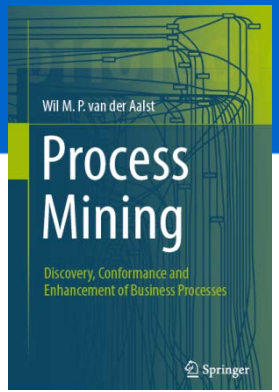
Process Mining: Data Science in Action

How To Conduct a Process Mining Project?



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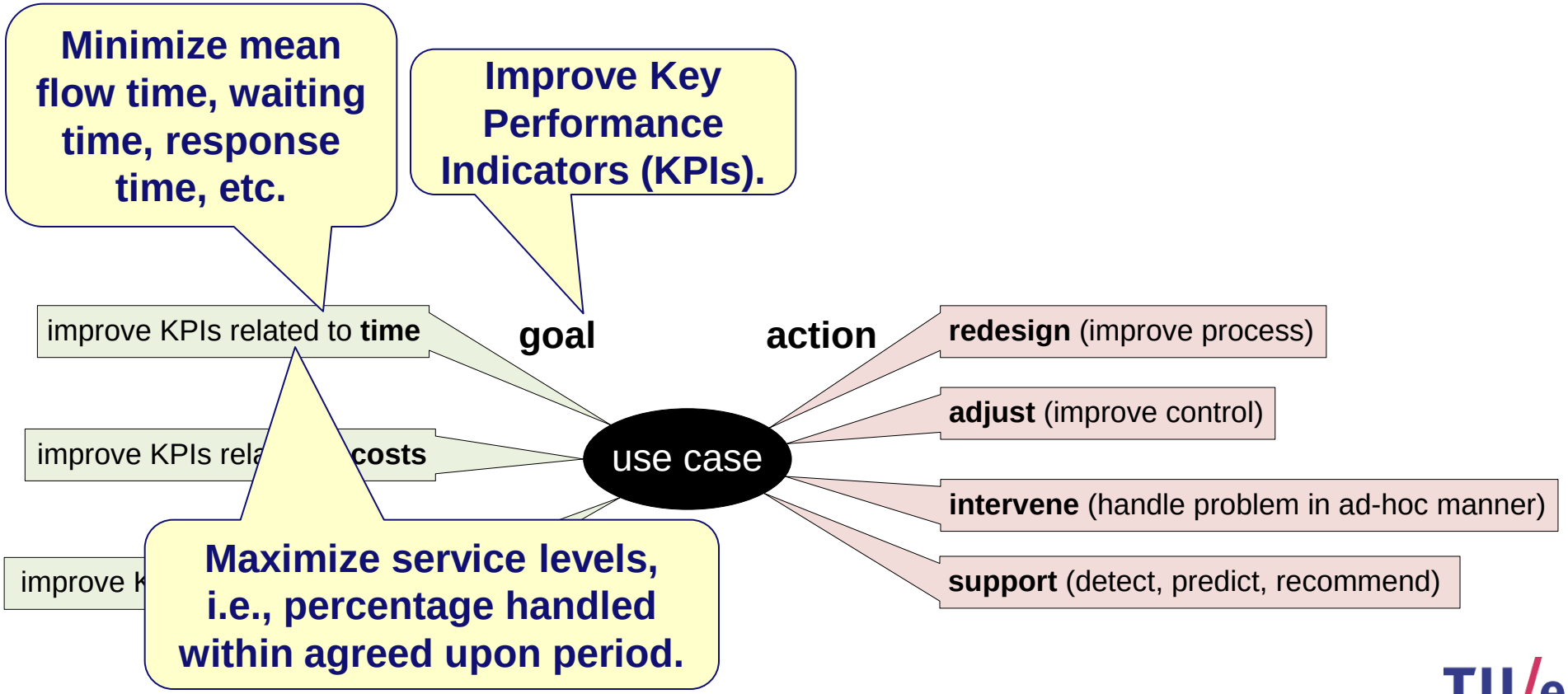
TU/e Technische Universiteit Eindhoven University of Technology

Where innovation starts

Drowning in data …

How to conduct a process mining project?

