Mphasis
The Next Applied

Applying Microservice Architecture to Camunda BPM

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Contents

1.
Acronyms

1	BPM	Business Process Management
2	SME	Subject Matter Expert
3	BAM	Business Activity Monitoring
4	TCO	Total Cost of Ownership
5	BI	Business Intelligence

2.
Introduction

This paper provides a concrete methodology to orchestrate large cross-functional, end-to-end processes across a uniform or hybrid enterprise landscape while respecting decentralized business control and functioning. While this document focuses on BPM-based orchestration, it applies and leverages microservice architecture principles and thus equally applies to microservice orchestration at a large scale. This paper concentrates on helping Business SMEs, Enterprise Architects, IT Sponsors as well as all BPM roles involved in implementation.

Microservice architecture

Microservice is an architectural style to create enterprise application with independent services.

The benefits of microservice architecture are:

1. Ability to create more manageable implementation units
2. Ability to deploy and test independent units without having to test complete application
3. Ability to delegate control of each independent unit to different business groups
4. Scalability, security, availability parameters can be applied differently to different units

Orchestration

Orchestration brings together different business steps in a business unit, in a meaningful sequence, augmented by business logic. This is the wiring of a workflow!

Firstly, the orchestration brings different business units together to perform a single process from the business unit perspective. Further, the orchestration brings different business units within the enterprise together to complete a single process from the customer's point of view. This is the progression of orchestration scope from a business unit to the whole enterprise.

Hence, orchestration could be defined as the ability to bring different steps, sub-processes, processes together to form an end-to-end process. The end-to-end process for an enterprise usually is a single service for its end-customer, e.g., a policy purchase, a housing loan, etc.

3.

Enterprise orchestrations can create centralized monoliths!

In the microservice architecture section, we identified the benefits of creating independent units of work, which can be performed, tested, deployed, and executed as independent units – which solves IT problems.

However, if you closely observe how we define orchestration, it is about unifying, stitching together different business steps. So microservices architecture is all about breaking the application into cohesive units, and orchestration is about stitching together different units of work to form a big unit of work for your customer.

Does it mean that the process orchestration is about creating a monolith? Well, not intentionally, but it is always possible with an enterprise process unless consciously avoided. A BPM usually uses a stricter data structure like RDBMS (compliance to the 12 Codd's rule) to maintain the integrity of the process data. RDBMS is known for not being distributed but centralized.
Even if we replicate it, mirror it in real-time, it cannot guarantee the integrity of certain transactions unless we are ready to invest in a two-phase-commit across two RDBMSs, which will slow it down further anyway. Extremely high scaling and high performance naturally demand distributed architecture, serverless computing, edge computing and none of these are close cousins of RDBMS. There is a wall between SQL & No SQL world, structured & unstructured data to stretch it further.

Camunda launched Zeebe as a separate product from Camunda BPM to support distributed architecture for microservice orchestration. There is no RDBMS with Zeebe. Therefore, Zeebe is not an actual BPM or replacement to Camunda.

4.
Solution

The solution is an opinionated approach to create an enterprise process implementation, which leverages the best part of microservice architecture, distributed architecture and amalgamates it with process orchestration to bring the best of both worlds together.

Applying white-box & black-box approach

It is an approach to apply a microservice architecture style to process monoliths!

