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HIP CDR and Camunda:
Designing processes with the help of highly structured data

vitagroup

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CDR
CLINICAL DATA REPOSITORY

<modelVersion>4.0.0</modelVersion> {return
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Digitalisation in healthcare has made enormous progress in recent years. Most hospitals now have electronic health records that allow them to process patient information quickly and easily. However, they often face challenges in managing complex workflows, especially when it comes to clinical processes. To ensure effective patient care, hospitals should evolve and optimize their business processes.

This white paper explores the possibilities of combining the two platforms, HIP CDR and Camunda, to create a powerful solution for healthcare organizations.

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Clinical Data

Content

HIP CDR and Camunda: Designing processes with the help of highly structured data

HIP CDR, EHRbase and openEHR

vitagroup's HIP CDR (HIP Clinical Data Repository) was specifically developed for secure and effective storage and management of medical data. It ensures extensive interoperability with other systems. Thus, data from various sources, such as electronic patient records or clinical information systems, can be automatically imported into the repository.

HIP CDR is based on EHRbase, an open-source platform designed specifically for managing electronic health records (EHRs). It supports a variety of standards including HL7 version 2 and FHIR. The platform is based on modern web technologies, includes a powerful query engine, and provides a RESTful API for integrating EHR data with other applications. It is scalable and can be customized to meet the specific needs of healthcare organizations and applications.

The HIP CDR uses openEHR archetypes and templates to define the structure and content of clinical data. Archetypes describe the structured data that is stored in an EHR, and templates define the EHR structures and functions. This ensures that the data is standardized, semantically interoperable, and can be shared across different EHR systems.

Camunda Business Process Engine

Camunda is an open-source platform for automating and optimizing business processes and managing workflows.
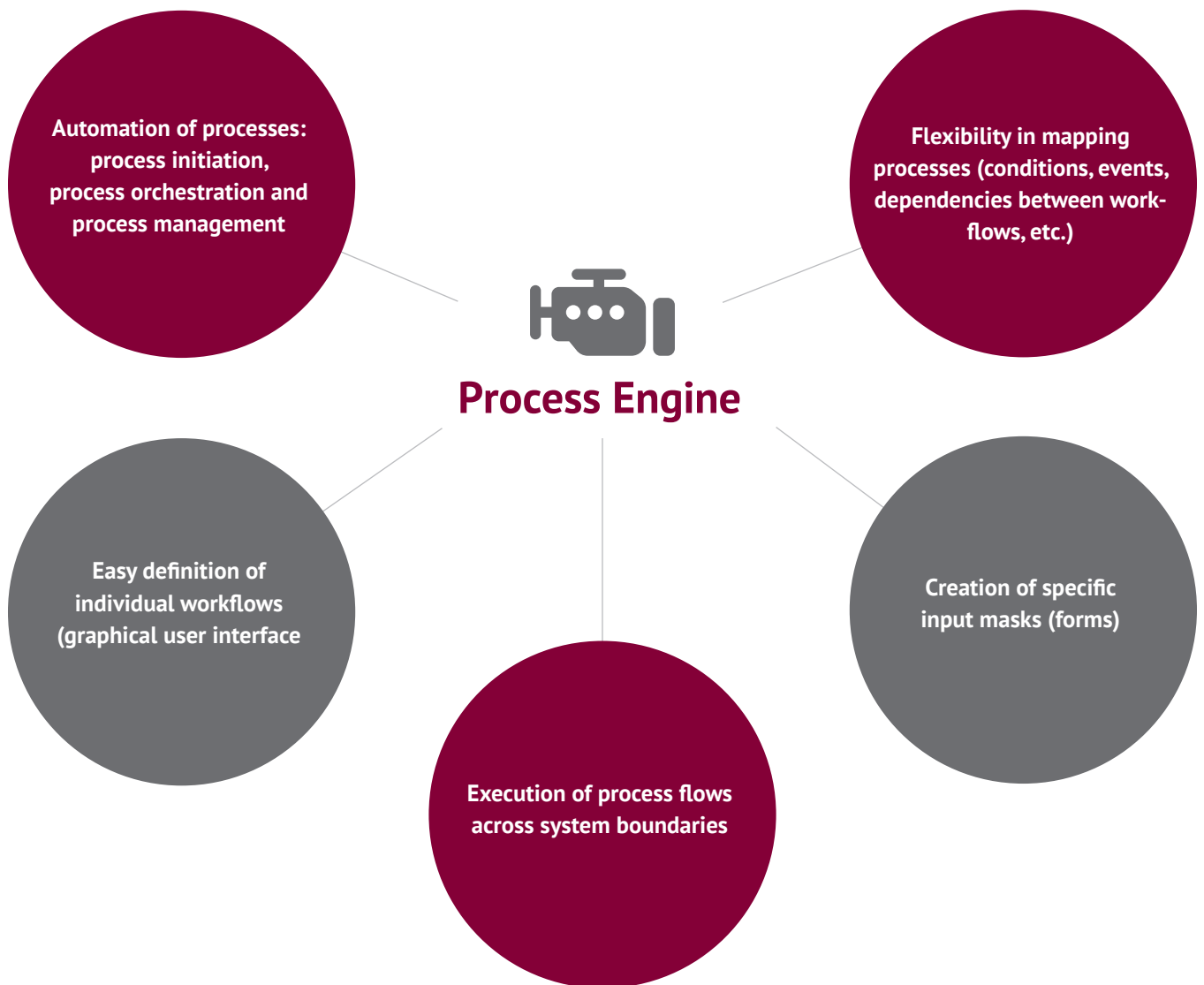
The Camunda Business Process Engine supports the BPMN 2.0 standard for process modelling and enables companies to create complex workflows that can be automated and monitored. The system also provides a RESTful API through which processes can be integrated with other applications.

