MÁTICA
partners

Madrid, Diciembre de 2024

GENAI FRAMEWORK

PURPOSE-DRIVEN SOLUTIONS

Inteligencia Artificial, Big Data, Business Analytics,
Gobierno del Dato y de la IA, y soluciones Event-Driven.

matica.ai

WE ARE A CUTTING-EDGE TECHNOLOGY COMPANY.
BORN SEVEN YEARS AGO, WITH A CLEAR PURPOSE: TO
HELP BUSINESSES SOLVE COMPLEX AND IMPACTFUL
PROBLEMS THROUGH THE RESPONSIBLE USE
OF DATA, TECHNOLOGY, AND
ARTIFICIAL INTELLIGENCE.

"WE LEAD THE TECHNOLOGICAL REVOLUTION
THAT IS RAPIDLY TRANSFORMING US GLOBALLY."

MÁTICA
partners

Our team of data and AI experts is made up of highly qualified senior professionals. We focus on their well-being, convinced that a motivated team ensures results of the highest quality and precision.

MÁTICA
partners

1 **HIGHEST EXPERTISE AND SPECIALIZATION**

We don't aim to be the best at everything, but rather 'the best' at what we do.

2 **WE TAKE CARE OF OUR TEAM**

KM0 Partnership, 100% flexible work hours, remote work, etc. Focus on the employee.

3 **HIGH PERFORMANCE AND MAXIMUM PRODUCTIVITY**

We work when, where, and how we can be most productive, always adapting to our clients.

4 **TRANSPARENCY AND HONESTY**

We concisely present our level of expertise and, in collaboration with our clients, assess the suitability of our partnership.
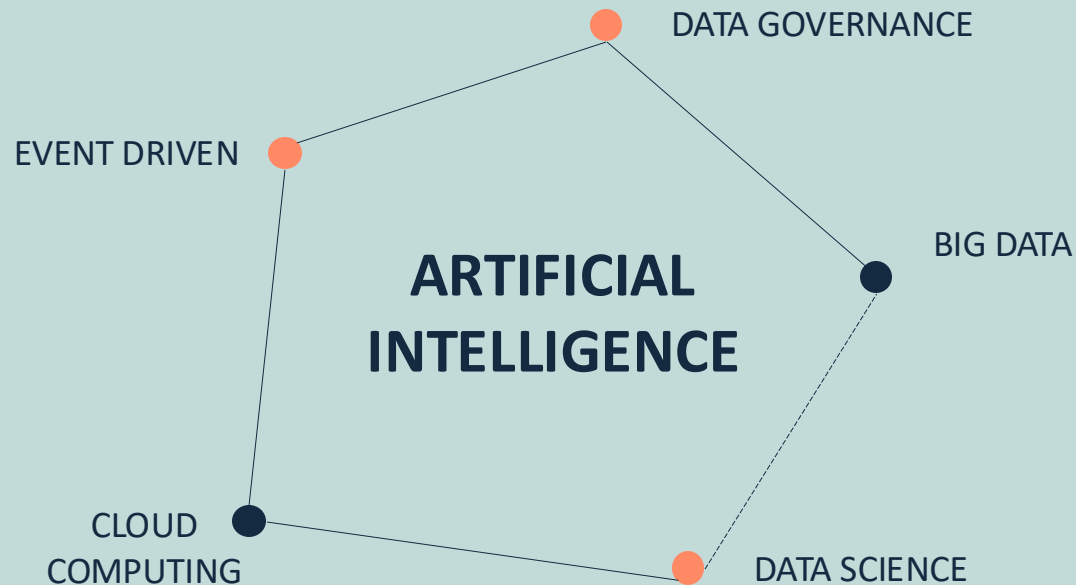
5 **HIGHEST LEVEL OF CONFIDENTIALITY**

We never talk about our end clients, nor do we use their name or image in vain.

6 **SOUL**

We are a company that says "please" and "thank you".

MÁTICA partners

What do we excel at in Mática?

1

DATA GOVERNANCE

EVENT DRIVEN

ARTIFICIAL INTELLIGENCE

BIG DATA

CLOUD COMPUTING

DATA SCIENCE

2 Detecting and turning initiatives based on Big Data and Artificial Intelligence into success.

3 Optimizing and automating 'data engineering' activities to enhance 'data science.

4 Collaborating with third parties to meet the needs of our clients.

MÁTICA partners

MÁTICA PARTNERS GROUP IS ALL ABOUT INNOVATION AND SERIAL ENTREPRENEURSHIP. AN EXAMPLE OF THIS IS:

MÁTICA partners

Over 21 years of experience in advanced analytics and AI. We transform data into real-time strategic decisions, applying Machine Learning, Deep Learning, and Generative AI to optimise processes and accelerate business growth.

