10) MARINA - Manufacturing optimization with ARtificial INtelligence Advanced planning & scheduling; **ManoGem SA**, Belgium

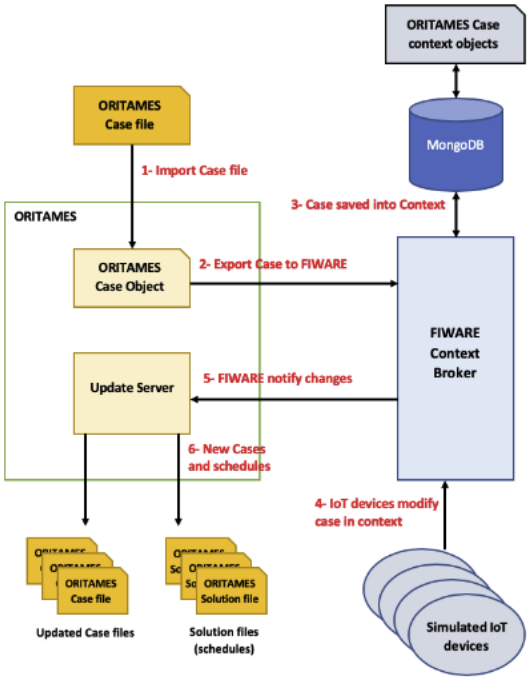
EXPERIMENT DESCRIPTION

Industry requires intelligent systems that turn raw data into useful information for optimization of operations. Besides ERP, SCM or MES, Advanced Planning & Scheduling (APS) is the key to KPI better real-time decisions and improvements as it brings intelligence on top of the ERP. APS is an area with high potential and APS usage is growing at about 7% CAGR worldwide. The concept of the MARINA project proposal is to "use AI to fine tune the AI". I.e. to build an AI and ML layer on top of an existing multi-solvers and multi-heuristics APS optimization system in order to automatically find optimal heuristics parameters and to self-learn from historical data how to adapt to changing datasets and constraints.

TECHNICAL IMAPCT

Today, fine tuning of solver parameters is done by hand by an expert in the Objective Screen, this is a tedious and error prone procedure. Then, without optimized parameters, finding an optimal schedule can take a very significant time, even hours. In the new process, solver parameter tuning is done using the implemented ML (Machine Learning) framework that:

- Performs an automatic learning of parameters
- Is connected to FIWARE / MIDIH architecture through the Context Broker
- Provide mapping of models stored in FIWARE / MIDIH
- Process real-time manufacturing information captured by IoT devices.



ECONOMICAL/BUSINESS IMPACT

Having reached the project results of an enhanced ORITAMES APS improves the market position of ORITAMES. Already a very completive package compared to SOTA, the AI brings better optimization, more manufacturing KPIs improvements and thus better ROI for MangoGem's customers.

In a recent study, McKinsey estimates the disruptive impact of AI applications in the supply chains and the economic value creation potential of AI for "supply chain" (meaning ERP, SCM, APS, ... applications) at around 1.4 trillion USD for the next 20 years!
Using "AI to optimize the AI" is the key concept and the benefits of this approach are twofold:

- AI is able to plan, schedule and explore optimization scenarios better than traditional approaches, combining the best of machine computing power and human know how, thus enabling more efficient organizations,
- AI is able to make implementation of SCM and APS (Advanced Planning & Scheduling) systems much easier, in shorter time and at lower costs by making modeling easier, improving data quality and lowering the dependency on human expertise

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