Process mining use cases



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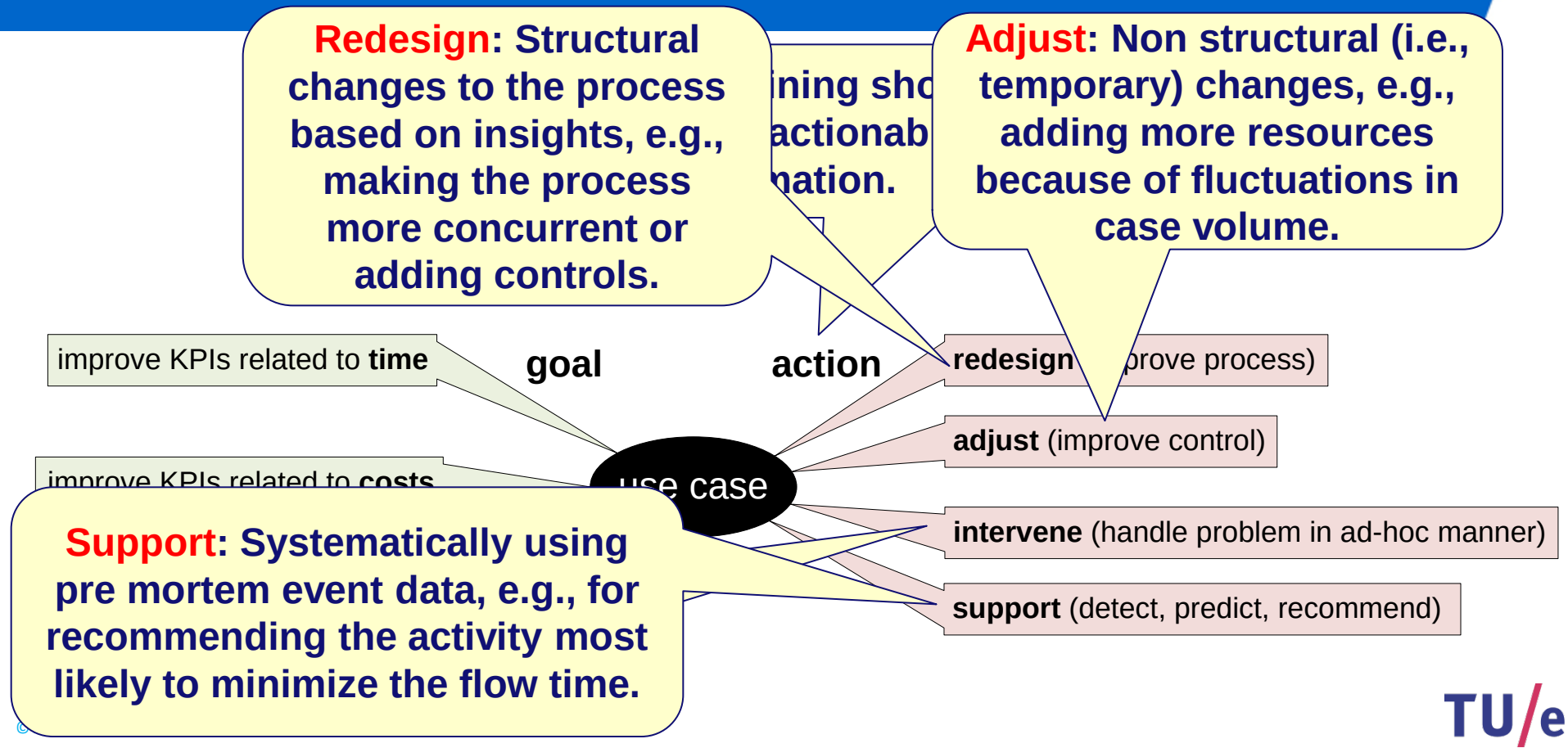
Process mining use cases



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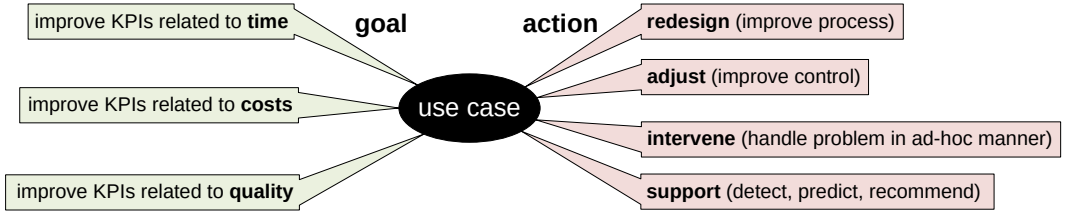
Process mining use cases

