



Process mining

Added value of data driven technology

July 4th, 2024

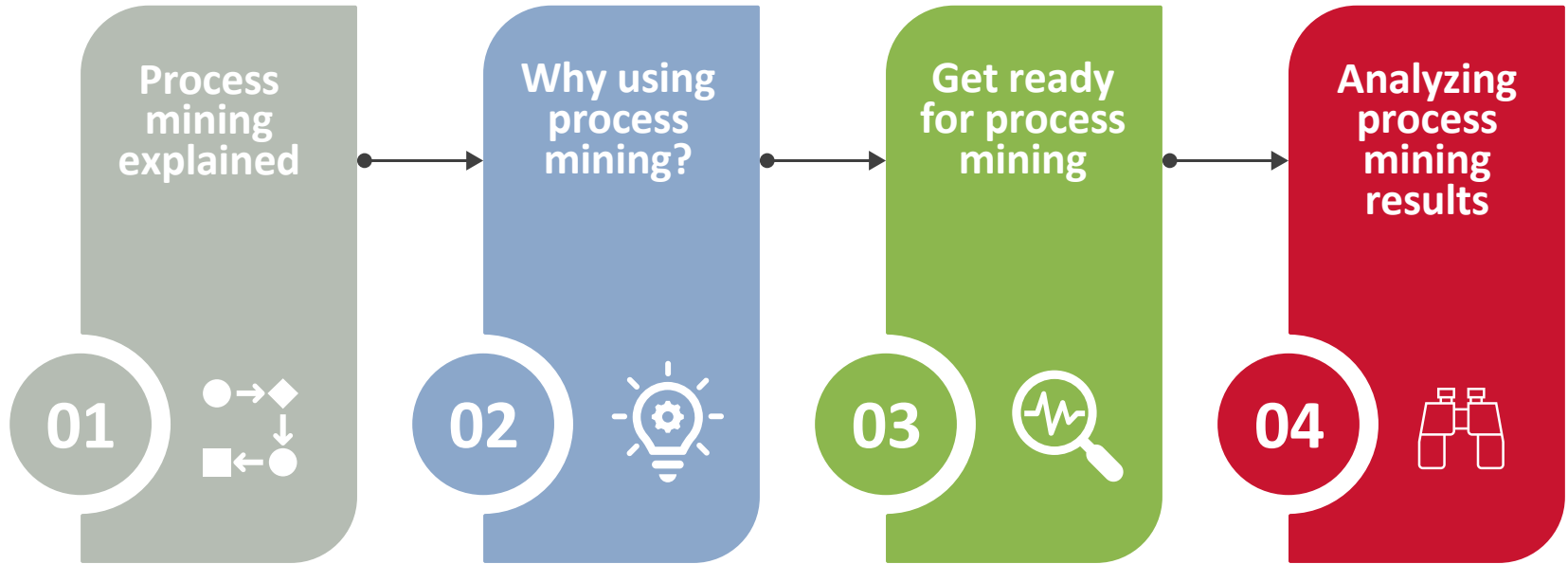
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Process mining: Added value of data driven technology





About Joanknecht



About Joanknecht

Joanknecht is a boutique audit and consulting firm. With our roots in Brainport Eindhoven, IT is an important starting point in all our activities.

IT Assurance

Our IT auditors are experts in the field of IT audit & assurance, IT security & privacy, governance risk & control, business intelligence and process mining.



