# Explainable AI

Graph technology incorporates context and connections that make AI more broadly applicable and graphs can be used to train machine learning models leading to more accurate AI decisions.

## Understand AI outcomes

By analyzing large graphs, Galileo XAI not only enable enterprises to gain valuable insights but also provide easy-to-understand explanations behind AI decisions leading to trust and increased adoption.



Galileo ML AI Alert List / 10/20/2020, List of UDP Flood attacks ADMINISTRATION ACCOUNT

- Dashboard
- Rule
- Alert**
- Deep Tensor (beta)
- Graph Snapshot
- Discover (beta)
- Legend

### Advanced search in alert's nodes

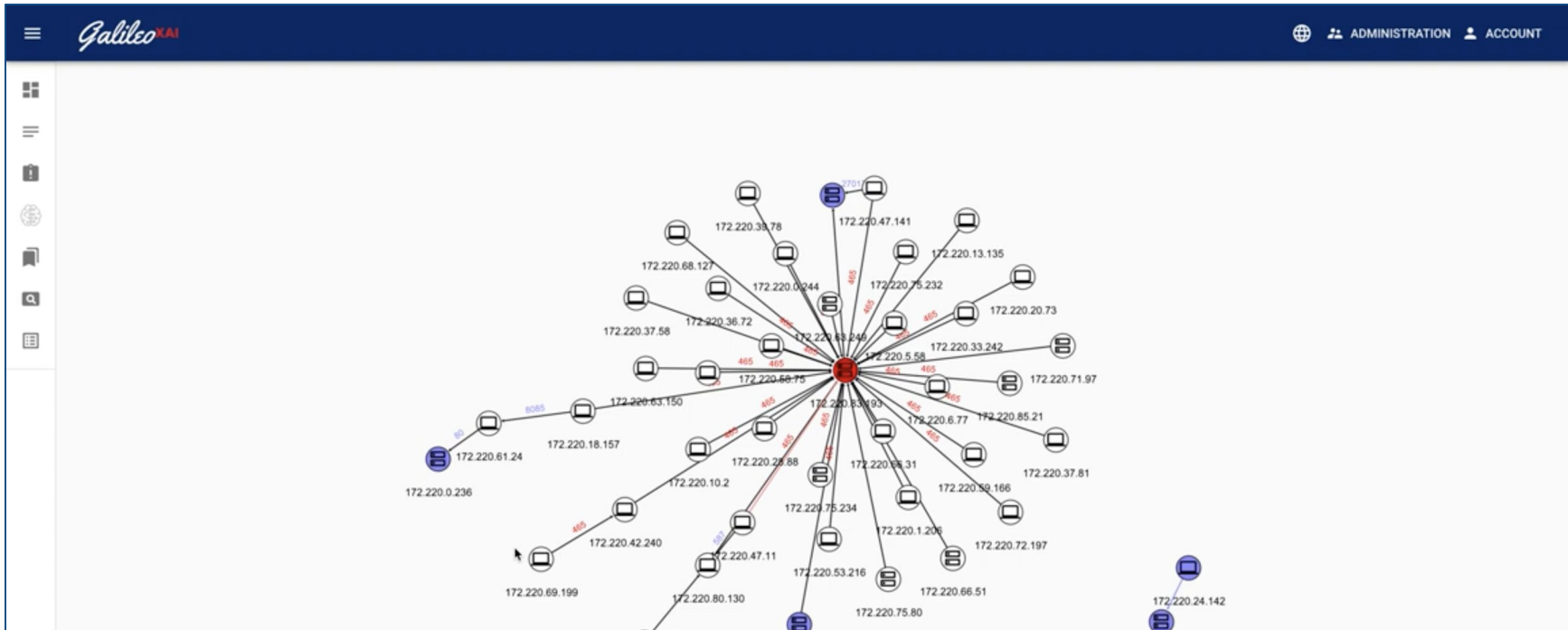
Label:  Property:  Filter:   
Select label Select property Outcome Select filter  
 Free search:   Show just my alerts    
Search text in ID and outcome Notes

