PUBLIC

USING PROCESS MINING AT INTERNAL AUDIT

„Turning Data into Knowledge“

Process Mining Camp, 10 June 2016, Eindhoven

Marc Gittler & Patrick Greifzu

Deutsche Post DHL Group
Corporate Internal Audit

Deutsche Post

DHL

Introducing Deutsche Post DHL Group

Group

Deutsche Post DHL Group

Group revenues[1]: € 59.2bn **Group EBIT**[1]: € 2.411bn **Market capitalization**[2]: € 31.5bn
Approximately 500,000 employees in more than 220 countries/territories

Corporate Divisions	Post - eCommerce-Parcel	Express	Global Forwarding Freight	Supply Chain
	61m letters and 3.9m parcels each workday in Germany: 28,000 points of sale, 2,750 Packstations, 33 parcel and 82 mail sorting centers. Parcel delivery in selected international markets	Global Time-Definite-International (TDI) leader with 34% market share, serving >2.5m customers in >220 countries and territories 3.8m tons run through virtual airline network	World´s largest Air and 2nd largest Ocean freight forwarder:2.3m tons of air freight/ 2.9m TEU[3] of ocean freight in 2014. No 2 European road freight	Global market leader, market share of 7.4% well ahead next biggest competitors: 13.7m square meters of DHL owned or leased warehouse space
Brands	Deutsche Post, DHL	DHL	DHL	DHL

1) Financial year 2015; 2) As of 12/31/2015; 3) TEU = Twenty-foot equivalent unit

Introducing Post - eCommerce - Parcel

82 mail sorting centers in Germany

Allyouneed MARKTPLATZ

3.9 million parcels per day

33 parcel sorting centers in Germany

29.000 shops in Germany

POSTPAY

> 60 millions letters per day

Deutsche Post DHL Group

Corporate Center

>44 million delivery addresses

E-POSTBRIEF Ein Service der Deutschen Post

Deutsche Post

Die Post für Deutschland

DHL

The logistics company for the world

Fresh Allyouneed SUPERMARKT

Since 2014: expansion to 8 European countries

>47.000 vehicles

Introducing Internal Audit

Internal audit is an independent, objective assurance and consulting function designed to add value and improve an organization's operations.

Audit subjects:

- organization governance
- risk management
- management controls
- efficiency/effectiveness of operations
- safeguarding of assets
- the reliability of financial and management reporting
- compliance with laws and regulations

Audit methods:

- Interviews
- Onsite visits
- Collection information
- Process walk through
- Sampling
- Data analysis
- **Process Mining ?**

Data driven auditing - opportunities and challenges

Challenge: The process complexity and the amount of data is increasing, **sample testing is inadequately**

Opportunity: Data analysis can increase efficiency and effectiveness (speed, depth)

Challenge: The process complexity and the amount of data is increasing**, effort for data analysis is very high**

Opportunity: Usage of innovative methods to optimize the most time consuming activities

Usage of process mining methods and tools

Stop: Is there a need for data driven auditing?

§ 91 Abs. 2 Aktiengesetz:

German companies act requires that the board establishes a working Internal Control System. One the components is an Internal Audit organization.

By conducting a precise data analysis the efficiency and effectively of Internal audit can be raised. This leads to higher information content which serve the basis for reliable business decisions by management.

International Standards by the IIA require the usage of data analysis

Institute of Internal Auditors Standard No. 1220.A2:

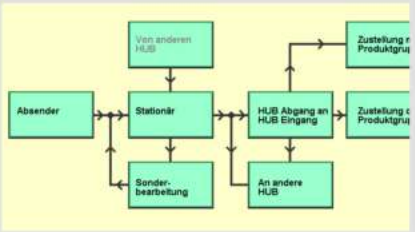
„In exercising due professional care internal auditors must consider the use of technology-based audit and other data analysis techniques.“

Using data analysis is not optional for internal audit,

but internal audit can decide which methodology or tool will be used.