A quick brush up on key BPM process components

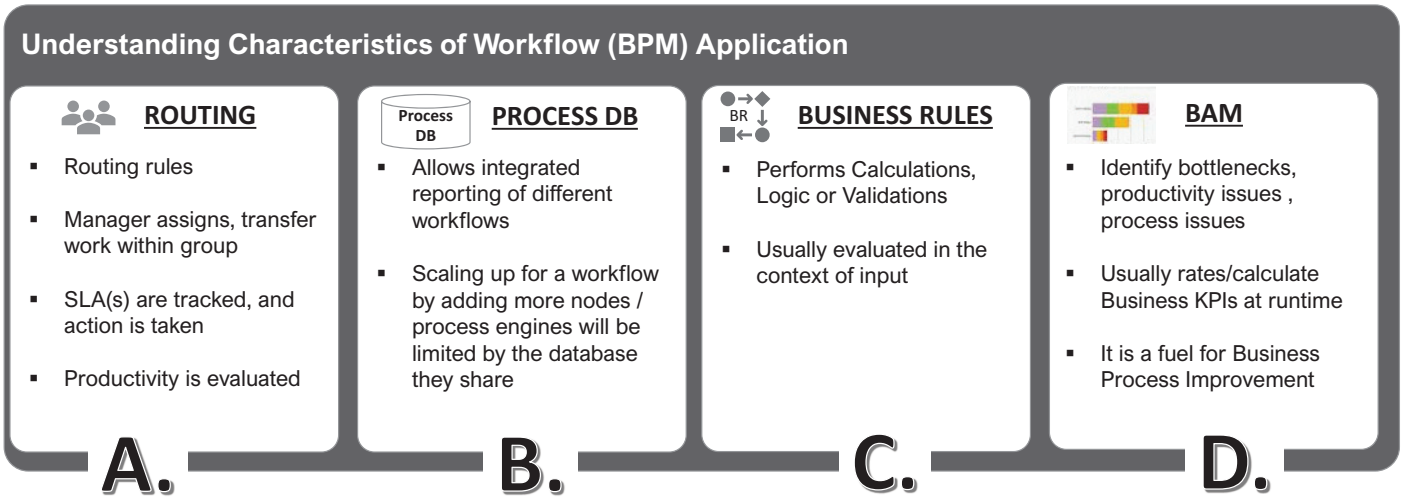
Process has four key parts when it comes to implementation:

1) Routing of User Steps
   a. Assignment, reassignment, transfer of work
   b. Routing logic, SLA or timeboxing tasks
   c. Assign automated tasks to robotics
   d. Identifying & solving productivity hindrances and solving bottlenecks of human workers

2 Process Persistence Layer
   a. Single persistence layer across the process is important to have a single layer of reporting from BPM
   b. Single persistence layer with RDBMS creates performance bottleneck, especially when higher scales are required

3) Business Rules
   a. Business rules need to be volatile and business-managed layer for higher control and faster turnaround
   b. Business governance becomes necessary around this layer

4) Business Activity Monitoring
   a. Real-time monitoring of cases and business data in a single dashboard becomes critical for enterprise-level monitoring
   b. Individual groups handle monitoring and productivity management and its continuous improvement by solving problems on the business floor



Define a white-box workflow

An end-to-end enterprise-level process, which forms a single end-to-end significant service for customer is a white-box process, e.g., a policy purchase, a housing loan, etc.

It's called a white-box process because the transparent understanding of this process is necessary across the enterprise and to some extent to our partners and customers as well.

Following broad objectives are met by the white-box process:

- Monitoring and status tracking for customer
- Ability to identify the performance of business units
- Historical reports and BI
- Ability to provide an audit trail for any investigation and compliance

Define a black-box workflow

A cohesive department or business-unit level domain service can be referred to as a black-box workflow as long as that department or that unit manages it independently.

Following broad objectives are met by black-box process:

- Performance & productivity tracking at business-unit level
- Take control of business-unit level business rules
- Task management, assignments, re-assignments

How to carve out a black-box process from process monolith?

1) Take a customer-centric enterprise-level process for implementation, this is our white-box process.

2) Identify sub-workflows of this white-box process mapped to each participating business unit or department.

3) Identify each sub-workflow with an independent boundary for all four characteristics of BPM (A, B, C, D) listed above. Each eligible sub-workflow with independent boundary is a candidate black-box workflow.

4) Once the candidate black-box workflow is identified, apply a benefits checklist to each candidate.

5) If significant benefits are aligned, then carve it out as a black-box workflow for implementation.

6) The black-box workflow will be wired using event-based wiring to the white-box workflow.

7) Most of the time, the black-box workflow will also reshape how business units and sub-units own and handle the process improvement and ownerships.

Benefits of a black-box workflow (checklist)

1) Autonomy on this application to develop and test business-unit level process changes independently over the enterprise customer delivery process.

2) Allows vertical scaling of this application as needed without dependency on white-box or another black-box workflow.

3) Drives decentralization of business controls (local business-unit control monitoring, improvement of this piece of the process).

4) This application represents a true single unit of work at an enterprise level, i.e., for white-box workflow, this business unit's work is measured as a single state change and under a single SLA.

5) IT unit managing it can make use of a technology stack for its implementation, which is different from white-box workflow implementation or another black-box implementation.