ID	Match Date	User	Outcome
00b92d07-3c64-4a7b-b26d-4b9b5a297376	10/20/2020 17:12	Administrator	Confirmed
00f2f1f9-26f1-4351-954b-9cd7ba74efd5	10/20/2020 17:12	-	No outcome set
0ce14199-41a3-4cdf-8bd8-def56b05e974	10/20/2020 17:12	-	No outcome set
110c863d-4d70-4756-b9d8-54ea4d1cc379	10/20/2020 17:12	-	No outcome set
18f18a03-d07a-4a8c-9988-bc97d785a64a	10/20/2020 17:12	-	No outcome set
1a153e17-dd37-484f-a647-6292c8f3fe18	10/20/2020 17:12	-	No outcome set
1b2e165-165f-44f5-4b18-4b44f0242e2	10/20/2020 17:12	-	No outcome set

# Real-Time Analysis

Find new evidences on your data as soon as they occur.





## Discover Patterns

Not only thresholds. Solve most complicated cases where someone is connected to others subjects through very complex relationships.





## Apply Explainable AI

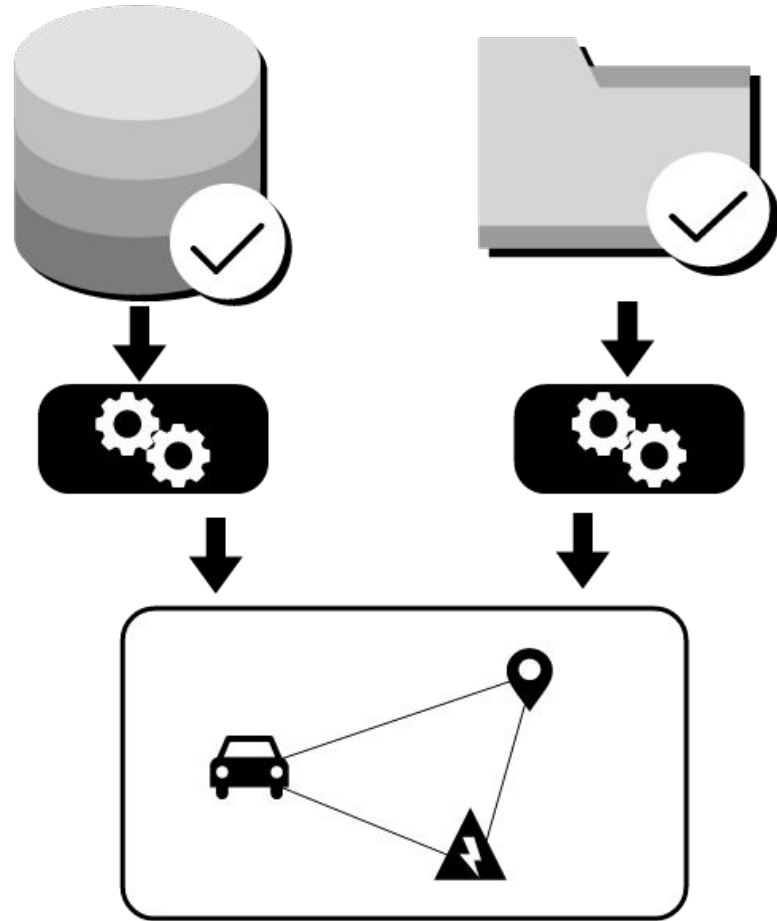
XAI explains the rationale for the decision-making process, surfaces the strengths and weaknesses of the process, and provides a sense of how the system will behave in the future

# Load Your Data

With Galileo XAI “Import” component you can load your own data with ease.

Put this custom component in your data pipeline and fill the data model.

You can start with the shipped data model and increase or change it incrementally according to your specific needs and favourite information.