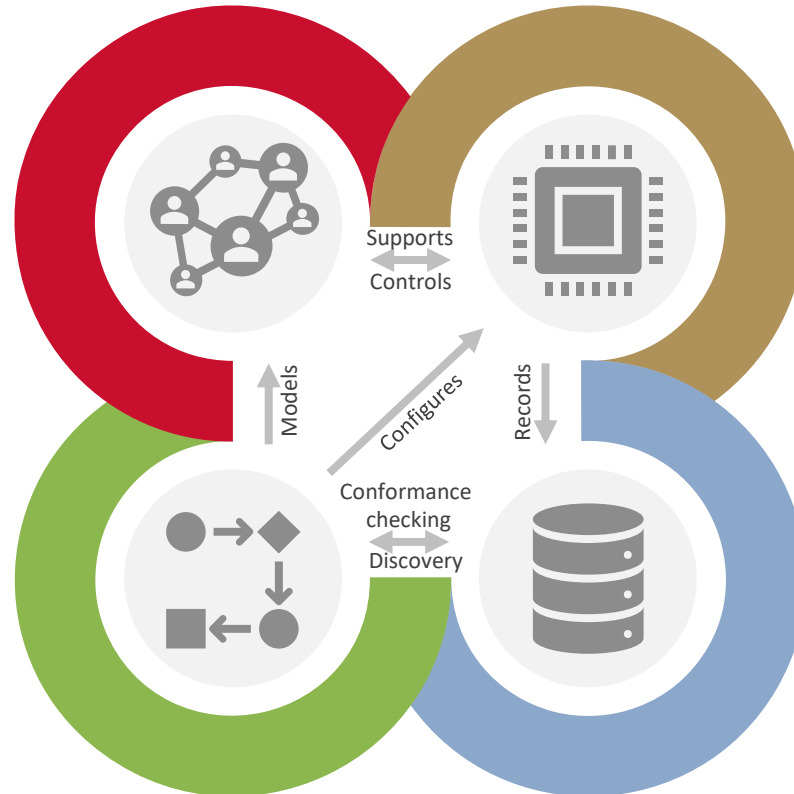
What is the concept of process mining?

2. Operational process

The actual processes in the organization

1. Process model

The process as designed by the business process modeler/Enterprise Architecture



3. Information systems

The supporting information systems for the Operational Processes. Responsible for recording relevant activities in the processes.

4. Event logs

Based on all changes in activities stored in the information systems, specific event logs are generated. These logs will provide the data for the Process Mining analysis

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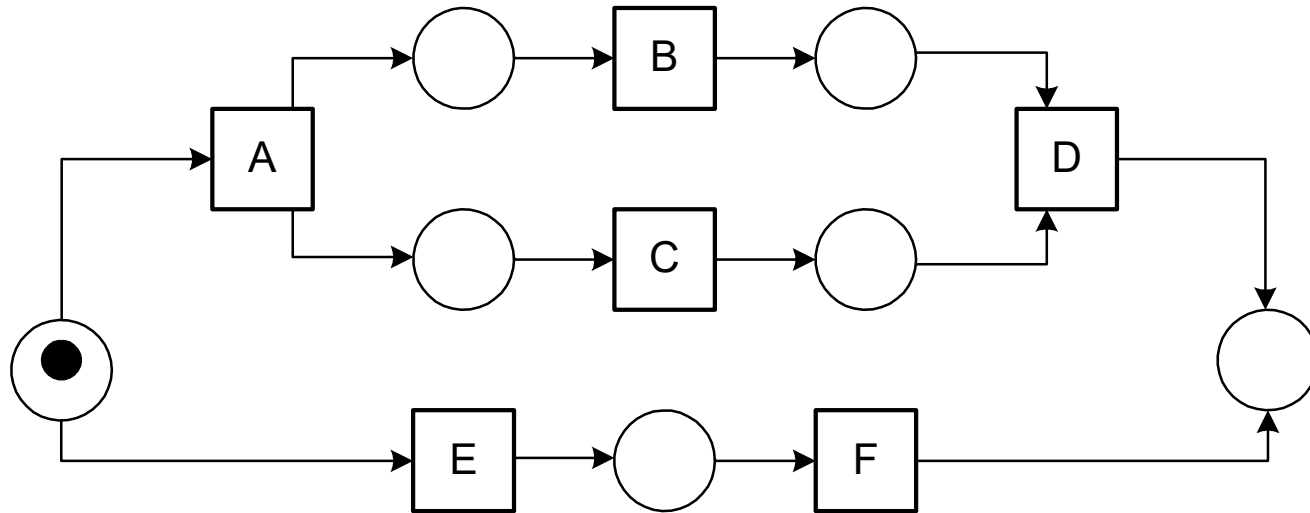
02

03

04

What is the concept of process mining?