DAUS DATA

Our new brand focused on Big Data, AI, and data governance projects, 100% on AWS.
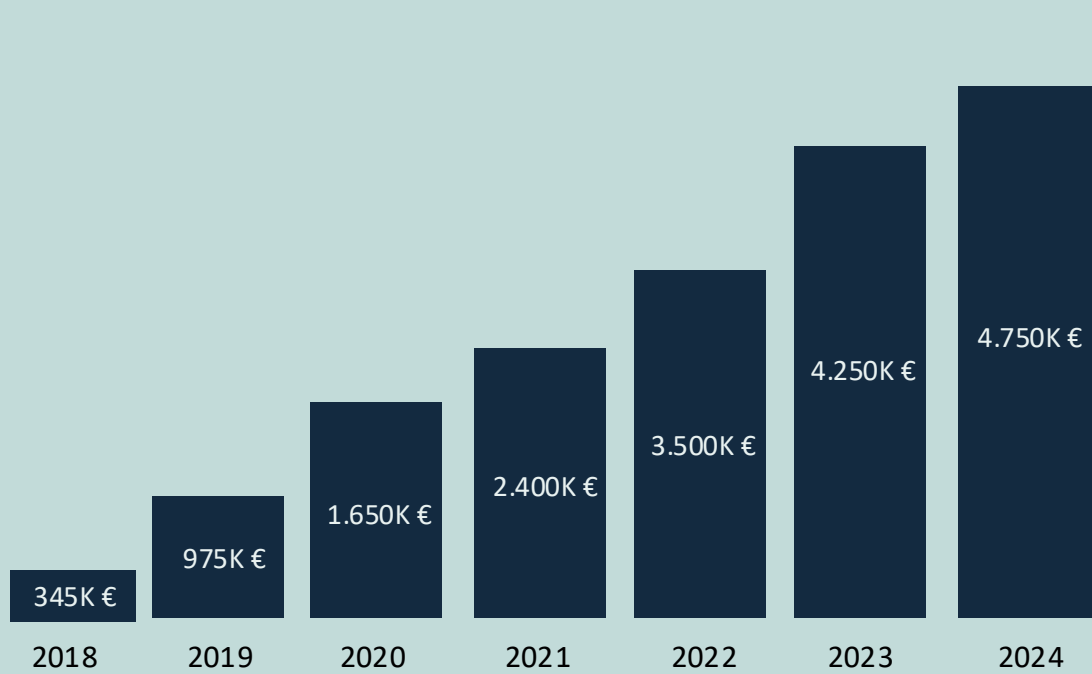
OMMA

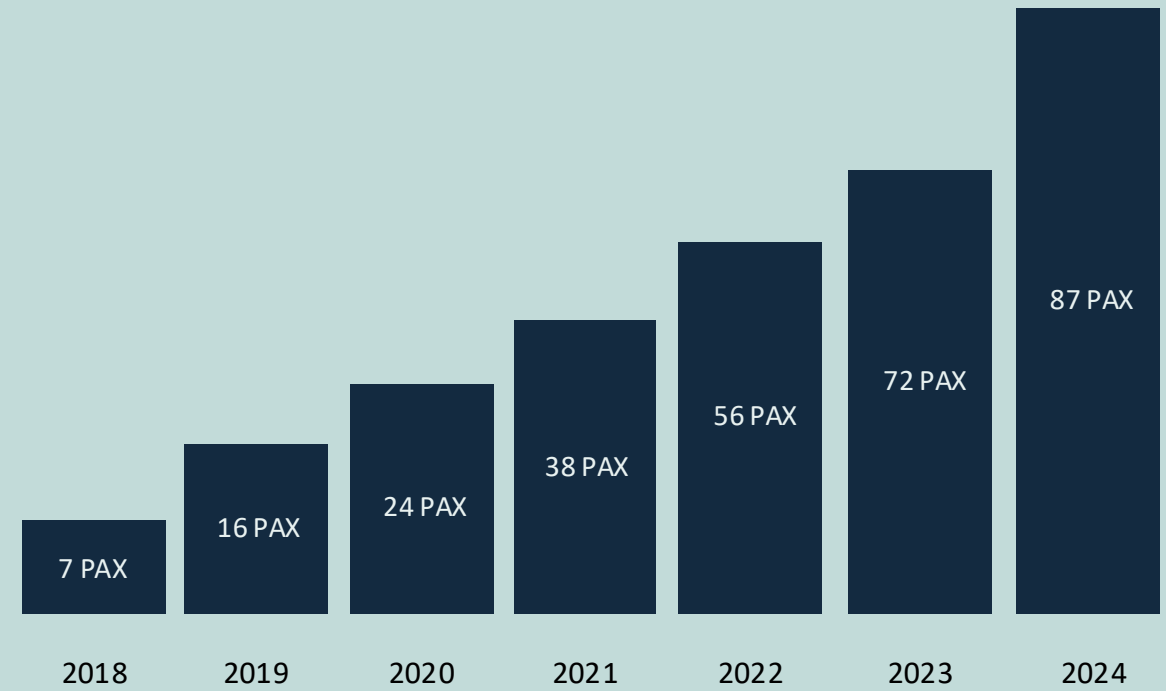Our data quality tool enhanced with AI.

MÁTICA venture builder

All investments made through Mática Venture Builder.