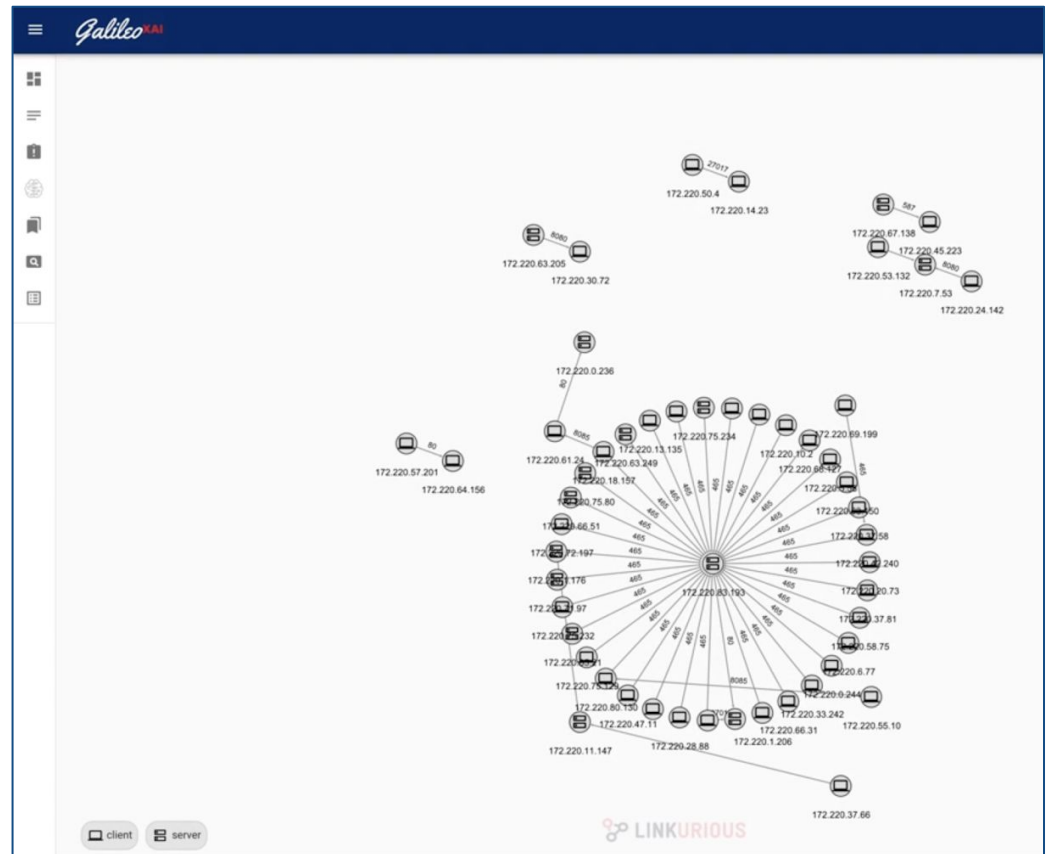


# Discover Patterns

Working with patterns is easier and more human friendly than defining thresholds.

Start thinking at your data as a “graph”, a network of connected actors, such as a Subject who DRIVES a Car INVOLVED in an Accident.

Surf on your data as well as you’re used to surfing on the web.