Process model



case 1 : Activity A
case 2 : Activity A
case 3 : Activity A
case 3 : Activity B
case 1 : Activity B
case 1 : Activity C
case 2 : Activity C
case 4 : Activity A
case 2 : Activity B
case 2 : Activity D
case 5 : Activity E
case 4 : Activity C
case 1 : Activity D
case 3 : Activity C
case 3 : Activity D
case 4 : Activity B
case 5 : Activity F
case 4 : Activity D

Goal

1. What do you want to achieve?

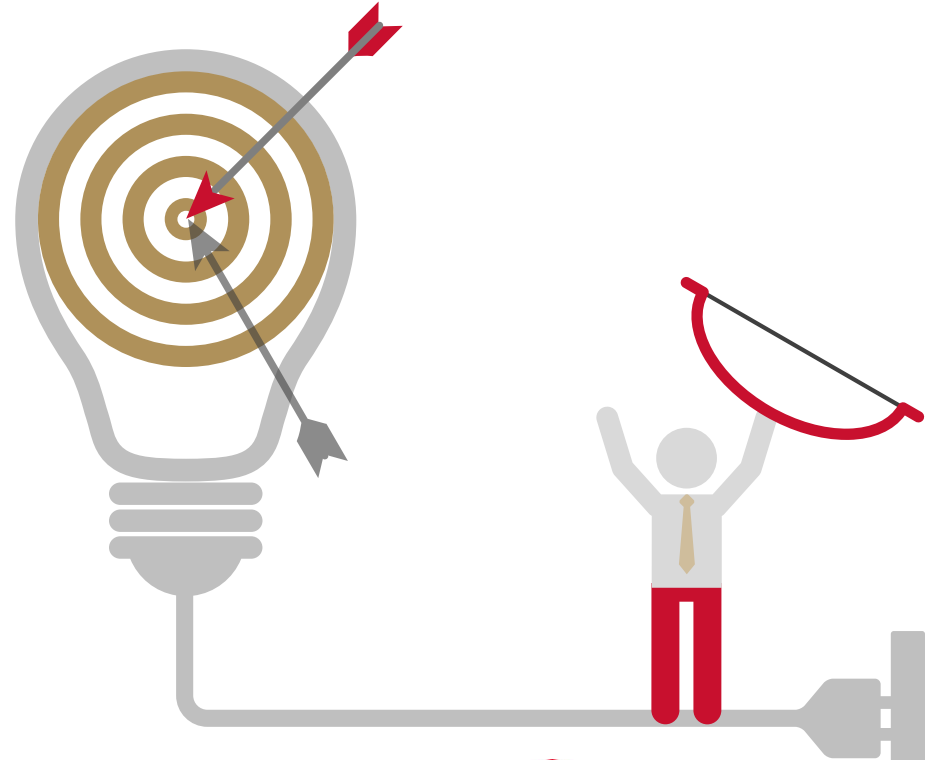
Like every data analysis project, process mining should always start with a specific research question!

2. How can this research question be answered?

Is process mining the way to go? Or is a more static data mining approach more appropriate?

3. When applying process mining, which aspects are required?

- **Case:** what identifies the unique key in this process (e.g. a ticket id)?
- **Activities:** which activities in the lifetime of the case can be distinguished (e.g. opening ticket, impact analysis, closing, etc.)?
- **Timestamp:** When did these activities occur?
- **Other attributes** relevant for answering the research question (e.g. who performed the activity, are other departments involved, etc.)



Multiple use cases

1. Process improvement

Process mining gives excellent opportunities to get a better view on how processes are actually performing in real life, because it is a fact-based visualization of the processes.

- Better understanding of the actual process
- Review actual processes compared to the desired paths
- Which activity can be classified as the main bottleneck, and who or what is responsible?
- Minimize the number of variances in possible paths.
- How many exceptions exist compared to the main process (the 'happy path'), and what are the related costs of those deviations?
- Which 'elephant paths' exist, and is this always wrong or what can be learnt?