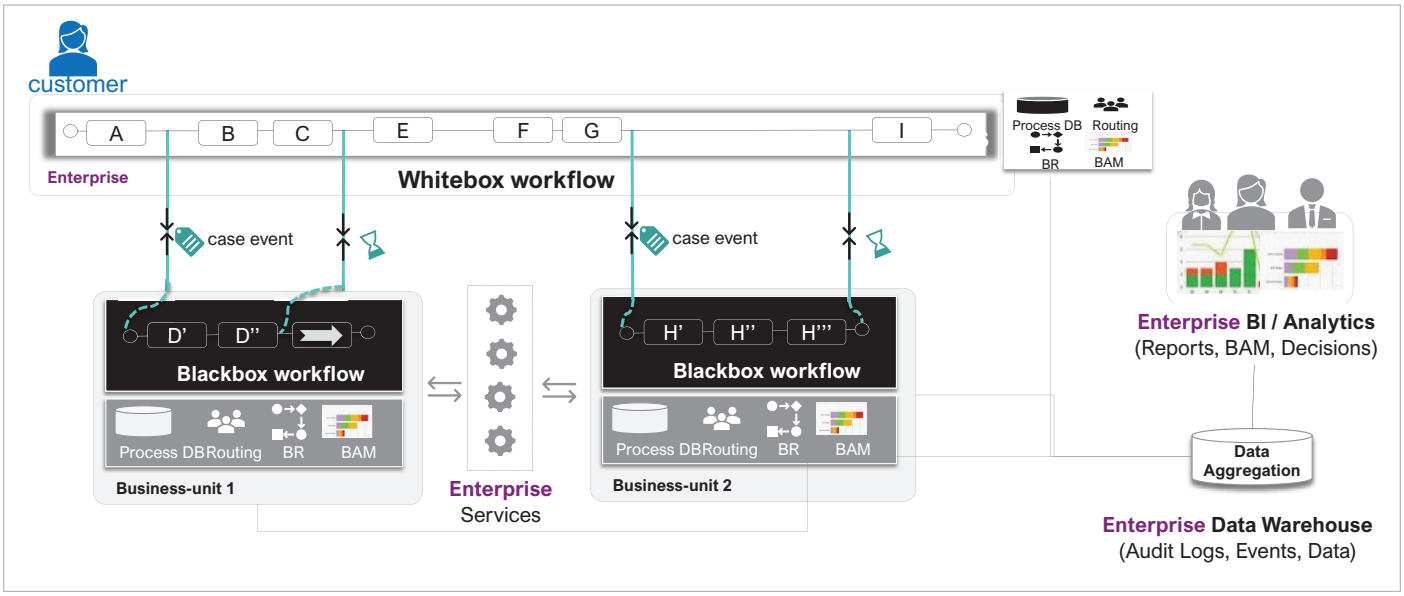
6) Separate implementation allows separate billing or expense for managing and maintaining application if necessary.

7) A thoughtfully defined white-box - black-box workflow will also allow a phase-wise implementation of enterprise roadmap by deferring implementation/upgrade or enhancement of some black-box workflows.