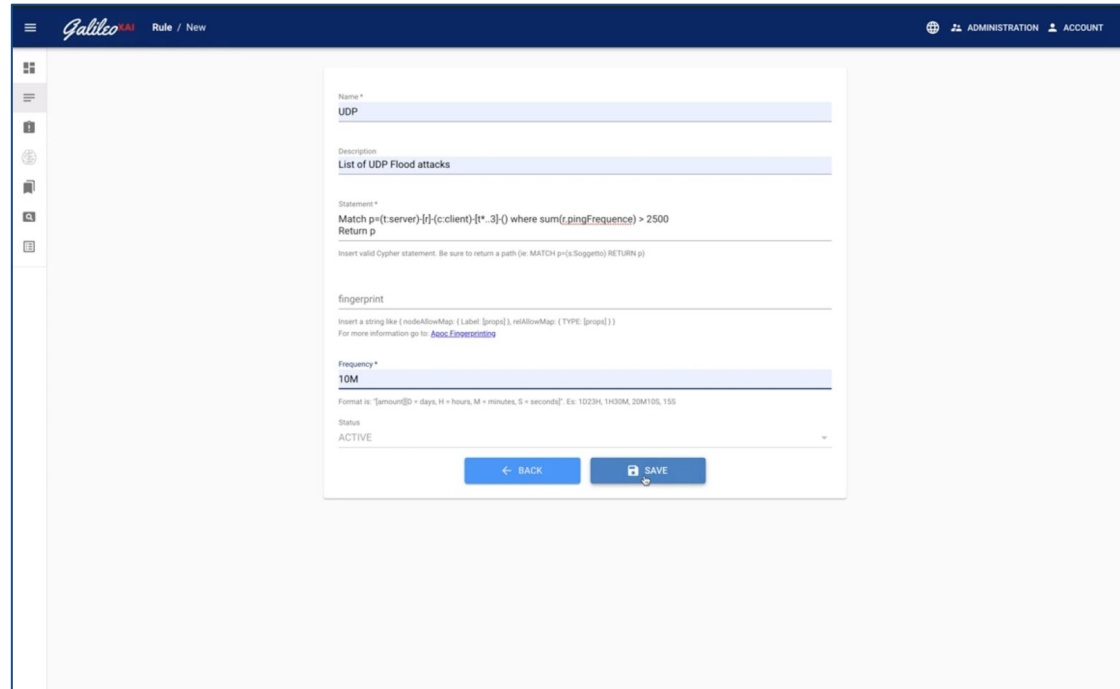


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# Custom Rules

Get new rules to improve the system.

You can buy them from the marketplace, ask for modifying existing ones or build them from scratch with our experts' team.



The screenshot shows the Galileo AI 'Rule / New' configuration page. The rule is named 'UDP' and has the description 'List of UDP Flood attacks'. The Cypher statement is: `Match p=(t:server)-{1}-(c:client)-{1*..3}-() where sum(r:pingFrequency) > 2500`. The return path is `p`. The fingerprint is '10M'. The status is 'ACTIVE'. There are 'BACK' and 'SAVE' buttons at the bottom.

Name\*  
UDP

Description  
List of UDP Flood attacks

Statement\*  
Match p=(t:server)-{1}-(c:client)-{1\*..3}-() where sum(r:pingFrequency) > 2500  
Return p

Insert valid Cypher statement. Be sure to return a path (ie. MATCH p-(r:Relationship) RETURN p)

fingerprint  
10M  
Insert a string like {nodeId:Map, {Label: [props], relId:Map, {TYPE: [props]}}  
For more information go to [App.Fingerprint](#)

Frequency\*  
10M  
Format is: '[amount]@> days, H = hours, M = minutes, S = seconds'. Ex: 1023H, 1H30M, 20M10S, 1SS