Multiple use cases

2. (internal) Audit and Compliance support

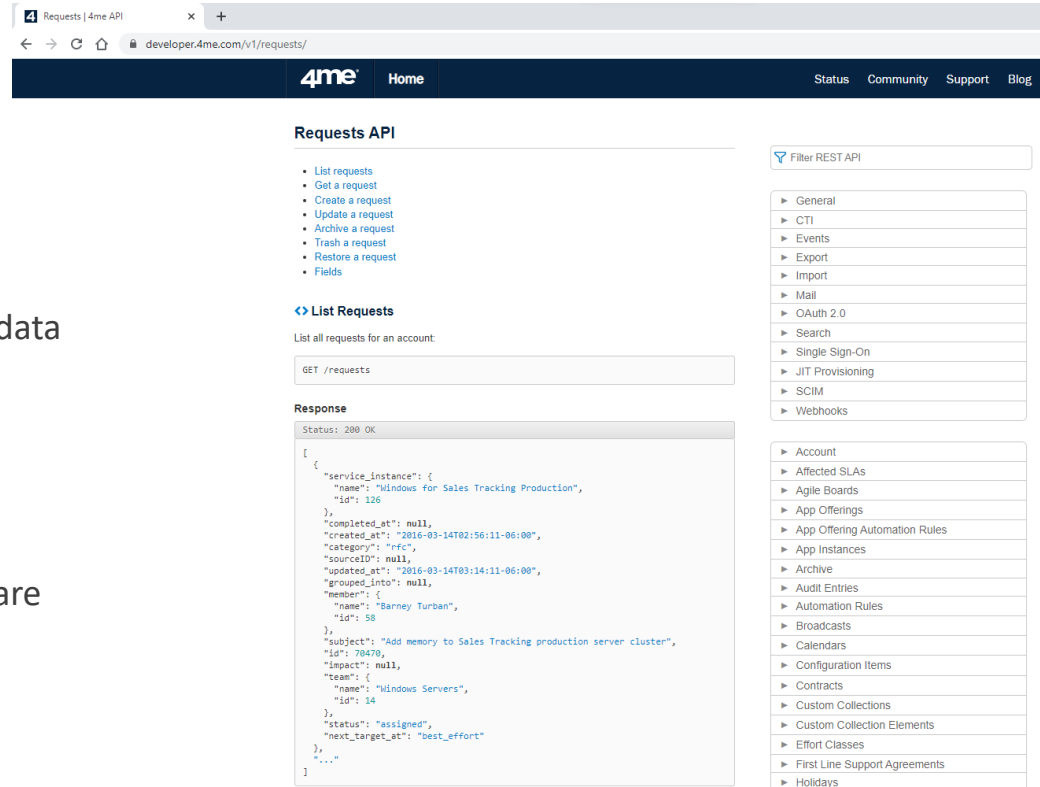
Process mining also gives excellent opportunities to support (internal) audit, compliance and IT security departments.

- Have activities been performed in the wrong (mandatory) order?
- Have transactions been changed after approval by authorized employees?
- Is the required Segregation of Duties always followed?
- Focus on outliers!



The ETL proces


1. Extract data from IT systems
 - Finding/creating data
 - Extracting data
2. Transform data to “process mining proof” data
 - Transforming to usability
 - Different formats
 - More or less data
3. Load and analyze
 - Loading into the process mining software
 - Applying filters
 - Analyzing results





The screenshot shows a web browser window with the URL `developer.4me.com/v1/requests/`. The page title is "Requests | 4me API". The navigation bar includes "Home", "Status", "Community", "Support", and "Blog". The main content area is titled "Requests API" and contains a list of API endpoints: "List requests", "Get a request", "Create a request", "Update a request", "Archive a request", "Trash a request", "Restore a request", and "Fields". Below this is a section for "List Requests" with a search bar containing "GET /requests". The response section shows a JSON object with details for a request, including service instance, creation and update timestamps, category, and team information.


```
{
  "service_instance": {
    "name": "Windows for Sales Tracking Production",
    "id": 126
  },
  "completed_at": null,
  "created_at": "2016-03-14T02:56:11-06:00",
  "category": "r-rc",
  "sourceID": null,
  "updated_at": "2016-03-14T03:14:11-06:00",
  "grouped_into": null,
  "member": {
    "name": "Barney Turban",
    "id": 58
  },
  "subject": "Add memory to Sales Tracking production server cluster",
  "id": 70470,
  "impact": null,
  "team": {
    "name": "Windows Servers",
    "id": 14
  },
  "status": "assigned",
  "next_target_at": "best_effort"
},
  "..."
```


ETL: Automatic Process Mining API


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Start date: 

End date: 

Account: 