MÁTICA partners

MÁTICA IN NUMBERS

2018	2019	2020	2021	2022	2023	2024
345K €	975K €	1.650K €	2.400K €	3.500K €	4.250K €	4.750K €

100% STEAM

2018	2019	2020	2021	2022	2023	2024
7 PAX	16 PAX	24 PAX	38 PAX	56 PAX	72 PAX	87 PAX

47% Women   **53%** Men

MÁTICA partners

GenAI Framework
Introduction

MÁTICA
partners

THE CREATION OF APPLICATIONS BASED ON GENERATIVE AI IS A NEED THAT MORE AND MORE CUSTOMERS ARE REQUESTING EVERY DAY, BUT THE TECHNOLOGY MARKET IS STILL EVOLVING AND MATURING

1   **Complex** to use standard market libraries

2   **Multiple architectures**: Creating an LLM is still more "art" than science

3   **Examples and PoCs vs Productive Applications:** Security, Monitoring, Evaluation, ...

4   Each provider has **its own stack**. Platform-dependent development

5   Development **forecasting and predictability**

MÀTICA
partners

Mática has created the GenAI Framework, a Python framework focused on improving efficiency and productivity in the creation of applications with Generative AI, providing predictability in the development effort, providing it with all the necessary productive capabilities in a productive environment, without sacrificing its adaptability and potential.

MÁTICA
partners

For that, GenAI Framework is:

1 **Python library**, based on the standard libraries on the market

2 **Configurable** using code and configuration files

3 **Extensible and parameterizable** in all parts

4 Integrate out-of-the-box **reference architectures** into LLMs

5 Includes **security, evaluation, and monitoring** capabilities

6 Independent of the deployment environment, **decoupling** logic from the environment

7 Dramatically **reduces development, deployment, and production** times

MÀTICA
partners

A KEY ASPECT WORKING WITH LLMS IS TO TURN RAW CUSTOMER DOCUMENTS INTO QUALITY INFORMATION TO BE USED BY GENERATIVE AI.

1 **Custom Parsers**

We have created our own parsers to **improve the quality** with which the system converts **Word, pdf, ppts,** etc. to quality pieces of text that can be processed by LLMs

2 **Multimodal**

We don't just process text. We have integrated **image processing** to be used in the responses of our models

3 **Market Tools**

We integrate with the best tools on the market such as **LlamaParse** and allow **ad-hoc integrations** of any other tool

4 **Indexing Architectures**

From simple indexing like **Parent-Retrireval** to the latest market techniques like **GraphRag** Opensource and Cloud-based technologies

MÀTICA
partners

CUSTOMERS OFTEN START WITH GENERATIVE AI AGENTS TO WORK WITH THEIR INTERNAL DATABASES. TO DO THIS, OUR FRAMEWORK ALLOWS PROTOTYPING AND DEPLOYMENT IN AGILE PRODUCTION:

1 **Real-time Creation and Prototyping**

Create a RAG setup with a **friendly UX environment**
Prototype results and evaluate their result

2 **Automatic Evaluation**

In improving productivity, different models can be **evaluated against automatically labeled data**

---

3 **Production Deployment**

Direct integration of our RAGs or two-line code integration
Deploy on any architecture

4 **Observability**

Measure and control **costs**
Analyze **system usage**

MÀTICA
partners

RAGS OR OTHER MODELS ARE USUALLY INTEGRATED UNDER AGENTS: MORE COMPLEX REASONING SYSTEMS

1 **SQL Out-of-the Box Agents**

Creating **SQL Agents Visually**
Advanced **behavior settings**
Security at different layers
Integration with elements of **data governance**

2 **MultiAgent Architectures**

We make it easy to build complex architectures
We reduce **development time by up to 50%**

3 **Observability and Integration**

We allow you to obtain **complete traceability** of agents
Detailed **measurement of results and behavior**

4 **Structured Results**

Not just text but **structured information** to display in **charts, tables, or other UI components**

