SAP Operational Process Intelligence: Empowering Line-of-Business Workers with Real-time Process Visibility

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Abstract. Based on the in-memory database HANA, SAP fundamentally rethought and redesigned its business process management offering. In this paper we explain how organizations can use the new product SAP Operational Process Intelligence to create real-time process visibility and propose line-of-business workers appropriate actions to respond immediately on critical business situations. This product is designed to capture and manage the increasing vast amount of relevant process events from different internal and external systems.

Keywords: Process Visibility, Business Process Management, Intelligent Business Operations, Real-time Operational Intelligence

1 Introduction

The management of work and budget around end-to-end business processes instead of functional units has been discussed as highly beneficial for a long time: "In virtually every industry, companies of all sizes have achieved extraordinary improvements in cost, quality, speed, profitability, and other key areas by focusing on, measuring and redesigning their customer-facing and internal processes" [1]. End-to-end processes are the backbone of daily operations, generate business value and determine customer success. In process-oriented enterprises line-of-business workers need real-time process information which is actionable for operationally managing and continuously improving business processes. This process visibility is required for a micro level referring to individual process instances as well as for an aggregation on a macro level referring to entire processes [2].

However, the creation of process visibility is increasingly challenging as organizations generate vast amounts of operational data from different sources. In addition to transactional data captured in traditional operational systems like ERP (enterprise resource planning) and CRM (customer relationship management) systems, organizations are also capturing machine data and clickstream data e.g. web server logs in online retail stores, call data records in telecom, GPS location data in transportation and logistics. Explosion of data in the enterprise is known popularly as the big data

phenomenon [3]. Operational big data is widely diverse – diverse in sources (databases, server logs, sensors, scanners), diverse in structures (structured, un-structured and semi-structured), and diverse in speed and frequency at which data is generated (streaming data, transactional data, master data). As a result, employees don't see the big picture of their business operations. They often have to rely on keyholes of information in different systems that do not help them to make good operational decisions in the right time. Several operational decisions are still made based on reports produced daily, weekly or monthly. As a result, business situations that emerge during daily operations are rarely sensed and responded to in time. Such latency and missing end-to-end visibility impede right actions for coping with problems or taking advantage of opportunities. Therefore, analysts recognize the need for a new class of software packages: Gartner introduces *Intelligent Business Operations* as "an emerging style of business behavior that leverages analytics embedded in processes to support better decision making and improved knowledge worker collaboration" [5]. Likewise, TDWI uses the term *Real-time Operational Intelligence* for "an emerging class of analytics that provides visibility into business processes, events, and operations as they are happening" [6].

We see the implementation of such software packages in industries like telecom (customer on-boarding), logistics (shipment tracking), and retail (assortment and replenishment management). We also see core processes such as order to cash, procure to pay, and plan to inventory with the need for real-time process visibility. One inherent characteristic of these processes is the unavoidable complexity of managing the underlying heterogeneous process architectures. No single application or system controls and coordinates all the activities encompassed in the end-to-end process.

In conclusion, high volumes of operational data will be "dead data" if it is not contextualized and made actionable for line-of-business workers such as process owners, operational managers, service agents and customer relationship executives in a timely fashion. They demand real-time visibility into operations for improved responsiveness to upcoming threats and opportunities. In response, SAP introduced a new product *SAP Operational Process Intelligence*[1] which is renewing and rethinking SAP's business process management technology by leveraging the in-memory database SAP HANA [7]. In the remainder of this paper we present the functional scope, architecture, and tooling of SAP Operational Process Intelligence.

2 Functional Scope

SAP Operational Process Intelligence is a new breed of analytical application that creates real-time process visibility by:

1. Correlating and contextualizing large volumes of operational big data from multiple diverse sources (SAP and non-SAP) into end-to-end processes and creating the big picture.

[1] Product demo is available at https://www.youtube.com/watch?v=HHBCdwPzkG0 .

2. Representing end-to-end process value-stream as phases and milestones thereby hiding all the technical details from line-of-business users.
3. Combining stream data from new sources with historical data from traditional business systems.
4. Providing real-time metrics and key performance indicators.
5. Detecting critical business situations and alerting responsible business users.
6. Providing capability to business users to collaboratively solve problems before they turn into escalations.
7. Proposing appropriate actions to business users to respond to business situations.

The user interface of SAP Operational Process Intelligence shows end-to-end processes in well-defined phases and milestones with the corresponding goals (example screenshot: see Fig. 1). Additionally, it allows drill down into data of single process-instances and triggering of appropriate actions. In summary, SAP Operational Process Intelligence correlates streaming events to business data in transactional systems and contextualizes them into end-to-end processes. Thus, line-of-business users can understand business situations as they evolve and take actions to reach defined goals.