- **Identification of bottlenecks to trigger a process redesign that reduces the overall flow time with 30%.**
- **Identification of compliance problems using conformance checking. Some of the compliance problems result in ad-hoc interventions whereas others lead to adjustments of the parameters used for work distribution.**
- **Harmonization of two processes after a merger based on a comparison of the actual processes. The goal of such a harmonization is to reduce costs.**
- **Predicting of the remaining flow time to improve customer service.**
- **Providing recommendations for resource allocation aiming at a more balanced utilization of workers.**
- **Identification of exceptional cases that generate too much additional work. By learning the profile of such cases, they can be handled separately to reduce the overall flow time.**
- **Visualization of the 10 most complicated or time consuming cases to identify potential risks.**



L* lifecycle model for process mining

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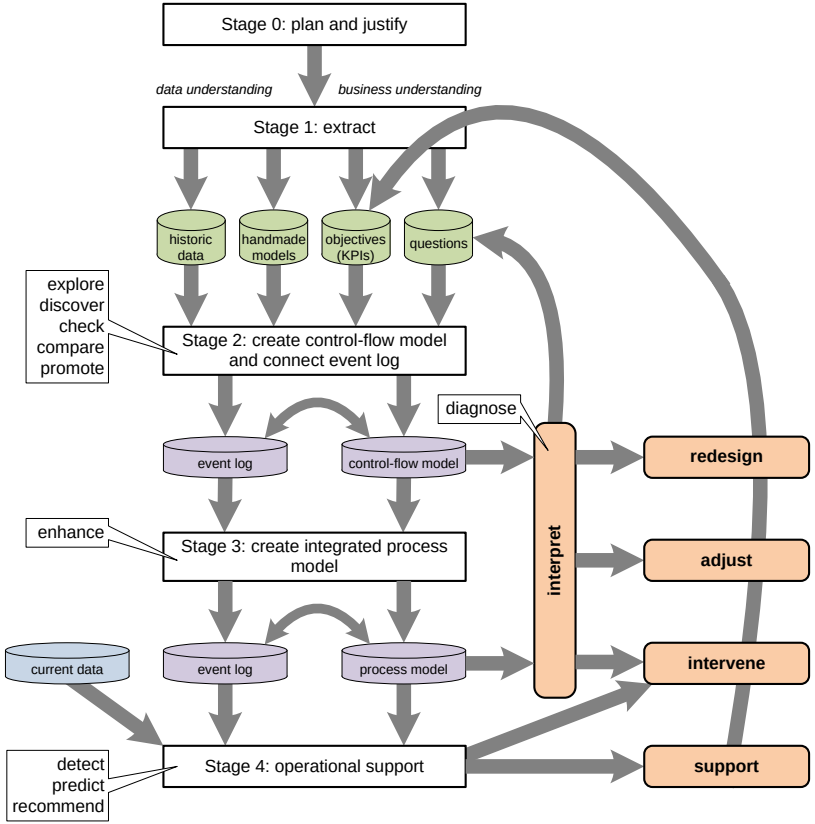
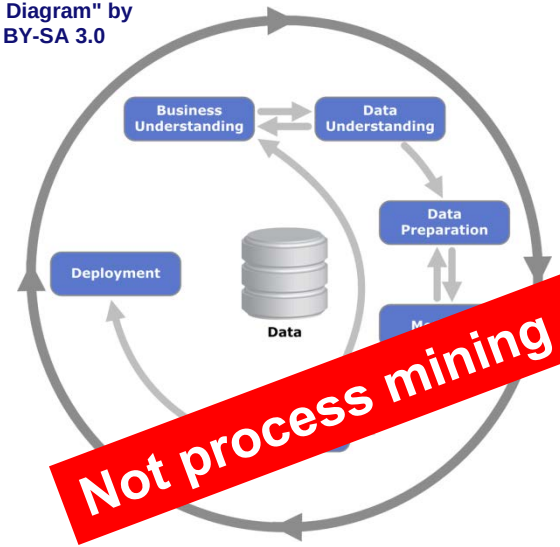


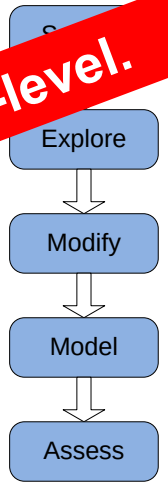
Describes the lifecycle of an idealized process mining project (assuming "Lasagna processes").

Similar to reference models describing the lifecycle of a typical data mining/BI project

"CRISP-DM Process Diagram" by Kenneth Jensen CC BY-SA 3.0



Not process mining specific and very high-level.