Illustration with example

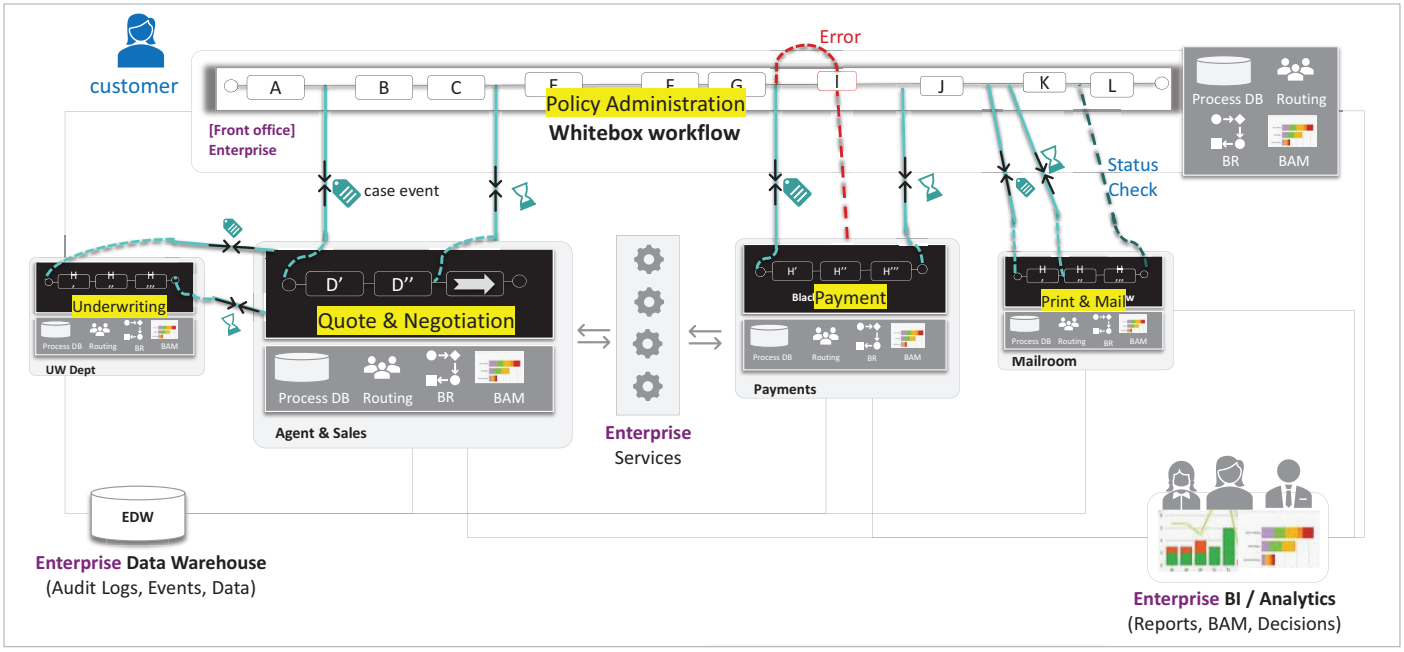
Closer look at configuration of enterprise workflow

Below figure depicts an enterprise white-box workflow augmented together with pieces of black-box workflow.



Sample insurance use case applied

Below diagram enhances the understanding of white-box & black-box workflow configurations with a typical Insurance Policy Administration lifecycle depiction as white-box & black boxes.



5.
Conclusion

The white-box and black-box approach is a simplified approach to decompose enterprise processes into localized implementation with different business units, thus decentralizing the business-unit level processes with each business unit.

This approach provides many IT benefits like creating a distributed implementation of a process and more. The real benefit lies in how it augments business architecture by decentralizing the process monolith and keeping the maximum control locally with respective business units. Higher control to business units allows better improvement of the process and a wholesome delegation of the department-level process to the department itself. Though the black-box process is carved out and delegated to its respective department, nothing stops IT from having a stream of data aggregated from these process executions to the enterprise level if that benefits from the enterprise level BAM, BI and analytics. This ties together all the ends, thus providing the best benefits accumulated for the user.

6.
References

www.microservices.io

www.zeebe.io

www.camunda.org

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Vaibhav is a BPM Architect and brings over 18 years of solid IT experience in product development, application delivery, production support, and R&D initiatives. In addition, he has great depth and breadth of knowledge on Microsoft and Unix-based developments. Vaibhav has been closely working with our customers in the BPM space for over 12 years, with Pega and Camunda as focus areas. He has driven modernization and digital transformation engagements for our clients with business-centric implementations. This white paper expresses hard earn views on how BPM is best implemented for large enterprises and presents a proprietary methodology to create a sweet spot between IT & Business.

About Mphasis

Mphasis (BSE: 526299; NSE: MPHASIS) applies next-generation technology to help enterprises transform businesses globally. Customer centricity is foundational to Mphasis and is reflected in the Mphasis' Front2Back™ Transformation approach. Front2Back™ uses the exponential power of cloud and cognitive to provide hyper-personalized ($C = X2C^2_{TM} = 1$) digital experience to clients and their end customers. Mphasis' Service Transformation approach helps 'shrink the core' through the application of digital technologies across legacy environments within an enterprise, enabling businesses to stay ahead in a changing world. Mphasis' core reference architectures and tools, speed and innovation with domain expertise and specialization are key to building strong relationships with marquee clients. To know more, please visit www.mphasis.com

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NR 06/07/21 US LETTER 9A5L6369

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