MÀTICA
partners

A KEY ASPECT OF SUCCESSFUL AI PROJECTS IS EASE OF USE: USING TECHNOLOGY WITHOUT KNOWING IT'S BEING USED

1 **Reusable Web Components**

Reusable **Web Chat Components**
Streaming response
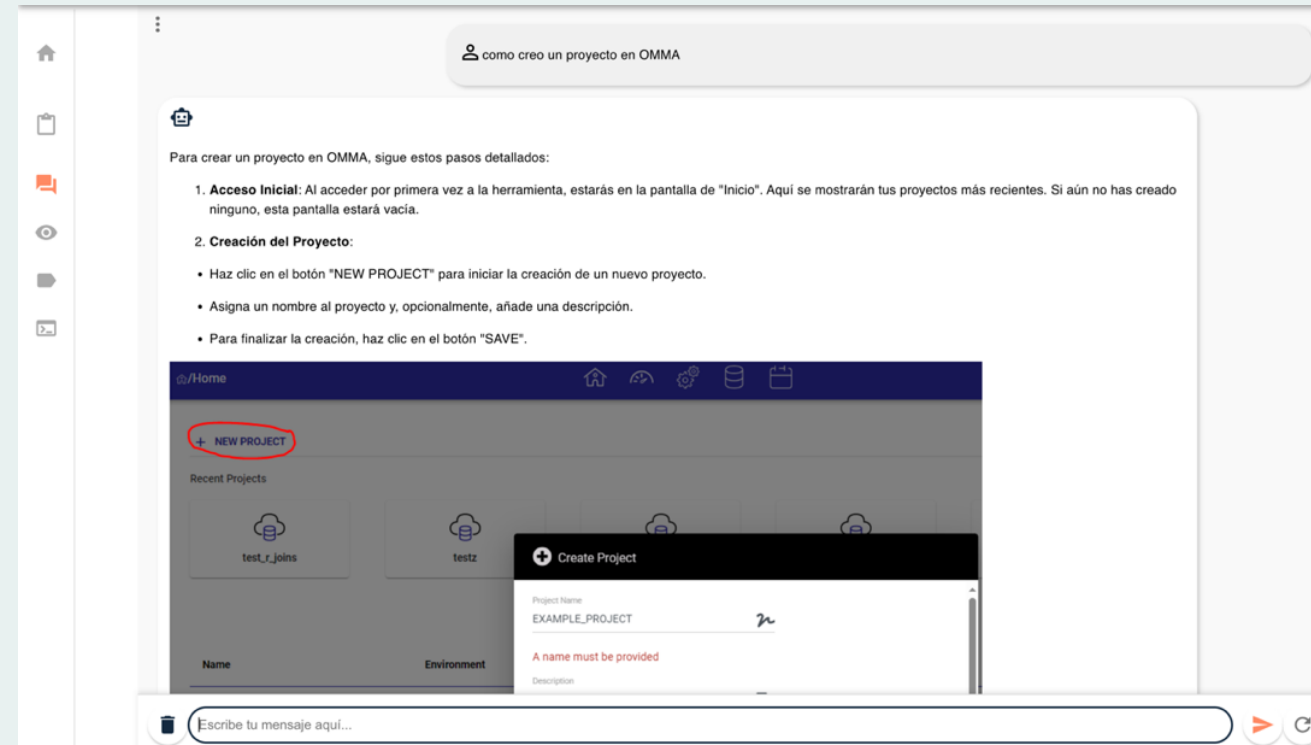Viewing **tables, graphs, and images**
Extensible and customizable

2 **Messaging Connectors**

Integration with major messaging technologies such as:
Slack, Teams, and Google Chat.
Designed to create **"Peer Buddies"**

1 **EFFICIENCY IN DOCUMENT PROCESSING**

- Hierarchical processing
- Image Processing
- Tag and keyword extraction

2 **DRASTICALLY REDUCED DEVELOPMENT TIMES**

- Our teams have reduced development times by 70%
- Testing and validation times reduced by 50%

3 **PUBLIC APP CREATION OR PRIVATE**

- Private deployments on any cloud provider.
- Integrable with any client architecture

4 **EASE OF USE, LOW LEARNING CURVE**

- Python library, simplified methods, much easier to use than base libraries such as LangChain or LlamaIndex

5 **RAG SOLUTIONS PACKAGING**

- Predictability of results allows the creation of applications with Generative AI to be packaged in closed commercial solutions

6 **SECURE, SCALABLE, AND FAMILIAR**

- Easy, flexible and efficient but above all safe.
- Based on market standards and reference architectures

MÀTICA
partners

GenAI Framework Impact in Project Dev Cycle

MÁTICA partners

GENAI FRAMEWORK IS DESIGNED TO SUPPORT ALL STAGES OF BUILDING APPLICATIONS WITH GENERATIVE AI:

DEVELOPMENT

- Rapid prototyping and idea validation
- Secure development
- Simple to complex architectures
- Market reference architectures