CRISP-DM
CRoss-Industry Standard Process for Data Mining

SEMMA
Sample, Explore, Modify, Model and Assess [SAS Institute]

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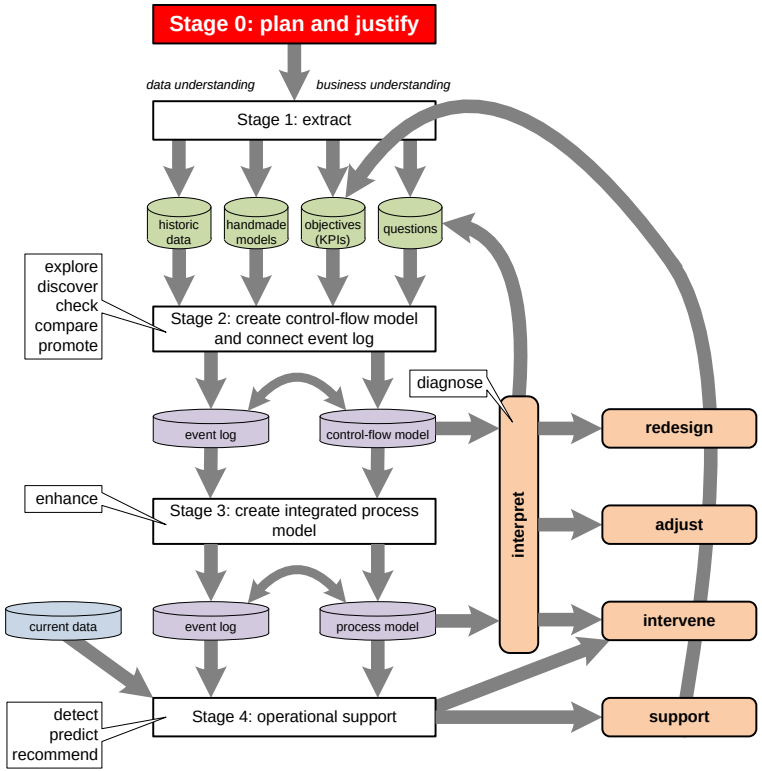
Stage 0: Plan and justify



- **Three types of projects:**
  - **data-driven ("curiosity" driven)**
  - **question-driven ("why?")**
  - **goal-driven (improve KPI)**
- **Plan project.**
- **Justify planned activities ("business case").**

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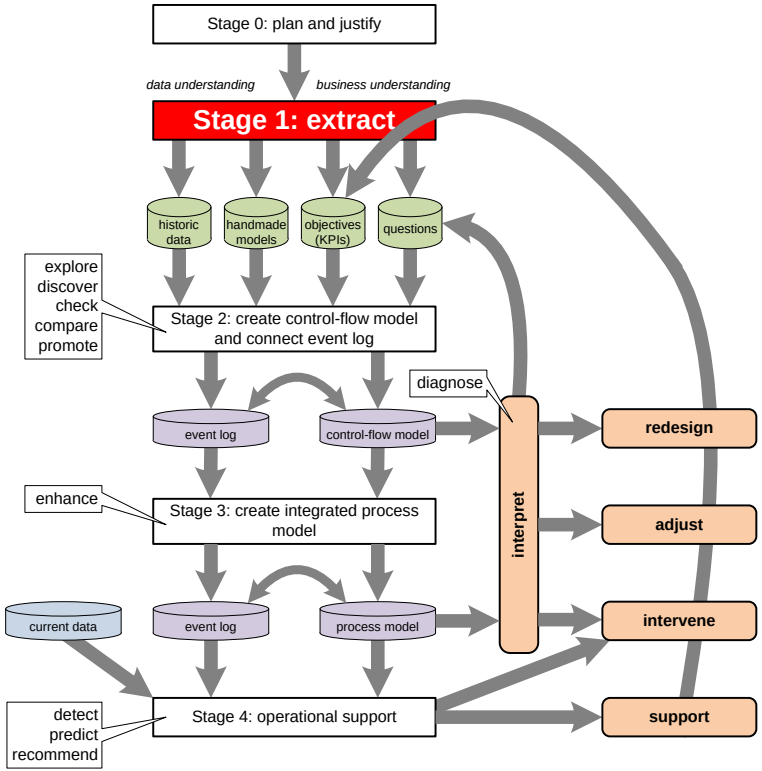
Stage 1: Extract



- **Locate, extract and transform event data (non-trivial, see previous lectures).**
- **Moreover, collect:**
  - **models and other artifacts,**
  - **objectives (KPIs), and**
  - **questions.**
- **Exploit existing (domain) knowledge!**