Category: 

 wdc_incident_2024-01-01_2024-12-31.csv
18,2 KB • Klaar

Analyzing process mining results



The **Complete**
Service Management Platform

Financial Management						
Reporting & Dashboards						
 Service Integration with other Internal Support Domains and External Providers	Resource Planning					
	Time Tracking					
	Request Fulfillment	Incident Management	Problem Management	Access Management	Change Management	Asset & Config Management
Release Management	Knowledge Management	Service Catalog	Service Level Management	Capacity Management	Availability Management	
Webshop	Service Continuity Management	Security Management	Contract Management	Risk Management	Portfolio Management	Project Management
User Experience Management	Demand Pipeline	Reservation Management	Live Translations	Agile Development	Self Service	Virtual Assistant
Enterprise Service Management						
Automation						
Integration						

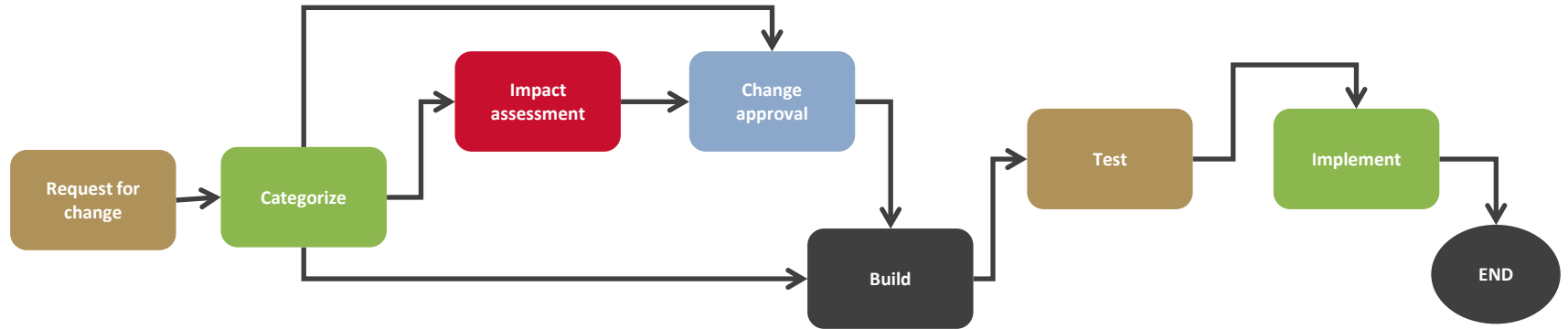
01

02

03

04

Process model for a change



Analyzing process mining results

The screenshot displays a change management system interface. At the top, there is a dark blue header bar with icons for adding, editing, playing, deleting, viewing, and settings. On the right side of the header, there is a notification bell, a refresh icon with '0%' next to it, and a user profile picture.

Below the header, a grey bar contains the following information:

Change #	Category	Impact	Status	Completion Target
1695	Non-Standard	Top	Registered	To Be Planned

The main content area features a blue wrench icon followed by the title **Non-standard application change**. Below this, the following details are listed:

- Manager: Howard Tanner
- Service: SAP Basis Widget Data Center, External IT
- Type: Application Change
- Justification: Improvement

At the bottom, there is a Gantt chart showing a timeline from August 6th to September 0th. The timeline is divided into weekly segments. A blue bar indicates the duration of the change, starting on August 6th and ending on August 27th. Below the timeline, a list of questions is displayed:

- Is sufficient capacity available for the change to be taken into production?
- Will the change implementation cause the service to become degraded or unavailable?
- When would be the best time to implement the change?
- Will events be generated when the change is implemented?