Example process mining projects

system interfaces



Analyzing the **control effectiveness** of interfaces between two systems

parcel delivery process

Analyzing the **efficiency** of the parcel delivery process

audit process

Analyzing the **quality** of our audit process

All data in the following examples were anoymised or reduced

PUBLIC

EXAMPLE 1

Analyzing the **control effectiveness** of interfaces between two systems

Deutsche Post

DHL

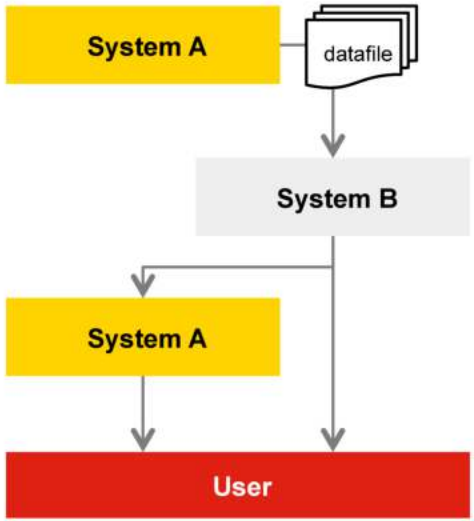
Example: Interface Testing

Objective: End-to End process audit of data transfer from System A to System B .

Data source: System A (operational data, 7 tables), System B (Logfile, flat file)

Procedure:

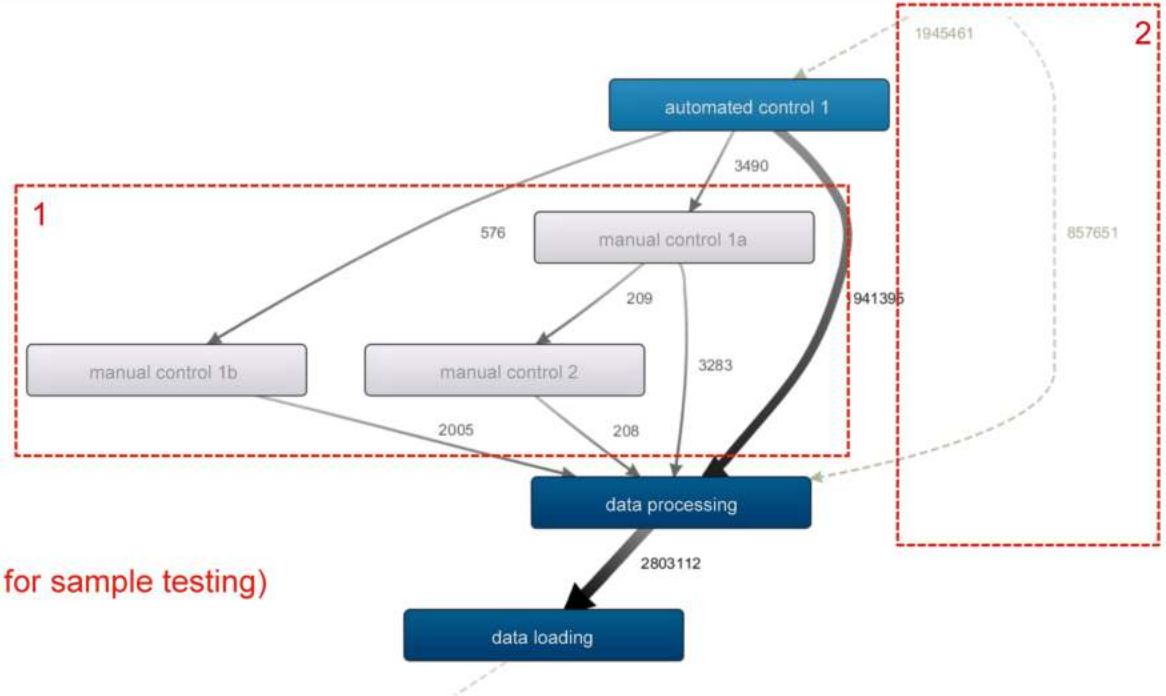
1. Import of data in data analysis tool
2. Identification of all fields with dates and assignment of process steps to time-stamps
3. Creation of a sequential logfile (every event in one line incl. time-stamp and activity)
4. Visualization of the process via DISCO
5. Identification of conspicuous process variation in DISCO
6. Re-import of conspicuous cases in data analysis tool und further analysis



Example: Interface Testing

Knowledge of the process:

- It has to be ensured that all datasets in s
  a were checked by an automated control.
- This control is implemented in system B.
- There are also manual controls.



