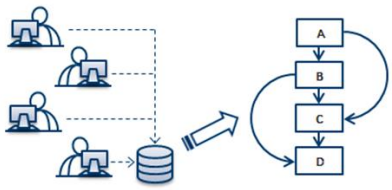
A case study at an energy grid company

SURMOUNTING THE DATA CHALLENGE

Data-driven insight in operations

Organizations have to meet ever more restrictive rules and regulations, and increasing quality and cost demands from customers. An accurate and objective view on the current operation is invaluable, to monitor, control, and improve an organization's processes. Until recently, many organizations acquired this view from random sampling, interviews, and brown-paper sessions. These techniques often result in inaccurate and highly subjective views on the actual operation. Moreover, they tend to heavily impact resources. With an ever-increasing amount of data, organizations are eager to put it to good use. Process mining is the leading-edge technology to automatically extract process knowledge from data as registered by corporate systems. It results in an objective and highly accurate foundation for decision making.



Corporate systems manage, control, and support day-to-day operations. Transactional data is registered each time an action is performed for an order, invoice, complaint, patient, etc. Based on these so-called audit trails, process mining techniques are able to construct the underlying process model.

Process mining is purely based on data – How to overcome data challenges?

Process mining is solely based on data, making the technique 100% accurate and objective. However, for the same reason, issues with respect to quality of registration and extraction of transactional data greatly impact its potential. Scattered over multiple applications, and often not registered in a process-aware manner (van der Aalst et al, Process Mining Manifesto, 2012), data can be difficult to capture and the process of converting it into the required format can have a high impact on resources.

In this case study the use of the *DEMO BPM Engine by ForMetis was considered as a solid foundation for process mining* to overcome quality issues related to data registration and extraction. The analysis is performed on the implementation of the engine at an energy grid company. The *added value of process mining for the customer process* was also investigated. The process mining *analyses were performed by ProcessChemistry using the popular process mining software Disco by Fluxicon®*. The DEMO BPM Engine will prove to provide complete and reliable data, simplifies the extraction of data, facilitates data-driven process analysis, monitoring and improvement, conformance checking, analysis on various levels of granularity from various perspectives, and allows for optimal harmonization between ForMetis and her customers.

ForMetis' DEMO BPM Engine surmounts the data challenge

ForMetis' DEMO BPM Engine orchestrates the workflow within corporate IT systems. It is a next-generation workflow management system (WFMS) based on Model Driven Engineering. This implies that once a business process is modeled, it can be directly executed by the DEMO Engine as native source code. The engine automatically registers various communication acts surrounding activities or transactions. Examples are a request, statement of execution, and acceptance of execution of a specific activity. Because of this level of detail, the data is complete and highly reliable, and supports various perspectives for process analysis.

QUALITY ISSUES RELATED TO DATA REGISTRATION AND EXTRACTION

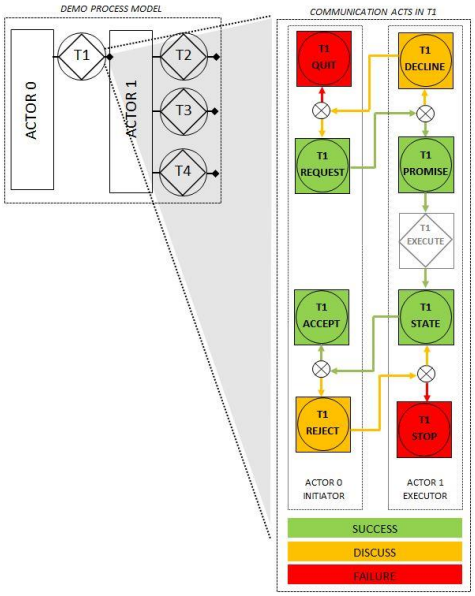
- *Data is scattered over multiple applications*
- *No process-aware data registration*
- *Incomplete and inconsistent data registration*

DEMO BPM ENGINE PROVIDES A SOLID FOUNDATION FOR PROCESS MINING

- ✓ *Complete, consistent, and detailed registration*
- ✓ *Single-source, reliable, easy and efficient data extraction*
- ✓ *Ensures minimal preprocessing*

PROCESS MINING ON THE DEMO BPM ENGINE

- ✓ *Facilitates data-driven process analysis on various levels of granularity*
- ✓ *Offers optimal design and continuous optimization*



COMMUNICATION ACTS SURROUNDING EACH ACTIVITY IN THE DEMO MODEL.