Camunda provides a comprehensive set of features for managing workflows, including task management, user authentication and process monitoring. In addition it supports advanced features such as parallel execution, event-based triggers, and rule-based routing. The system can be used to model both simple and complex workflows, making it a versatile tool for managing clinical processes.
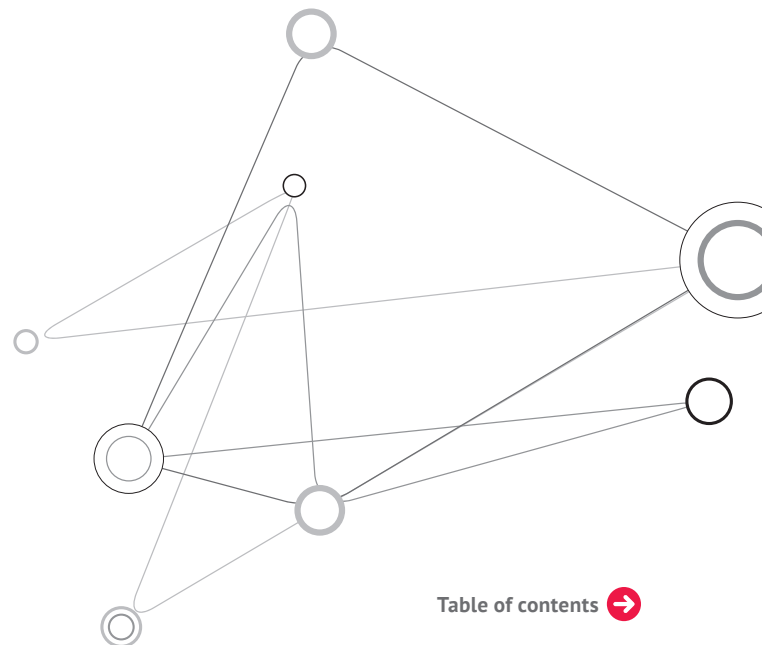
Cross-application Process Engine Solution

What goals should be achieved with the introduction of a process engine?

Automation of processes: process initiation, process orchestration and process management

Flexibility in mapping processes (conditions, events, dependencies between workflows, etc.)

Process Engine

Easy definition of individual workflows (graphical user interface

Execution of process flows across system boundaries

Creation of specific input masks (forms)

Goals of using a business process engine

Process automation

Leads to faster and more efficient execution of tasks.

Process standardisation

Leads to higher quality and consistency of work results.

Improved transparency and traceabilit

Progress and status of business processes can be tracked in real time.

Flexibility and adaptability

Processes can be quickly and easily adapted to respond to changing business needs or market conditions.

Cost savings

By automating processes and reducing manual intervention, costs can be reduced and efficiency increased.

Advantages of using HIP CDR and Camunda hospitals

Improved quality of patient care

Highly structured data helps physicians and nurses quickly access important medical information and make informed decisions. The risk of errors and duplicate data entry is reduced, and data quality is increased. For example, electronic health records (EHRs) containing structured data such as diagnoses, medications, and allergies can help physicians access this information quickly and provide better care and treatment for patients.

Increased efficiency and cost savings

By structuring and standardizing data, processes get automated and made more effective. Scheduling, ordering, and billing can be handled automatically, resulting in increased productivity and efficiency. Laboratory data can be automatically imported into CDR to make it available for diagnoses and treatment plans.

Compliance and security

Structured collection and storage of data and automation of processes help minimize the risk of errors and security breaches.

Research and analysis

Structured data enables researchers to access and analyse medical data in a systematic and structured way. For example, epidemiological and clinical studies can be conducted to identify trends and patterns in medical data and explore new treatment options.