Results:

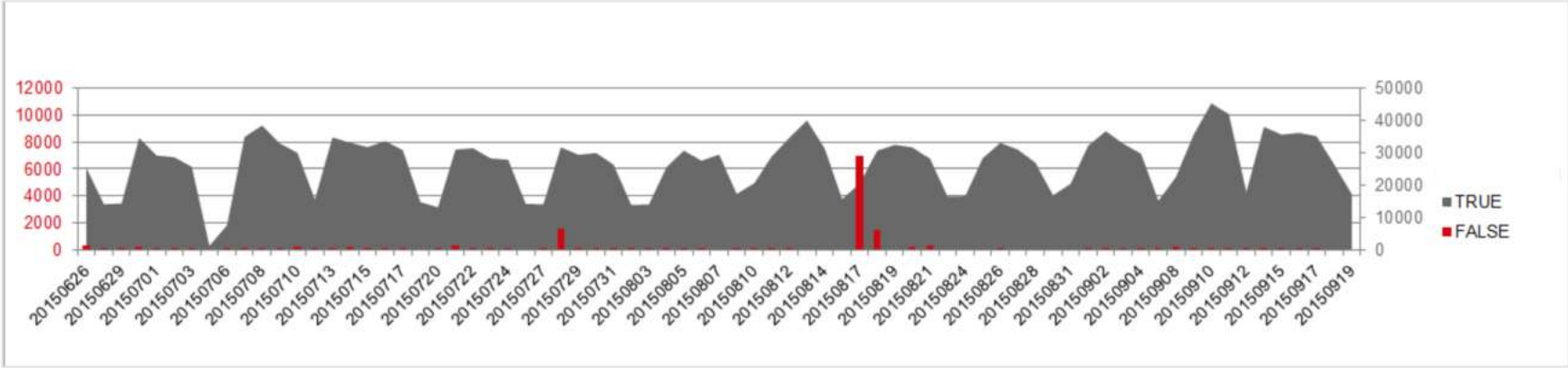
1.) Number of manual processing (= basis for sample testing)

2.) Circumvention of automated control.

Example: Interface Testing

In a second step we exported the suspicious transactions into ACL:

- Based on the information gained in the process mining analysis target-oriented analysis could be performed in ACL to get more information about the reasons.
- As a result we could identify that there was a problem with an IT-interface at 3 days:



