ICPM Fellows Session Summary: Challenges in Object-Centric Process Mining (OCPM)

Summarized by Dirk Fahland

Introduction

This document summarizes the ICPM Fellows session on Challenges in Object-Centric Process Mining (OCPM). The session involved five practitioners presenting challenges in applying OCPM in industrial practice, followed by discussions.

The summary includes

- detailed descriptions of each challenge,
- insights from discussions,
- key lessons learned,
- relevant research areas for collaboration, and
- detailed notes with deep insights from the discussion.

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Practitioners Challenges

Challenge 1: Lack of Standardized Modeling Procedure

Presenter: Frederik Knockaert, Euroclear Bank

Context & Objective:

Euroclear Bank, a financial institution handling post-trade services, has been exploring OCPM to improve process transparency and efficiency. The goal is to move from case-centric to object-centric models to better reflect the complexity of their services.

Challenges:

- No standard procedure or methodology for building OCPM models from scratch.
- Difficulty in defining objects and attributes consistently across services.
- Need for a scalable, repeatable approach that data analysts can follow independently.

Research Needs:

- Development of a "cookbook" or SOP for OCPM modeling that gives guidance on aspects such as "this is how you define your objects and attributes", "this is how …".
- Guidance on iterative model building and object definition.

Challenge 2: Time-Intensive Model Building

Presenter: Timo Peters, Bayer

Context & Objective:

Bayer is implementing OCPM across divisions to support end-to-end process visibility, especially in supply chain and manufacturing.

Challenges:

- OCPM models are more complex and time-consuming to build than case-centric ones.
- Missing links between documents require inference from other data and subsequent validation
- Consequence is longer information gathering and validation phase as process knowledge and responsibility are split or divided across division and systems
- End-to-end view requires multiple tool integration to consume data, which in turn causes high integration effort across tools and systems.

Research Needs:

- Methods to accelerate data modeling and integration.
- Organizational strategies to align responsibilities and reduce silos.
- The ambition is reduce time from an average of 4-12 weeks to less than 14 days

Challenge 3: Object Reuse and Abstraction

Presenter: Florian Koepke, Olympus

Context & Objective:

Olympus aims to optimize its service processes, particularly the loaner device logistics for medical equipment.

Challenges:

- Process considered spans multiple systems, SAP CRM, SAP ERP (2x), SalesForce
- Need to use the same object in different contexts within the model (e.g., inbound and outbound deliveries originate from the same table but need to be represented separately, relationships between different object representations however leads to cycles in the data model), current solution is generating sub-objects that can be re-used but makes the model more complicated
- Current tools do not support object reuse or abstraction well.
- Difficulty in consolidating similar objects/events from different systems into higher-level representations.

Research Needs:

- Conceptual support for object reuse and abstraction.
- Tooling to support hierarchical object modeling and event abstraction.
- Tooling to support versioning as data models evolve (together with underlying source systems)

Challenge 4: Analyzing Inter-Object Influence

Presenter: Urszula Jessen, ECE

Context & Objective:

ECE manages shopping centers and uses OCPM to understand complex interdependencies in procurement and payment processes.

Challenges:

- OCPM allows to model life-cycles of individual objects in the same process, e.g, purchase orders and invoices. However, OCPM currently does not support modeling how, for example, delays in processing one object are caused by process steps in

another object. For example, a delay between Invoice Blocked and Invoice Paid can be caused by a late PO release (that happened in between both Invoice events)
- Difficulty in analyzing how objects influence each other.
- Lack of performant methods to query across object life cycles.
- Often need to "flatten" the event log again to perform deeper analysis.

Research Needs:

- Scalable algorithms for querying inter-object relationships.
- Visualization and interaction tools to support root cause analysis.

Related User Story:

I want to trace invoice delays back to upstream process dependencies (e.g., late PO release), so that we can reduce payment delays and improve supplier relationships.

Given: SAP ERP logs for P2P and AP, relational structure with multiple object identifiers (PO, invoice, GR).

Wanted: An OCPM-compatible view that:

- Preserves relations between PO, invoice, and GR.
- Supports querying across object lifecycles.
- Enables actionable insights on systemic process delays.
- Let me discover where and how actions/events in one process impact the behavior of another.

Challenge 5: Governance and Data Sharing

Presenter: Nicolas Größlein, BMW Group

Context & Objective:

BMW is implementing OCPM to support a new digital sales model involving over 130 systems and multiple departments.

- Started with case-centric but now exploring object-centric use cases
- Reason for object-centric:: case-centric implementations could not cover more over-arching use cases across processes/systems

Challenges:

- Aligning object definitions across departments with different semantics.
- Managing data access and visibility under strict governance (e.g., financial data privacy).
- Current manual data-sharing agreements are inefficient and risky.

Research Needs:

- Role-based, digital governance models for object-centric event data and OCPM.

- Secure, scalable data-sharing mechanisms across departments in line with regulations and legal requirements

Key Take Aways from Discussion

Iterative Implementation and Scalability

- Frederik and Dirk emphasized the need for iterative model building, starting small and expanding.
- Timo noted that while iteration is ideal, business stakeholders demand immediate value, which limits how small the initial scope can be.
- Axel supported iterative approaches but highlighted the complexity of connecting models across systems.

Modeling Complexity and Business Buy-In

- Florian and Frederik described the difficulty of defining objects, events, and attributes, especially when models become too large for business users to understand.
- Timo stressed the importance of finding a visionary sponsor who understands cross-process impacts.
- Nicolas observed that OCPM requires more consulting and stakeholder alignment than case-centric models.

Linking to Process Models and Architecture

- Participants asked about aligning OCPM with existing process models (e.g., BPMN).
- Frederik and Axel expressed skepticism about the value of tightly linking BPMN models to OCPM, citing granularity mismatches and limited practical benefit.
- Abdelhalim suggested using process models to guide object selection in early iterations.

Business Value of OCPM

- Timo and Nicolas highlighted that OCPM enables root cause analysis and cross-departmental insights that case-centric models cannot.
- Urszula emphasized the value of exploratory analysis for transparency and problem identification.
- Axel noted that once a robust model is built, it can support both analytics and operational applications (e.g., apps, dashboards).

Tool Limitations and Standardization

- Participants agreed that current tools (e.g., Celonis) lack support for abstraction, inter-object querying, and governance.
- Dirk and Axel called for better tooling and standards (e.g., OCED) to support modular, composable models.
- Urszula and Lien raised concerns about semantic mismatches and the need for better integration across models and systems.

Key Insights and Lessons Learned

- OCPM is powerful but complex: It enables cross-process insights and root cause analysis but requires significant effort in modeling, governance, and stakeholder alignment.
- Start small, but strategically: Iterative implementation is essential, but the initial scope must still deliver business value.
- Tooling and standards are lagging: There is a need for better support for abstraction, inter-object analysis, and secure data sharing.
- Governance is critical: Especially in regulated industries, role-based access and data privacy must be built into the model.
- Collaboration is key: OCPM projects require close collaboration between IT, business, and data teams.

Research Areas and Disciplines for Collaboration

To address these challenges, collaboration between practitioners and researchers is essential in the following areas:

- Process Mining and Data Science: For developing scalable algorithms for inter-object analysis and abstraction.
- Information Systems and Data Governance: For designing role-based access models and secure data-sharing frameworks.
- Business Process Management (BPM): For aligning OCPM with process architecture and modeling practices.
- Human-Computer Interaction (HCI): For building intuitive tools that support interactive exploration and visualization.
- Semantic Web and Knowledge Representation: For enabling modular, composable, and semantically aligned data models.