Interaction between HIP CDR, Camunda and other applications
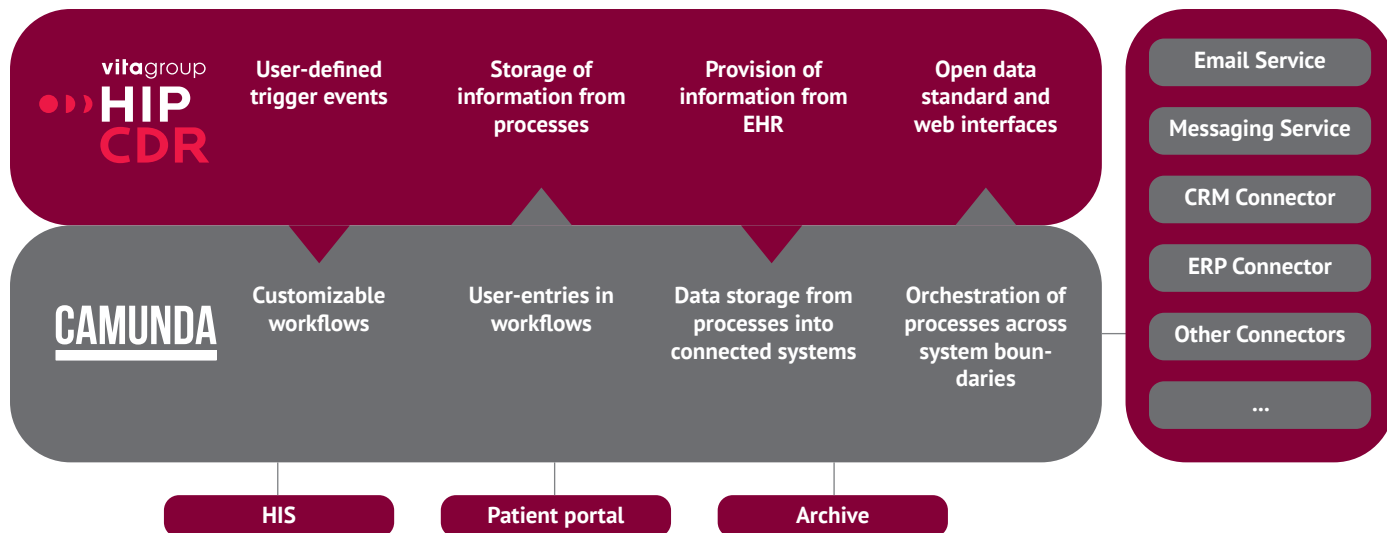
When connecting and integrating a Business Process Engine (BPE), it is essential to clarify how the process engine can access data and functions of the surrounding software landscape. In addition, external triggers enable the runtime behaviour of the processes to be controlled.

Using the concrete example of the HIP CDR connection, this looks as follows:

Outbound

Individual EHRs or entire AQL queries are queried from Camunda. The returned data is further processed in processes.

Inbound

Triggers are triggered in EHRbase, Demographic Service, Bridge, etc., which trigger existing process instances in Camunda or create completely new process instances.

There are several technical options for this:

• Camunda Connectors as the deepest integration. These allow a bidirectional communication between HIP CDR and processes.
• API interfaces from Camunda towards HIP CDR
• Control of Camunda REST APIs through trigger processors in HIP CDR

Case studies

Business Process Engines (BPE) and Clinical Data Repositories (CDR) are powerful tools that, when combined, open extensive application areas:

Patient Management

All patient data, including medical records and patient files, are stored in a centralized CDR database to enable seamless patient care. The BPE is used to manage the entire process of patient admission, examination, and discharge. When a patient is admitted to the hospital, a workflow is automatically started to manage the process of the patient's medical examination and treatment. When the patient is discharged, a discharge process is automatically started.

Diagnosis and treatment planning

A BPE can help automate the process of diagnosis and treatment planning. Here, the engine retrieves relevant medical information from the CDR to facilitate diagnosis and treatment planning.

Billing process

When a patient receives treatment, a workflow is automatically started to manage the billing process. If the bill remains unpaid, a dunning process starts automatically.

Health data monitoring

The CDR is used to continuously collect health data from patients. The BPE generates automated action instructions based on this data. For example, early alerts are generated when a patient is at increased risk for certain diseases.

The opportunities for the joint use of business process engines and clinical data repositories in healthcare are extremely diverse. It is worthwhile to thoroughly examine the potentials for use to improve the quality of patient care.

Summary and outlook

Using HIP CDR and Camunda leads to improved efficiency, quality, and safety in patient care. Complex medical workflows can be automated. Medical data is captured in real time and processed in a secure and controlled manner.

The advantages in summary:
- Configuration of own process flows (workflows)
- Access to HIP CDR data
- Creation of own forms for user input
- Open-source solution with no licensing costs
- Orchestration of processes across system boundaries
- Independence from individual applications
- Flexibly expandable for future applications

The consistent use of cloud technologies helps to increase the scalability and flexibility of medical systems.

Artificial intelligence (AI) and machine learning (ML) will play an important role in the analysis and processing of medical data in the future, for example in diagnosis and detection of unusual patterns in medical data.

The further development of interoperable systems and standards will help to improve data exchange between different medical systems and facilities.

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HEALTH INTELLIGENCE PLATFORM

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