DEPLOYMENT

- Public/private settings
- Concurrency and security
- Public or Cloud-Native, tailored to the customer's infrastructure
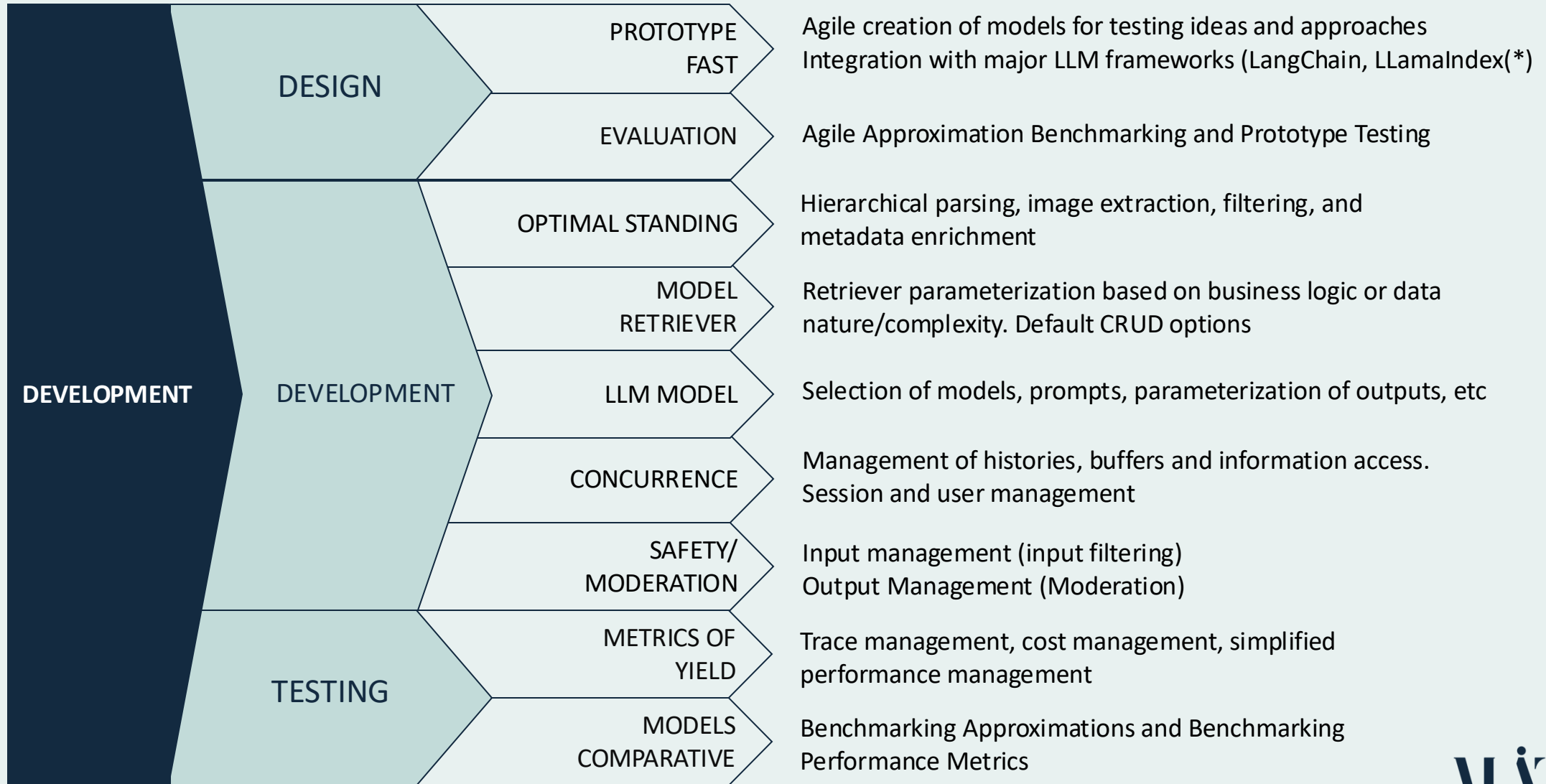
MONITORING

- System Evaluation and Performance
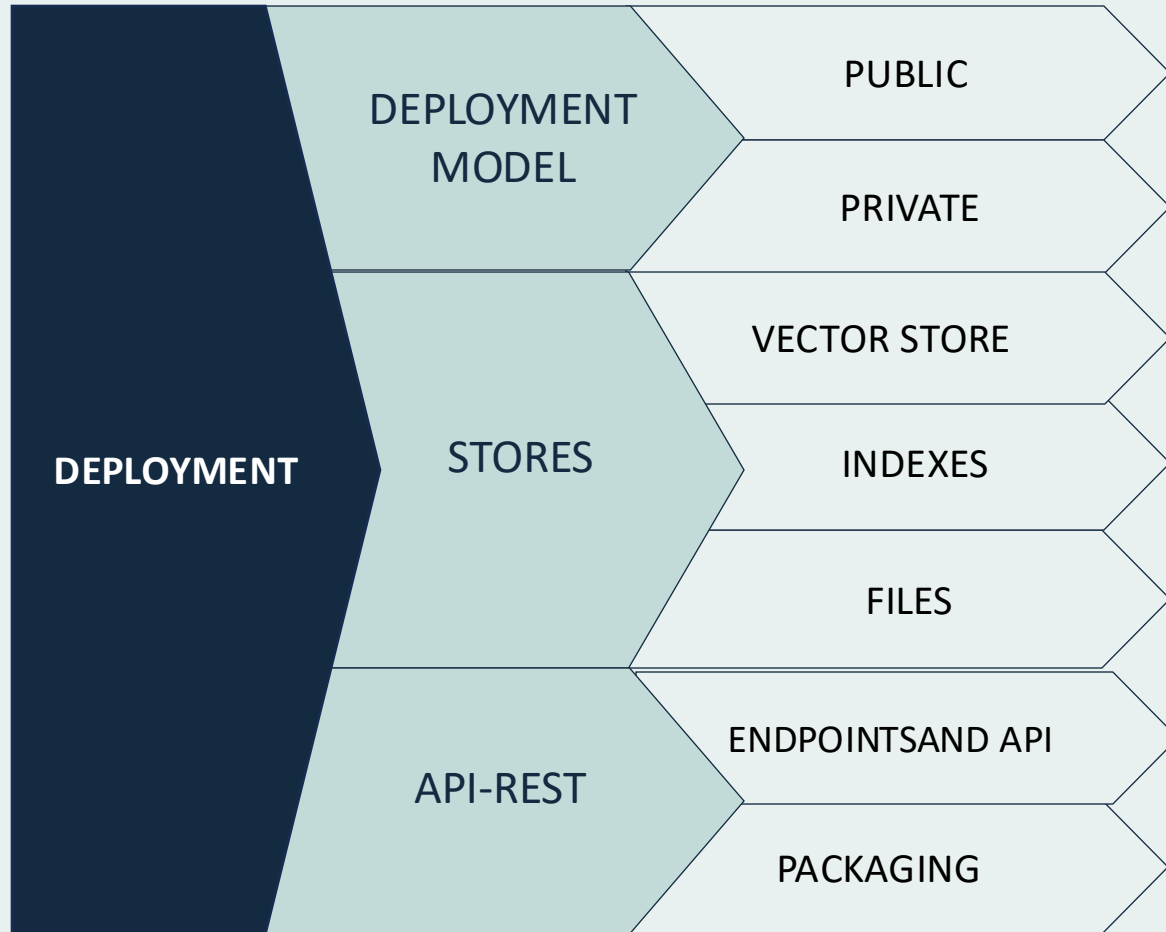- Cost control and predictability