PUBLIC

EXAMPLE 2

Analyzing the **efficiency** of the parcel delivery process

Deutsche Post

DHL

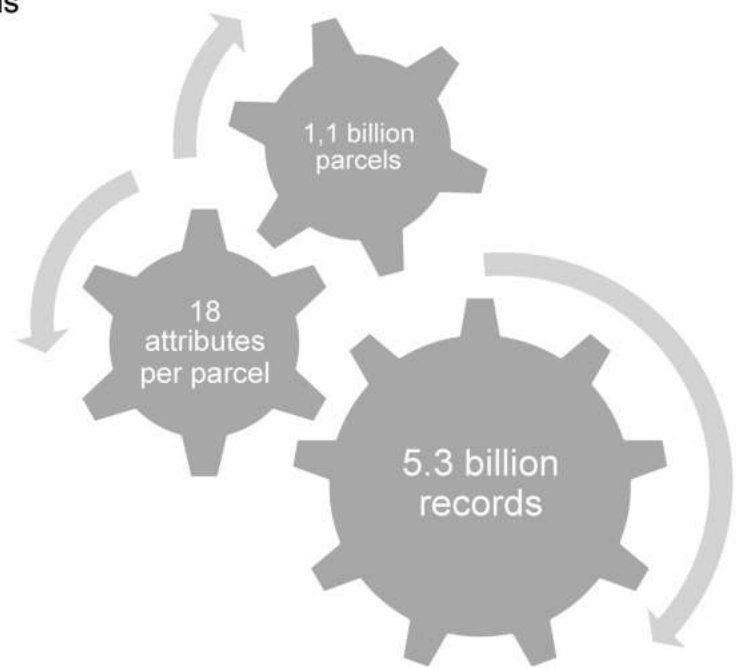
Example: Interface Testing

Objective: Identification of inefficiency handling during the delivery of parcels

Data source: Parcel Tracking Systems, 9 Tables, 5.3 billion records

Procedure:

1. Import of data in data analysis tool
2. Assignment of process steps to time-stamps
3. Creation of a sequential logfile
4. Generate a sample logfile with 100 million records
5. Develop and save the DISCO recipes
6. Load the full logfile
7. Re-import of conspicuous cases in ACL und further analysis in ACL



Example: parcel delivery process

Minimal detail level showed target process:

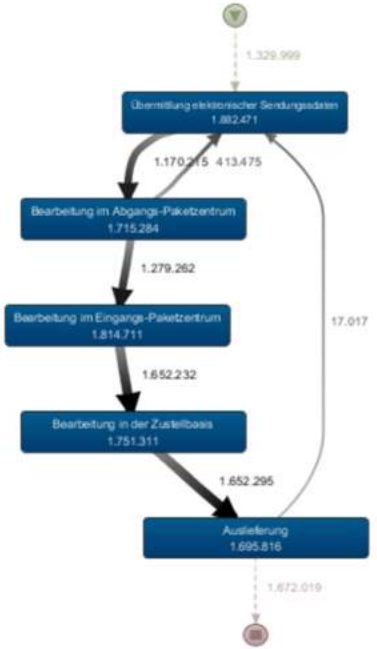
electronic item data
- delivered by sender
- data used for special services during delivery (like cash on delivery)

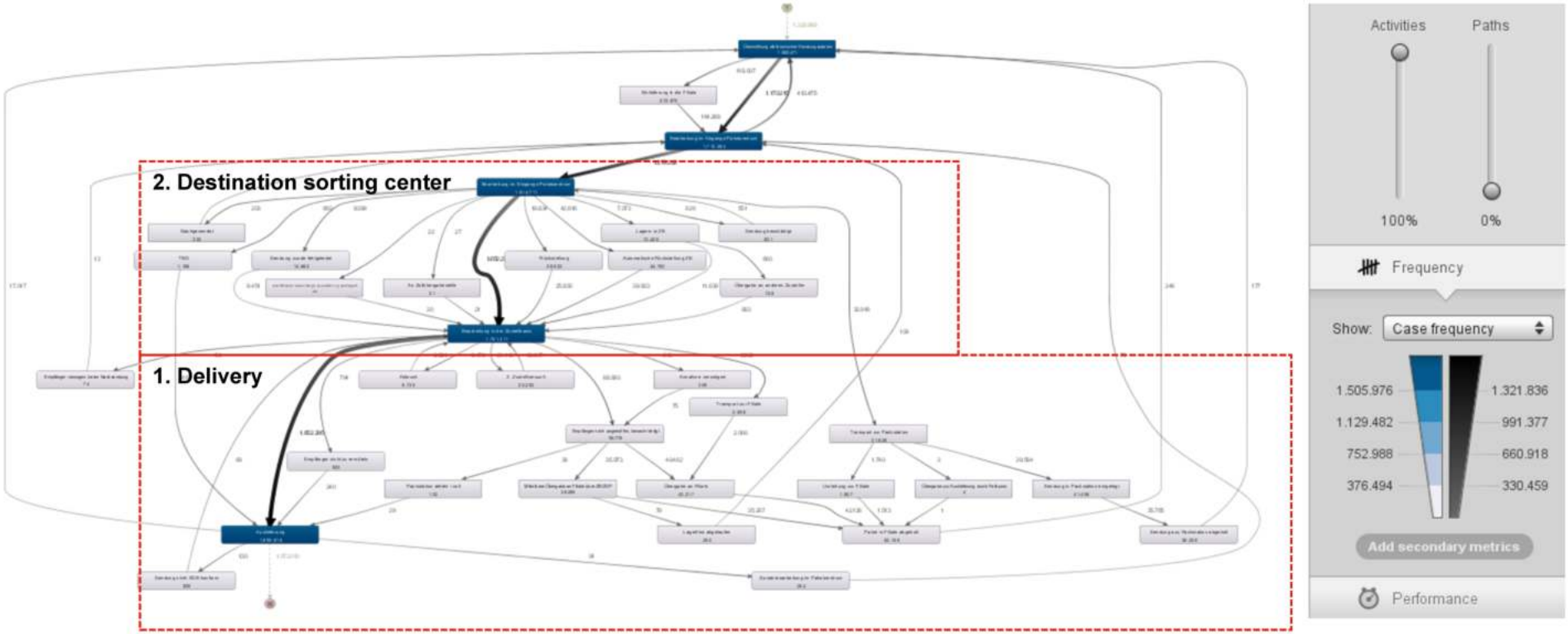
origin sorting center
- Sorting of all parcels
- Special handling for unreadable parcel labels