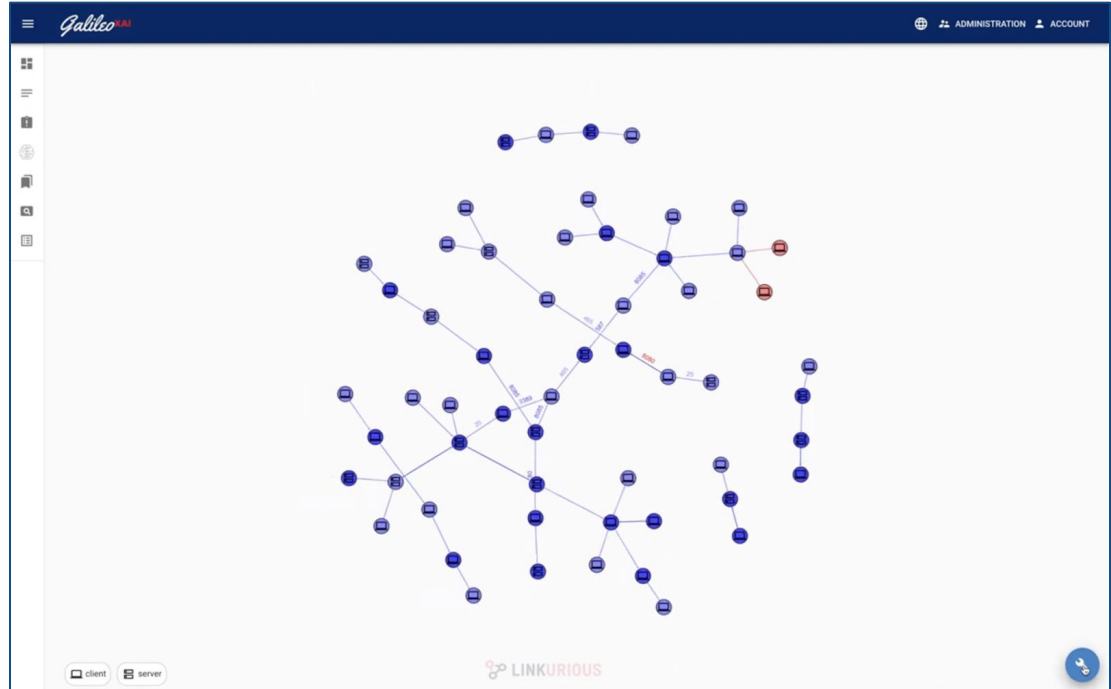
Status  
ACTIVE

← BACK SAVE

# Rules are Patterns

A rule is a pattern of connections that can be detected on the data model.

When new information come into the database, the rules are automatically applied and alarms occur when a new event is detected.

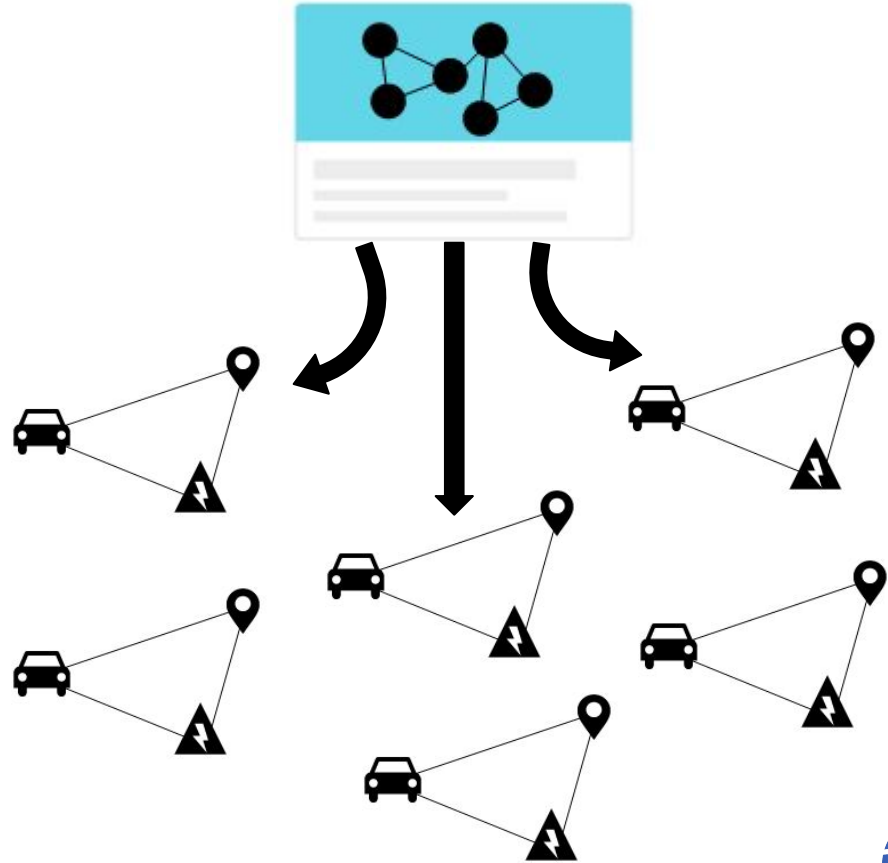


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# Apply new Rules

Apply a new rule to the entire database

- As soon as you load it on Galileo XAI
- When you change execution parameters
- When you change the data model adding new information