CROSS

- Based on the reference libraries on the market
- Extensible in all its components
- Creation in a few lines of code
- Can be integrated with any other Python code

MÀTICA partners

DEVELOPMENT

DESIGN

| PROTOTYPE FAST | Agile creation of models for testing ideas and approaches Integration with major LLM frameworks (LangChain, LLamaIndex(*) |
| EVALUATION | Agile Approximation Benchmarking and Prototype Testing |

DEVELOPMENT

OPTIMAL STANDING	Hierarchical parsing, image extraction, filtering, and metadata enrichment
MODEL RETRIEVER	Retriever parameterization based on business logic or data nature/complexity. Default CRUD options
LLM MODEL	Selection of models, prompts, parameterization of outputs, etc
CONCURRENCE	Management of histories, buffers and information access. Session and user management
SAFETY/ MODERATION	Input management (input filtering) Output Management (Moderation)

TESTING

| METRICS OF YIELD | Trace management, cost management, simplified performance management |
| MODELS COMPARATIVE | Benchmarking Approximations and Benchmarking Performance Metrics |

MÁTICA partners

(*) currently LangChain, Llama Index in development

GENAI FRAMEWORK IMPACT: **DEPLOYMENT STEP IMPACT**

DEPLOYMENT

DEPLOYMENT MODEL
- PUBLIC
- PRIVATE

STORES
- VECTOR STORE
- INDEXES
- FILES

API-REST
- ENDPOINTSAND API
- PACKAGING

Deployment in a "public" environment: OpenAI + Stores in its own infrastructure

Deployment in a "private" cloud environment: Azure (Azure OpenAI), AWS (Bedrock) and GCP (Bard/Gemini) (*)

Vector Stores openSource or native Cloud like Azure Search, OpenSearch, etc.

Index Public or private stores

Local/remote system of files o Object Stores as BlobStorages o S3

API-Rest for LLM Agent access, ready for direct access. Integration with different API-Rest managers in Python (**)

Pre-configured backend packaging.
JavaScript/React FrontEnd plugins and components to help and support

(*) Currently public, available on AWS and Azure. GCP development in progress.
(**) Currently using Flask