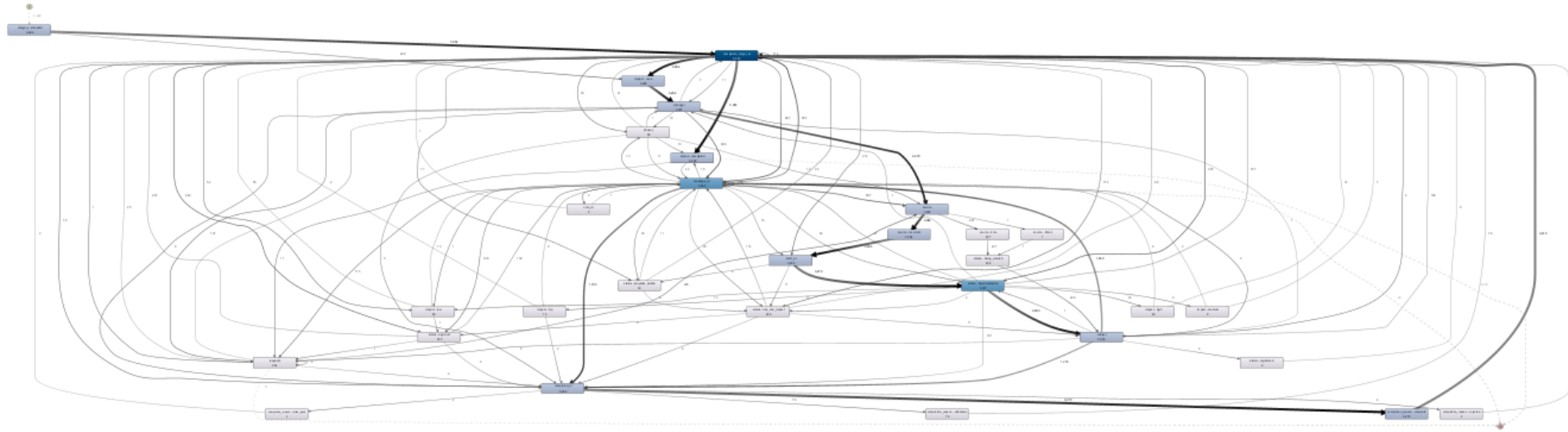
01

02

03

04

But actual data of all tickets is showing something else...



But actual data is showing something else...

Always ask for the 'Why':

- Not all activities from the original process model pop up in the process mining analysis
- There is no standard order in which different activities have been performed
- Some steps between activities take much longer than agreed upon in the Service Level Agreement
- Etc
- Etc



Audit perspective: internal controls testing!

Defined Controls:

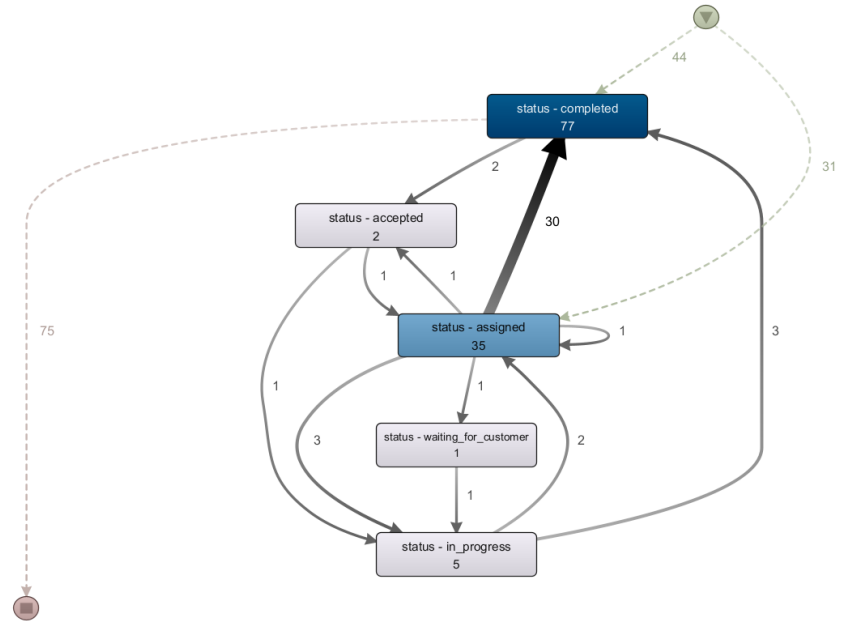
1. Changes are classified as standard or non-standard (normal or emergency)
2. In case of normal and emergency changes an RFC is made
3. Prior to implementing internal non-standard changes, approval of engineering team and CAB is required.
4. Prior to implementing external non-standard changes, approval of engineering team and client is required.

Research questions:

1. Are all changes classified as standard or non-standard (normal or emergency)?
2. Is in all cases of a normal or emergency change an RFC made?
3. Are all internal non-standard changes, prior to implementing, approved by engineering team and CAB?
4. Are all external non-standard changes, prior to implementing, approved by engineering team and client?