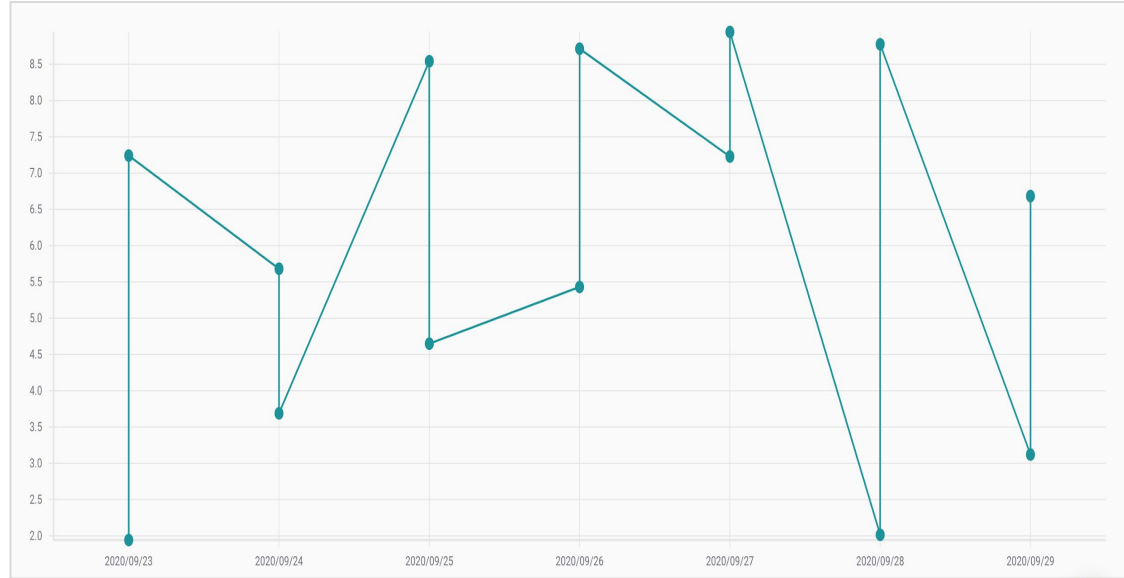


# Manage & Monitor

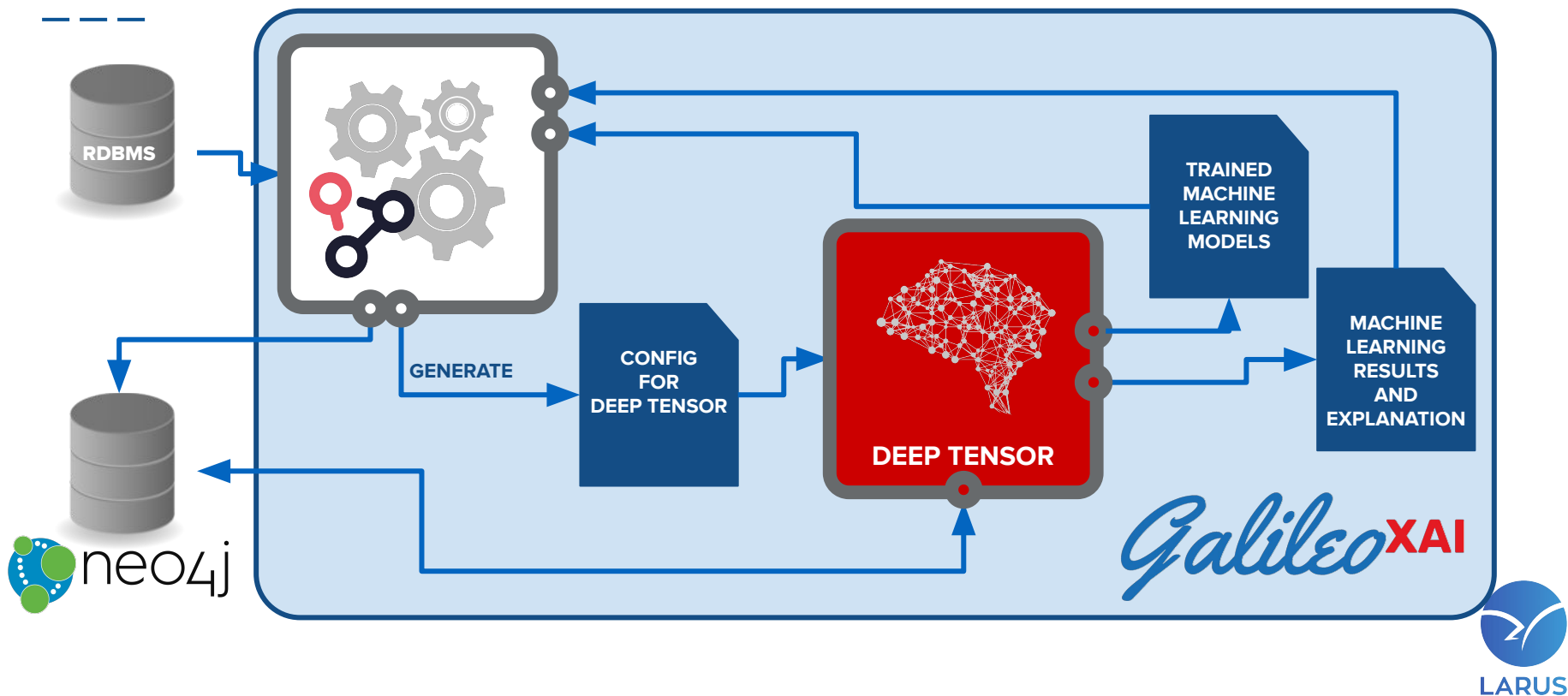
Keep track of each event trend.