destination sorting center
- sorting for delivery bases
- special handling for damaged parcels

delivery base
- initial scan by the deliverer
- load parcel to the truck

delivery
- Over 55 different actions

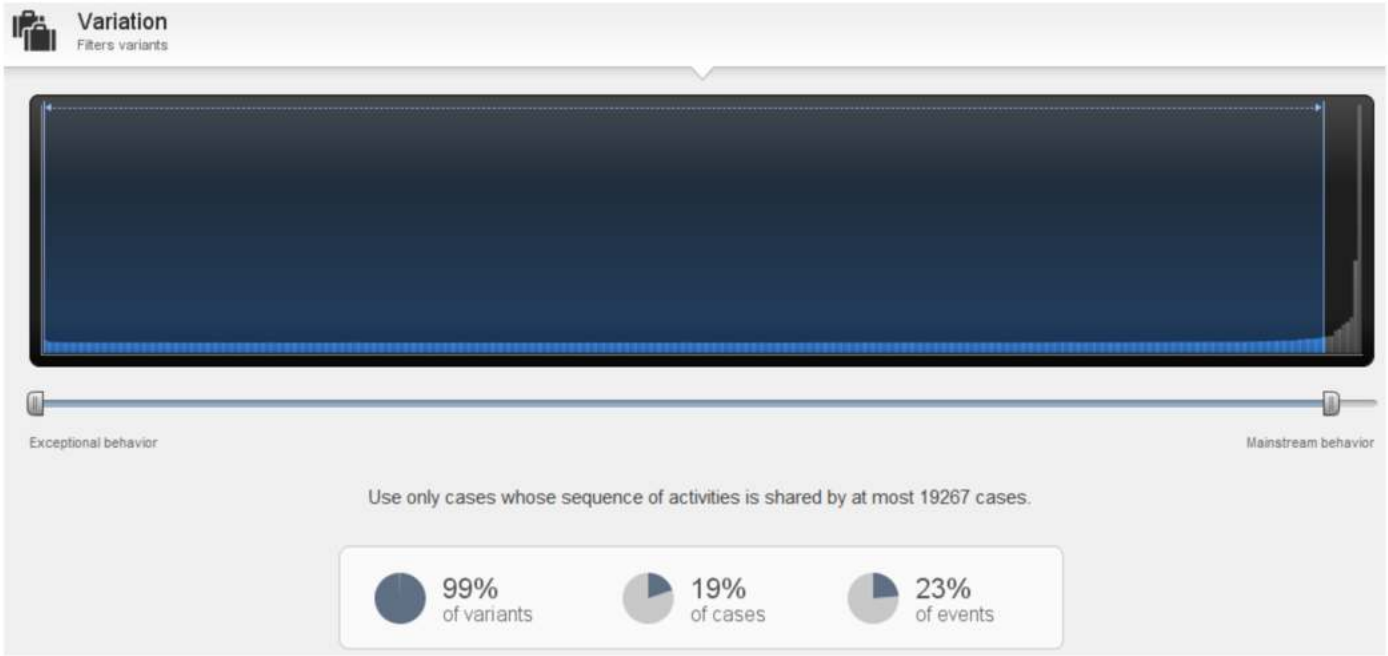




Most activities during delivery(1), as expected. But also many process steps in the destination sorting center(2).

Example: parcel delivery process

Good news: most of the cases are following the target process, lets focus on the other cases that require more effort



