SEPTEMBER 13, 2023

Object-centric process mining: how ERP's x-ray becomes an MRI

PROFESSOR WIL VAN DER AALST
Chief Scientist at Celonis

For numerous companies, process mining has evolved into an essential driver for digital transformation success. It is traditionally known to function as an "x-ray", enabling business leaders to gain a comprehensive understanding of processes from start to finish, and therefore enabling them to optimize business processes to improve business performance. It provides organizations with a data-based method of generating a positive impact on the top and bottom line, as well as reaching sustainability goals.

The advancement of process mining technology includes the integration of new functionalities, such as providing a 'three-dimensional' perspective of a company's business processes (while traditional process mining is 'two-dimensional').

Referred to as object-centric process mining (OCPM), this approach provides a robust and unified representation of an entire organization's internal processes. Rather than monitoring individual processes and treating them as isolated entities, OCPM enables companies to create a complete digital twin that captures all the objects (e.g., trucks, customer orders, parts) and events (e.g., shipment arrival, dispatching, resolution of a customer case) in the business.

Process mining is booming around the world. The market grew by 75-80 percent between 2020 and 2021, and will reach between $1.65 and $1.75bn by the end of 2023, according to Everest's report, 'The Evolution of Process Mining'. Gartner predicts a double-digit compound growth rate (33 percent) for the market, adding it expects 80 percent of organizations will embed process mining capabilities in at least ten percent of their business operations by 2025. By the end of this decade, Polaris Market Research predicts that the process mining market will be worth $11bn worldwide.

The financial returns of process mining can be considerable, and even though traditional process mining offers business leaders a uniquely dynamic tool, it can have even more impact if it can be applied to analyze and optimize interconnected processes.

This is why OCPM is so crucial: it allows organizations to gain insights and improve interconnected processes across different departments. OCPM takes process mining from an x-ray to a three-dimensional (MRI) scan.

The evolution of process mining: OCPM

Today's business processes are highly interconnected, and organizations need a 3D overview of their business processes. For example, sales orders also involve an invoice, a shipment and multiple systems across order management, procurement, supply chain and production.

Traditional process mining extracts data from source systems, and transforms this into a flat event log, which helps businesses zero in on blockages and inefficiencies – for example, to see the reason for delays in orders. However, when this flattening happens, the interactions between all the other objects involved in the business process are lost.

This is important because when you flatten the data, you introduce the problems of convergence and divergence. OCPM doesn't require data to be flattened like traditional process mining does, and interactions between the way objects interact in reality are preserved. This is immensely helpful in determining the 'butterfly effect' root causes in processes up or downstream very quickly, aligning departments to better work together, and it brings us closer to closing the loop between insights and action at the real speed of business.

Understanding OCPM in the real world

When a customer places an order with an online retailer, this may consist of multiple items; some of which may be in stock, and others might need to be produced. This triggers the creation of orders in the company's production management system. The in-stock items can be immediately delivered to the customer, but the other items must be shipped later. After all of the items are delivered, an invoice is sent. In this scenario, there is a sales order, sales order items, production orders, shipments and an invoice.

This demonstrates that processing a single sales order can involve multiple objects scattered across different systems and departments. The reality of multiple sales orders means it is possible that a single shipment includes items from different orders. This can happen when the same customer places multiple orders and the company batches the shipments together. The complex real world involves one-to-many and many-to-many relationships in end-to-end processes.

OCPM aims to capture these relationships more quickly, precisely enabling optimal and coordinated performance across all operational processes. Improving shipment efficiency through order bundling and reduction of end-to-end lead times from procurement through production becomes easier and faster to address.

As shipments, orders, invoices and goods receipts are strongly intertwined, problems that are related to one object type may have effects on many of the other items. This can create undesirable outcomes. For example, an issue procuring a battery could end up causing a late shipment, which could generate a negative customer experience, leading to an order cancellation. This means that objects cannot be fully and effectively analyzed in isolation, which is where OCPM comes in to reveal the full picture.

Taking this further with digital twins

OCPM starts with a powerful object-centric data model – an extensible business representation of your company that serves as the core of your digital twin. It can run alongside businesses' existing implementations and includes a set of automated knowledge of objects and events embedded within the data model.

Utilizing the digital twin will firstly allow for greater modeling simplicity. The data model objects are reusable and modeled in natural language common to the business itself, like invoices, orders and deliveries. This makes it much easier to work with for any process mining initiative. Reusability means no longer needing to reinvent the data pipeline for every project. The natural language of the model opens the door to broad adoption of AI in a company's process transformation.

With traditional process mining, a business needs a data model for each process it wants to examine. With the new object-centric data model, organizations can dynamically adjust process analyses, switching perspectives from process to process without needing to go back to the source data. This significantly reduces onboarding time and allows companies to get to insights and key actions much faster – which they can then action at the real speed of business.

Significance of OCPM

Process mining is currently undergoing a remarkable evolution, enhancing the transformative benefits that traditionally the technology has already delivered in practice. OCPM is an evolution and advancement of process mining technology that enables customers to find and capture value across and within interconnected business processes, rather than monitoring individual processes and treating them as isolated entities. In a challenging economic landscape, this holds immense importance, particularly given the increasingly intricate nature of business systems and processes.

The introduction of new OCPM initiatives marks only the initial stage. Capabilities such as predictive analytics within existing process mining functionalities will all receive significant advantages from object-centric process mining. In addition, the object-centric data model becomes a gateway to landing generative AI into the work of process improvement. All existing types of process mining can transition from a 2D to a 3D perspective, leading to a revolutionary transformation of the entire industry. The possibilities for applications are boundless, and the potential impact is extensive.

https://erp.today/object-centric-process-mining-how-erps-x-ray-becomes-an-mri/