Understand how your company can improve by using actual metrics.

Get the documentation related to an event, open a ticket, involve your team and start working on it.

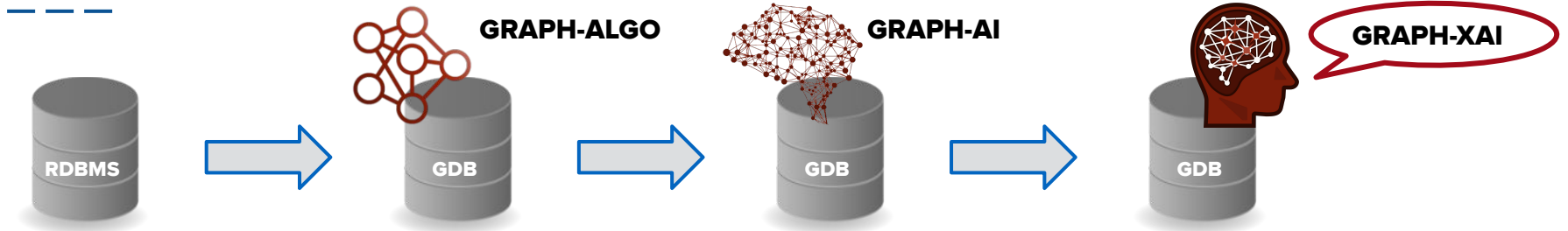


# GALILEO XAI: DEEP TENSOR<sup>®</sup> INTEGRATION





# GALILEO XAI: PIPELINE



## RDMBS to GRAPHDB

- Graph model design by GDB specialist
- Domain specific knowledge
- LARUS and NEO4J has a lot of knowhow

● *Customer and GDB specialist*

## GRAPHDB to GRAPH-AI

- Discovering and identify the cases (issue) by graph-tool
- Designing the AI-problems
- Creating training data by graph-tool
- Run GAI and tuning
- Redesign graph model?

● *GDB and GAI specialists*

## GRAPH-AI to GRAPH-XAI

- Discovering and identify the explanation needs
- Designing the XAI-problems
- Application and visualization design
- Run XAI and tuning

● *Customer, GDB and GXAI specialists*



# GALILEO XAI & DEEP TENSOR APPLICATION AREAS

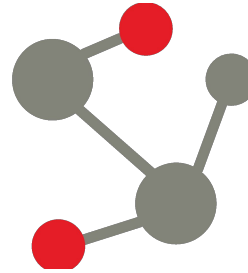
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**Finance**



**Cybersecurity**



**Chemistry and  
Genomics**



**Healthcare and  
Human Resources**



# Contacts

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*Galileo***XAI**

The graph-based platform for e**X**plainable **AI**