MÁTICA
partners
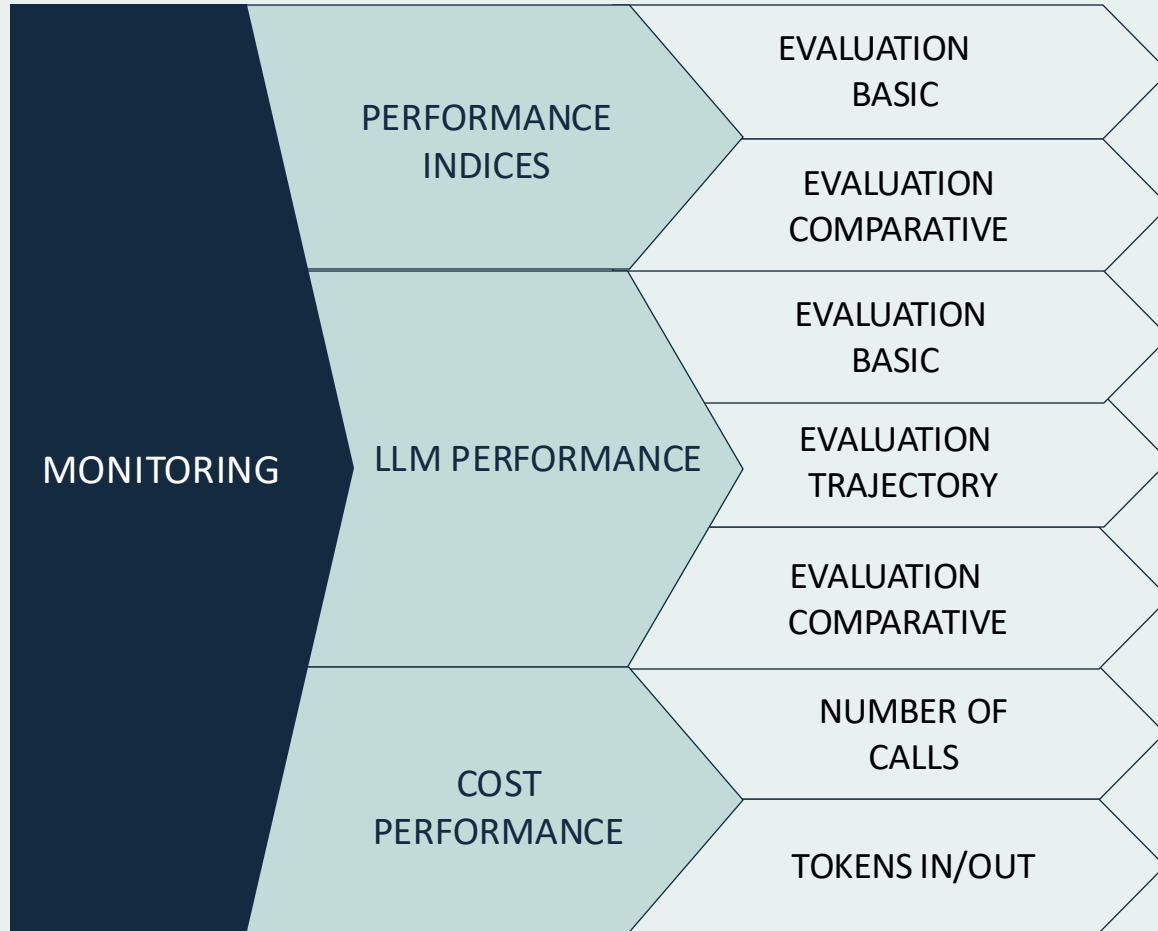
MONITORING	**PERFORMANCE INDICES**	EVALUATION BASIC	Score based on question docIds Requires testing dataset
		EVALUATION COMPARATIVE	Comparison of results in the question docIds success Require test data or assessment LLMs
	LLM PERFORMANCE	EVALUATION BASIC	Score basado en parecido entre question expectedResponse/realResponse
		EVALUATION TRAJECTORY	Basic evaluation in the different steps and elements of the chain (Evaluating their practicality)
		EVALUATION COMPARATIVE	Comparison of score-based LLMs (requires test data) or by comparative LLM
	COST PERFORMANCE	NUMBER OF CALLS	Tracking and measuring the number of calls made per execution
		TOKENS IN/OUT	Tracking and measuring the number of calls made and the input and output tokens per execution

MÀTICA partners

GenAI Framework
Use Cases

COMMERCIAL SQL AGENT

An AWS-based agent (Amazon Bedrock) was created which, based on the customer's information needs, is able to consult the commercial DataLake, obtain the data and provide information to the user in a rich format of tables, graphs or text.

The client had multiple dashboards for the analysis of commercial activity, but on many occasions the sales team needed specific information on a client, sector, etc. without having to access and navigate through multiple dashboards. At the same time, they wanted the learning curve and reluctance to change to be minimal.

Key aspects

- ◉ **Integration with the customer's corporate messaging tools (Teams) to have the agent as another companion**

- ◉ **Multi-level security integration: role-based data access security, prompting security**
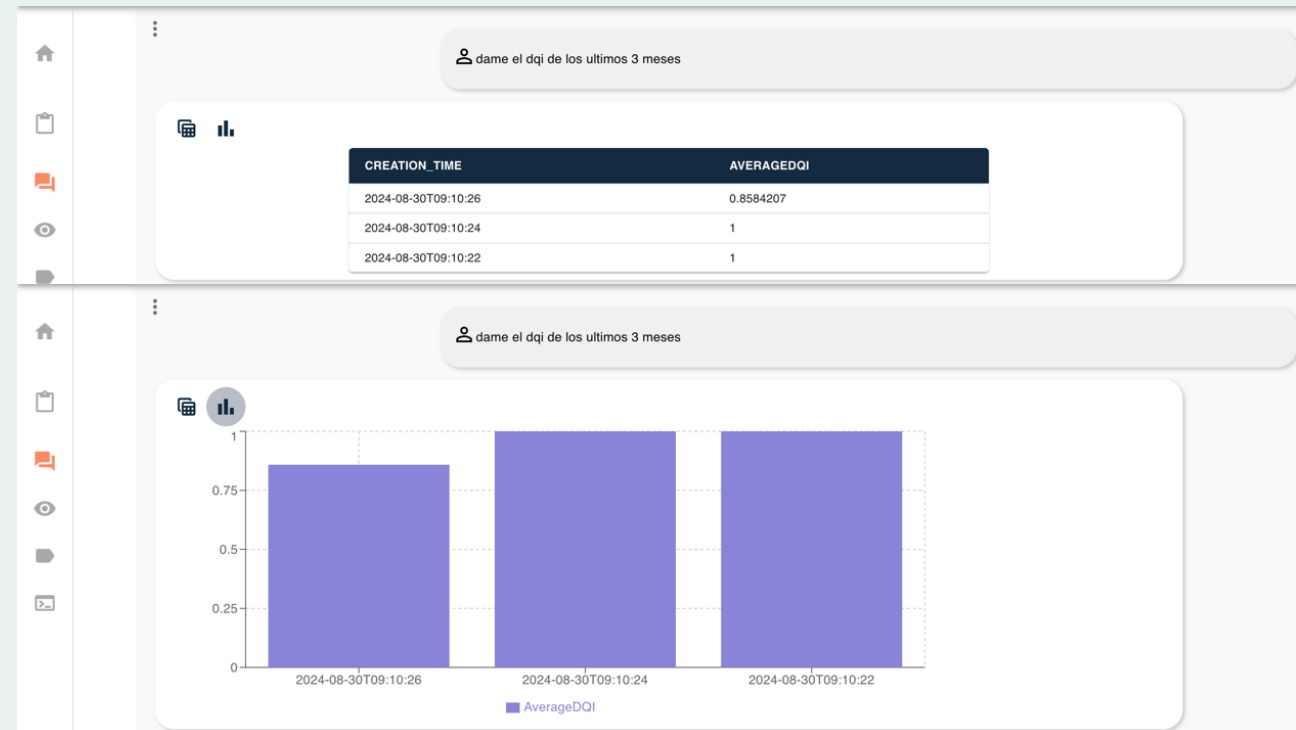
- ◉ **Scalable multi-agent structure both vertically (more complex agents) and horizontally (new specialized agents)**