Easily extract process knowledge

Since the DEMO BPM Engine drives several business applications within the business process, data does not have to be retrieved from various applications. Instead, all data required for process mining is stored in a single central database. Data from the engine is ***easily and efficiently extracted.*** Only a minimal amount of preprocessing is required. Due to the complete (both common and exception handling) and consistent registration and its high level of detail and reliability, event logs from the DEMO BPM Engine are ***perfectly suited for process mining***. Data-driven process improvement, monitoring, and audit are supported. And due to the high level of detail, various levels of granularity are possible for analysis and from various perspectives.

Optimal design and continuous optimization

Applying process mining to data from the DEMO BPM Engine allows for optimal design and continuous optimization of the WFMS to the actual behavior of end users. Implemented process improvements can immediately be monitored in the engine. In addition, ForMetis can ***anticipate to wishes of the end user*** that become apparent by analyzing their behavior. This results in optimal support for Formetis' customers.

Connecting households to the energy grid

ProcessChemistry and ForMetis have analyzed data at a ForMetis customer for which the DEMO BPM Engine coordinates the process flow across multiple applications. It concerns a semi-public organization that maintains part of the energy grid in the Netherlands. It has close to 400.000 connections to the gas and over 100.000 connections to the electricity mains. Customers represent both businesses and private individuals.

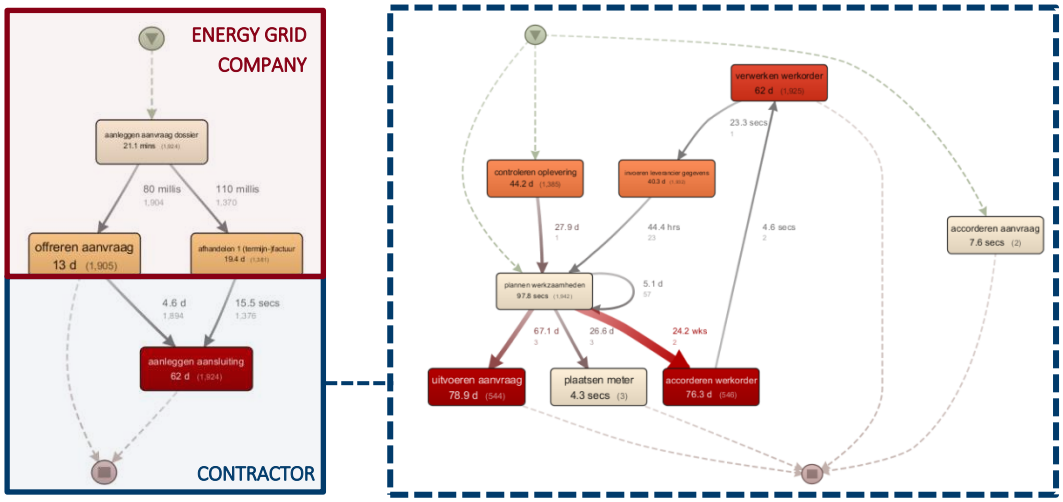
The analysis concerns the process of connecting households to the energy grid. The process is initiated by the receipt of a connection request. An application file is created, after which additional information might be requested. A quotation is made, signed off and a payment is agreed on. The process concludes when the customer is connected to the mains and the payment is fulfilled. The process consists of about 50 unique transactions. Over 3.600 applications were considered, handled within a time period of one year, for which close to 100.000 transactions were recorded.

Strive for the best AS-IS performance

In general, a throughput time of 16.4 weeks was achieved for the entire process. A closer look was given to the throughput time of different types of requests and geographic areas to identify potential improvements.