Example: parcel delivery process

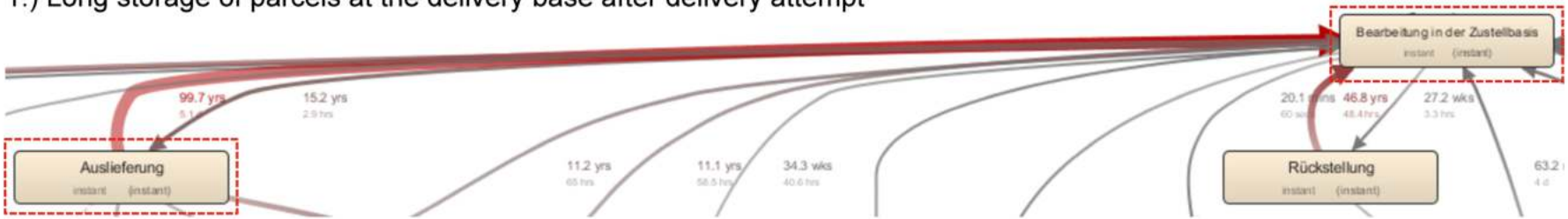
Now, lets peel the onion….

- **eliminate all cases that are following the target process**
- **trim the process (start at destination sorting center)**
- **filter and improve all cases with data quality issues**
- **and lets do it all again…**

Example: parcel delivery process

Results / findings:

1.) Long storage of parcels at the delivery base after delivery attempt



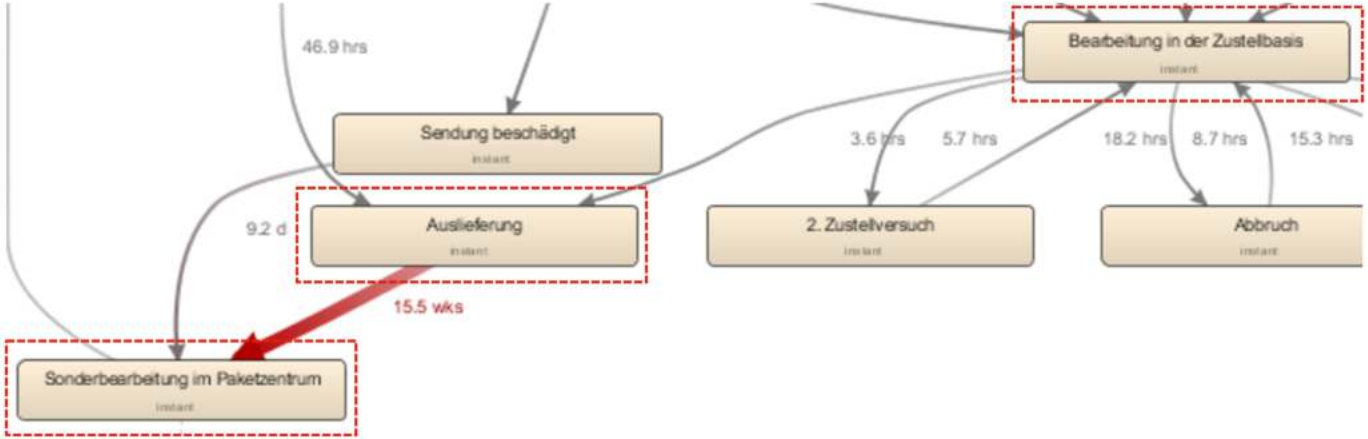
Filters used: Follower Filter with time option:

Suggestion for improvement : Filter for specific days to exclude cases including weekends

Example: parcel delivery process

Results / findings:

2.) Special handling of parcels after delivery attempt



PUBLIC

EXAMPLE 3

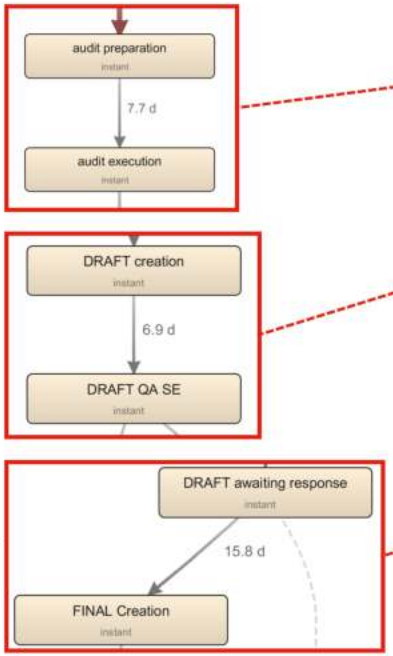
Analyzing the **quality** of our audit process

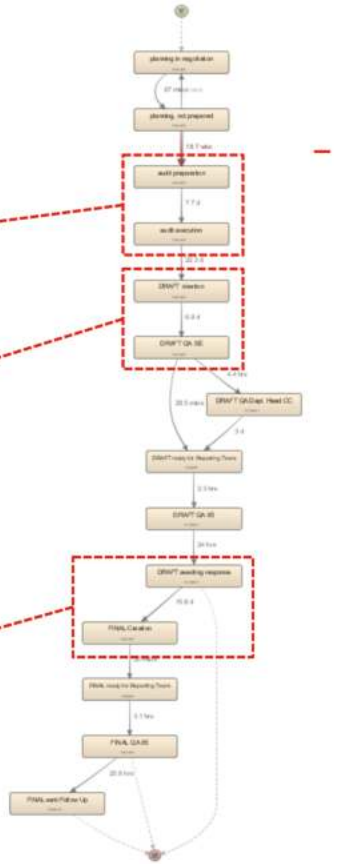
Deutsche Post

DHL

Example: audit process

- According to the audit process standards, the preparation phase should last a week.
- According to the audit process standards, the draft report should be ready after a week.
- According to the audit process standards, the business units have two weeks for a management response.

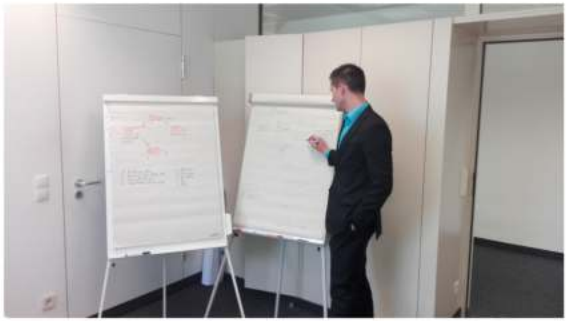




Conclusion

With process mining, internal audit can:

- speed up the data analysis cycle
- discover audit subjects and risk within business processes no one has ever thought about
- improve the quality of audit results
- visualize results in a more appealing way for the management



collecting process information

generating process information

THANK YOU

Marc Gittler
Senior Expert
marc.gittler@dpdhl.com

Patrick Greifzu
Audit Manager
patrick.greifzu@dpdhl.com

Deutsche Post

DHL