Incident management

Which statuses are being applied/neglected?



6 variants!

Analyzing process mining results

Request #	Category	Impact	Status	Reason: Gone
705739	Incident	Low	Completed	03 Jun

Test for Joanknecht (Service Instance changed)

Requested by Howard Tanner 16 Apr
Service instance LAN Connectivity Widget Chicago GlobalNet, Inc.

Assignment

Team Operations
Member Howard Tanner

Affected SLAs

- Standard LAN Connectivity for Widget Chicago
Network: GlobalNet
- Standard Monitoring for Widget Data Center-External-IT
Operations
- Standard Oracle Database for the Monitoring Production Instance of Widget Data Center
Database Administration

Time Entries

Time spent: 4:07

Notes

Howard Tanner 16 Apr 0:01

See below for audit trail:

Show all Show field changes only	
Tue, 16 04 2024 07:53:05am CDT updated by Howard Tanner	
Response target	set to Tue, 16 04 2024 08:23:05am CDT
Resolution target	set to Tue, 16 04 2024 03:53:05pm CDT
Team	changed from Operations to Database Administration
Service instance	changed from Monitoring Production to Database for Monitoring Production

Howard Tanner 16 Apr 0:05

Affected SLAs

- Standard LAN Connectivity for Widget Chicago
Network: GlobalNet 09:00AM
- Standard Monitoring for Widget Data Center-External-IT
Operations
- Standard Oracle Database for the Monitoring Production Instance of Widget Data Center
Database Administration

Howard Tanner 03 Jun 0:01

Test

✓ Howard Tanner completed this request 03 Jun

👍 Howard Tanner is satisfied with the manner in which this request has been handled. 03 Jun

Account: Widget Data Center Last updated: 03 Jun

Analyzing process mining results

Audit Trail - Request #705739 Test for Joanknecht (Service Instance changed)

Show all | Show field changes only

Mon, 03 06 2024 02:06:09am CDT updated by Howard Tanner

Updated changed from Mon, 03 06 2024 01:58:44am CDT to Mon, 03 06 2024 02:06:08am CDT
Satisfaction set to Satisfied

Mon, 03 06 2024 01:58:44am CDT updated by Howard Tanner

Status changed from Assigned to Completed
Completion reason set to Gone - Issue Can No Longer Be Found
Completed at set to Mon, 03 06 2024 01:58:44am CDT
Response target cleared Tue, 16 04 2024 09:00:22am CDT and set to blank
Team changed from Service Desk GlobalNet to Operations
Member set to Howard Tanner

Tue, 16 04 2024 08:00:22am CDT updated by Howard Tanner

Response target changed from Tue, 16 04 2024 08:23:05am CDT to Tue, 16 04 2024 09:00:22am CDT
Resolution target changed from Tue, 16 04 2024 03:53:05pm CDT to Wed, 17 04 2024 02:00:00pm CDT
Team changed from Database Administration to Service Desk GlobalNet
Service instance changed from Database for Monitoring Production to LAN Connectivity Widget Chicago GlobalNet

Tue, 16 04 2024 07:54:04am CDT updated by Howard Tanner

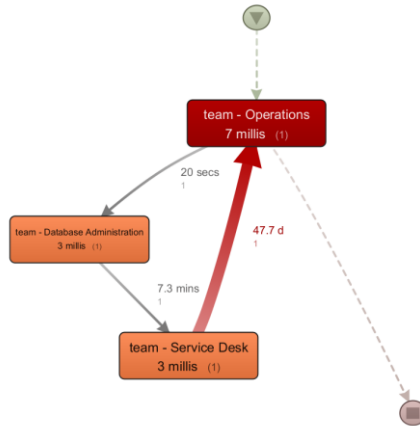
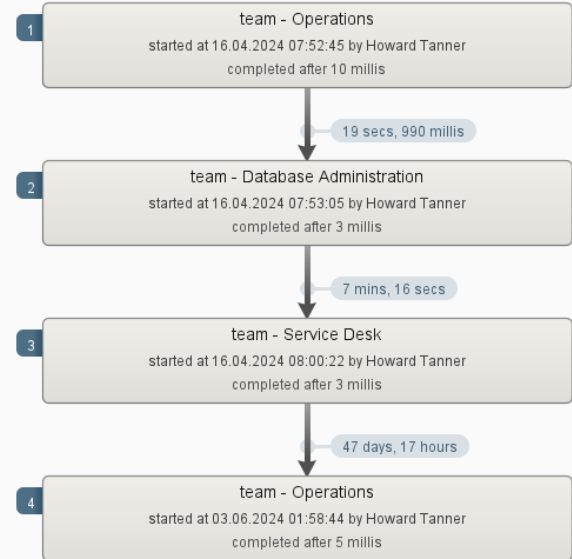
Subject changed from 'Test for Joanknecht' to 'Test for Joanknecht (Service Instance changed)'