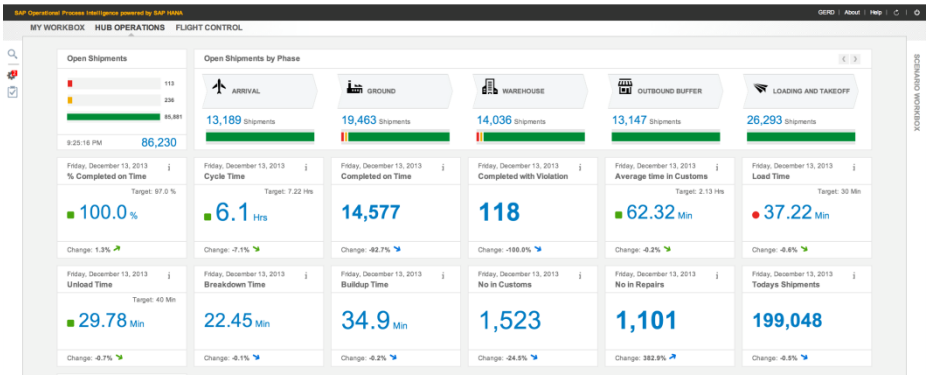

Fig. 1. Aggregated Process Status of a Logistic Airport Hub Operations Process

3 Architecture

In order to gain full insight into business process a variety of data sources must be integrated. SAP Operational Process Intelligence provides out-of-the box support to discover running processes from SAP Business Suite transactions (via so called "process observer models"), SAP Business Workflows, SAP Business Process Management, and SAP Process Integration. All these applications support SAP's Process Façade concept which standardizes the exchange of process definitions, process logs and process context between event providers and consumers. Non-SAP process events and data can be incorporated into the scenario using either an observed process (an observation model for a process modeled with standard BPMN 2.0 notation) or event-enabled operational data stores. These third-party process events need to be based on the open standard Business Process Analytics Format (BPAF).

The product is natively built inside the SAP HANA Platform - a new enterprise application platform that is highly optimized for new application types leveraging SAP's in-memory database [8]. Such databases make the "main memory the new disk" [9] and enables real-time processing of big data. Hence, the historical layer separation of transactional and analytical data due to performance reasons becomes obsolete as all data can be managed in one integrated database system [10]. Thus, events and process data from HANA-enabled products (such as SAP Business Suite, SAP Business Process Management, and SAP Process Integration) are directly available for SAP Operational Process Intelligence without data replication. If process data or transactional as well as streaming events originate in non-HANA systems, then they are replicated into SAP HANA using data provisioning (e.g. SAP System Landscape Transformation) or event streaming technology (e.g. SAP Sybase Event Stream Processor).

Furthermore, SAP Operational Process Intelligence does not require coding of software. Its tooling generates optimized native HANA run-time artifacts. These include calculation views, correlation procedures, and OData services. They are used to expose workspaces to line-of-business users, which are HTML5-based responsive user interfaces based on HANA Extended Application Services (HANA XS).

4 Design Time Tooling

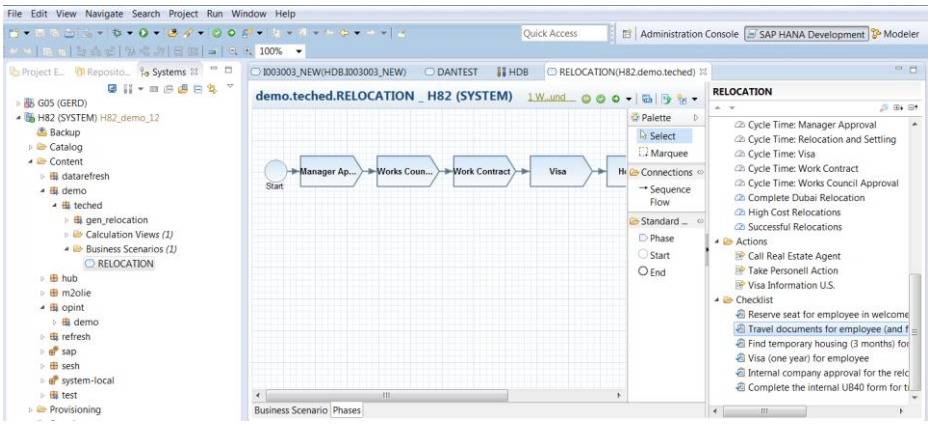

Fig. 2. Modeling and Configuring Process Phases of a Business Scenario

The leading artifact in SAP Operational Process Intelligence is the business scenario. It is a native HANA repository artifact that is configured by a solution expert using the business scenario editor (Fig. 2). The business scenario editor can be installed on top of the Eclipse based SAP HANA studio. The business scenario helps to contextualize the vast amounts of operational big data in a form that line-of-business users understand and relate to. A business scenario has three main components: First, the business scenario captures the end-to-end flow of a business process. Most importantly, the end-to-end flows need not be automated, or even be in the control of one single

system. A solution expert can assemble a process from different process fragments running in multiple SAP and non-SAP software systems and operational data providers. Second, the business scenario captures the high-level phases and milestones. Phases abstract the technical view and provide a value-stream view to line-of-business users. Phases are configured on the basis of process events that originate from the end-to-end flow configured in the previous step. Third, the business scenario captures key metrics and process indicators such as cycle times and durations.

5 Conclusion

If leveraged appropriately, operational big data can be a treasure trove of information to learn about customer behaviour, operational bottlenecks, weak spots, and help in constantly improving business operations. SAP Operational Process Intelligence aims end-to-end process visibility by combining stream data from new sources with historical data from traditional business systems in real-time. It proposes to empower front-line employees with intelligent insights and enables them to take the right actions based on emerging business situations.

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