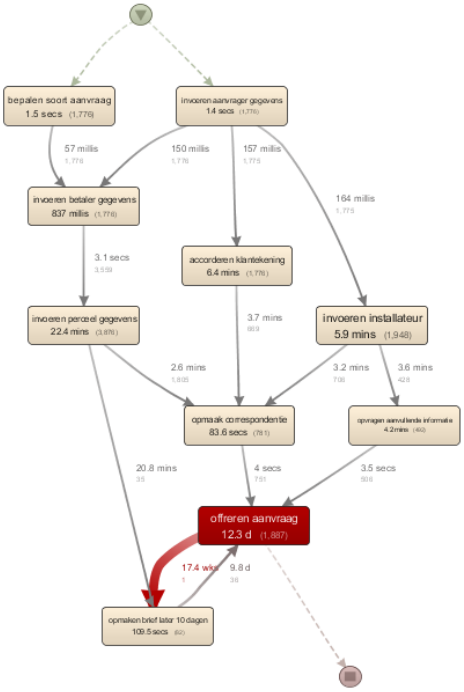
A request can be either for small- or large-scale consumption. Large-scale consumption requests were dealt with 4 weeks faster than small-scale requests. This was mostly due to the actual connection being created much faster. However, due to the online application form for small-scale requests, the general intake for small-scale was processed much faster. For large-scale requests additional information has to be entered manually. In addition, small-scale connections do not suffer from waiting times until agreement is reached on the invoice, since the connections are generally provided on credit.

PROCESS PERFORMANCE INFORMATION ON PROCESSING AND WAITING TIMES. *ON AGGREGATED MAIN PROCESS (LEFT) AND SUBPROCES OF CONSTRUCTING CONNECTION AT CONTRACTOR SIDE (RIGHT).*

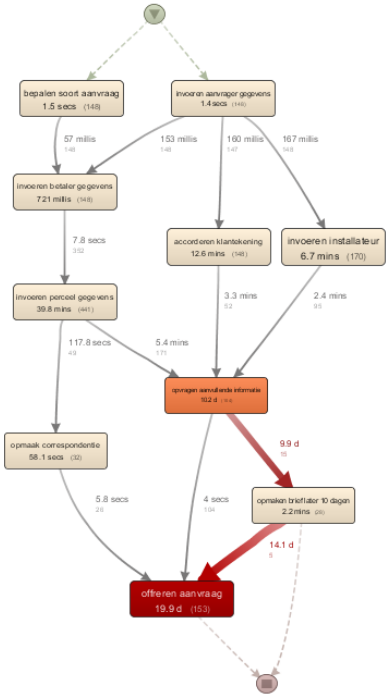


In total, five geographic areas were considered in which the connections were established. Interestingly, two areas with similar properties (small-scale gas connections in general) varied considerably on throughput times. That is, a median throughput time was achieved of approximately 13 versus 18 weeks. Looking more in-depth at the process execution showed among other things that all activities within the connection subprocess usually took about 28% more time. Every geographic area is connected to a contractor. Evidently, the best known throughput time should be achievable by the other contractors as well. Contractors could be called to account for their performance and be urged to improve it.

Between these geographic areas, activities preceding the establishment of the actual connection – activities performed by the energy grid company – also took considerably more time. For this specific area alone, billing could potentially be accelerated by 2 business days for each connection, providing a major improvement potential.



COMPLIANT (LEFT) VS. NONCOMPLIANT (RIGHT) PROCESS UP UNTIL "SEND OUT QUOTATION"



92% Compliant with ACM regulations

The Authority for Consumers and Markets (ACM) requires every grid company to send out either a quotation within 10 business days after receipt of a complete connection request*, or send out a letter within 5 business days containing the expected term within which the tender will be send out. Terms may be extended due to the collection of additional information from the customer.

**Note that the requirement holds only for connections below a certain connection capacity threshold. This property was not taken into account.*

Analysis showed that 92% of all completed requests were compliant with the above requirement. Additional comparison on both compliant and noncompliant processes revealed possible causes to be longer processing times on "Agree on customer design", "Enter parcel information", and "Send out quotation". For all noncompliant cases the quotation was sent out past the deadline, and in addition the mandatory letter was sent out too late (over 80%) or was not sent out at all (almost 20%). Adjustments should be made regarding the forecast of reaching the quotation deadline in order for the required letter to be sent out timely.

For more information, see www.processchemistry.nl

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