Tue, 16 04 2024 07:53:05am CDT updated by Howard Tanner

Response target set to Tue, 16 04 2024 08:23:05am CDT
Resolution target set to Tue, 16 04 2024 03:53:05pm CDT
Team changed from Operations to Database Administration
Service instance changed from Monitoring Production to Database for Monitoring Pr

Tue, 16 04 2024 07:52:45am CDT created by Howard Tanner

Subject set to 'Test for Joanknecht'
Category set to Incident - Request for Incident Resolution
Impact set to Low - Service Degraded for One User
Status set to Assigned
Source set to '4me'
Grouping set to None
Account set to Widget Data Center
Created by set to Howard Tanner
Requested by set to Howard Tanner
Requested for set to Howard Tanner
Team set to Operations
Service instance set to Monitoring Production



01

02

03

04

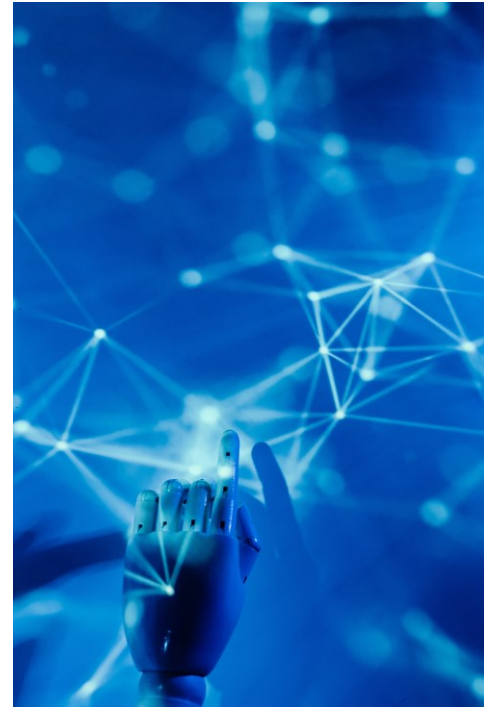
Process efficiency perspective: a real life example

- Overall 2948 fully completed cases during a full year -> average case duration 8,7 days
- In 48% (1415) of all cases minimum of 1 reassignment -> average case duration 10,9 days
- In 8% (227) of all cases minimum of 2 reassignments -> average case duration 27,5 days

Number of reassignments	Number of Incidents	Average duration (days)
0	1533	6,72
1	1188	7,73
2	127	19,50
3	44	27,36
4	20	26,96
5	13	44,48
6	11	37,03
8	8	83,12
7	2	52,46
9	1	38,39
11	1	227,53
Total	2948	8,73

Possible use cases for 4Me Users

- Incident management
 - Incidents are handled according to Service Level Agreements
 - Analysis of 'Ping-Ponging' with tickets between different employees and departments
- Change management:
 - Segregation of Duties in the change process
 - Analysis of waiting time between crucial activities
- Security management:
 - Analyzing behavioral patterns of logins etc.
- Process Health Check
- Etc, etc, etc



All use cases should be based on a specific need and research question!



Any questions?

Please contact me at Lvosten@joanknecht.nl





About Joanknecht





Corporate Finance



Assurance



IT-Assurance



Tax advisory



Family Services



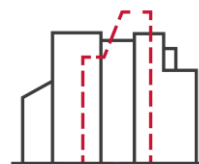
IT-Services



Integrated Finance



Forensics and
Recovery



Real estate advisory



Accountancy