SUPPORT MAILING AUTOMATIC PROCESSING

Based on a multi-agent architecture system:

- **Router:** based on the user's request and the context, if any, the support area or topic to be resolved is selected and the request is routed to a specialized assistant

- **Specialised assistant:** assistants in charge of responding to a specific type of request. 4 types of specialized agents were created:

The client had a set of mailboxes for incidents and doubts. Each of them involved more than 70 man-hours per week for attention and response. A system of agents was created to respond to more than 90% of requests through a structure of specialized assistants

Specialized Agents

◎ **Semi-automatic response agents: based on a set of predefined responses (usually information regarding tool urls) and customer information (obtained from Active Directory or HR tools) the system provides one of the predefined responses**

◎ **RAG: normally applicable to queries of procedures, regulations, etc. The system based on the client's private systems the assistant searches for the relevant information and provides an explanatory answer**

◎ **SQL agents: when it is necessary to obtain information through database queries (with or without data modification)**

◎ **Complex Reasoning Agents: when it is necessary to connect with APIs or multiple systems, and require a set of steps and complex reasoning**

MÁTICA
partners

PEER BUDDY

Creating a Peer Buddy is not just a Chatbot. It is an agent with tools to provide information and recommendations to the user, but includes specific elements such as:

Employee support assistant, advice on company rules and policies, meeting recommendations, insights for human resources and monitoring of the level of employee satisfaction

Key Aspects

◉ **Long-term memory: creates a real-time employee profile based on interactions, providing relevant information and personalizes all conversations**

◉ **Sentiment Analysis: monitor states and emotions to detect frustration problems, drops in motivation, etc.**

◉ **Able to monitor and improve employee satisfaction indicators in the first months.**

Evolution

Its integration with the company's Career Path is currently evolving, to provide information and recommendations for employee evolution, as well as automated support for internal processes and procedures.

👤 Peer Buddy

Latest conversations ⌃

💬 Holiday calendar
Today

💬 Employee benefits
Last week

Reminders ⌃

No reminders

Hello Maria!

How can I help you today?

🔔 Send survey to HR

You can start with these suggestions

📄 Find a document   👤 Show me a contact info   📅 Add a reminder

Chat with your peer buddy... ➤

Technical Analysis of Documentation (Internal)

Assistant capable of analyzing papers, documents and books on a topic and creating real-time query bots that allow the analysis and exploration of topics, as well as recommendations on related topics of interest.
In the process of development, its evolution to the automatic generation of tutorials and training materials.

ChatBot Migration DialogFlow a GenAI

Migration of an Employability Consultation Chatbot and training offer from traditional DialogFlow technology integrated in AWS to an architecture with GenAI using LangChain and AWS Bedrock.

The project not only streamlines the chatbot experience by minimizing interactions where the bot is not able to provide a response, but has also reduced its support and maintenance cost by 70%.

TalentMatch

Internal tool for matching offers and candidates. The system automatically parses the CVs received for a job offer, classifies them according to a defined taxonomy and prioritizes them based on the weights (importance) that the user gives to each element, so that a recommendation of profiles is provided for a personalized offer and weighted to the user's preferences.

MÀTICA
partners

MÁTICA PARTNERS SL

Av. Roma 13 – 15 Esc B Entresuelo 2º
08029 Barcelona

C. Martínez Izquierdo 45 Planta 1 Local 7
28028 Madrid

www.maticapartners.com

CONTACTO   JUAN RAMÓN GONZÁLEZ
CTO & COFOUNDER
jrgonzalez@maticapartners.com