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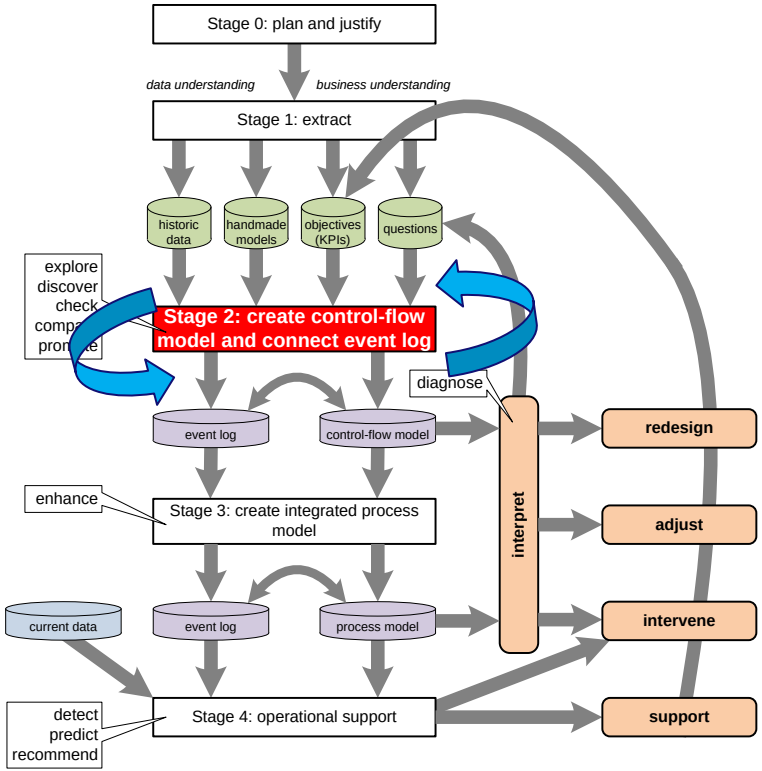
Stage 2: Create control-flow model and connect event log



- **Control-flow is the backbone of any process.**
- **Therefore, first create a suitable control-flow model well-connected to the available event data.**
- **Conformance checking and alignments are key!**
- **Iterative (like other stages).**

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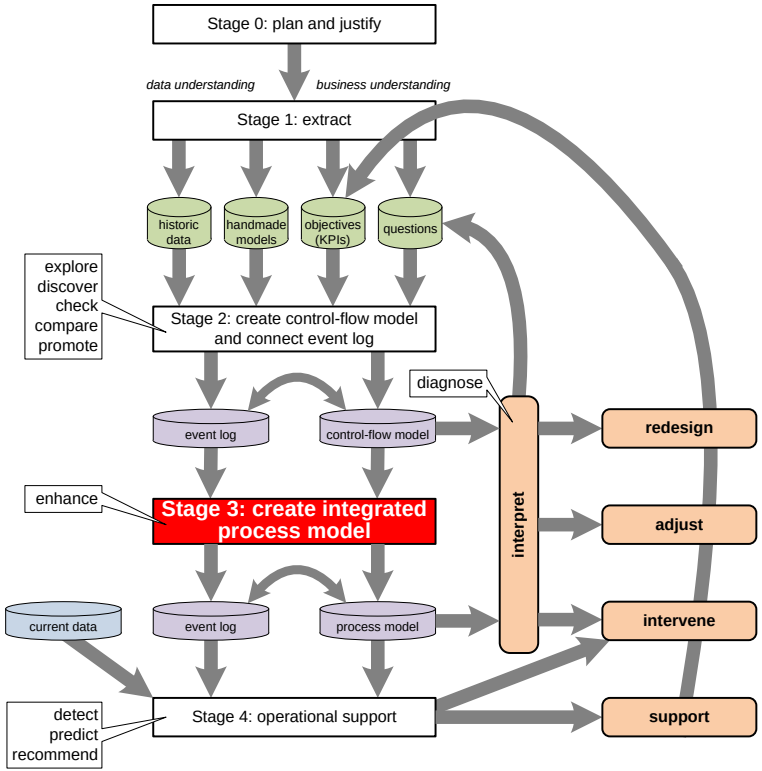
Stage 3: Create integrated process model



- **Replay event data on control-flow model to learn about the other perspectives (time, data, resources, …).**
- **Merge into an overall model showing the different perspectives.**

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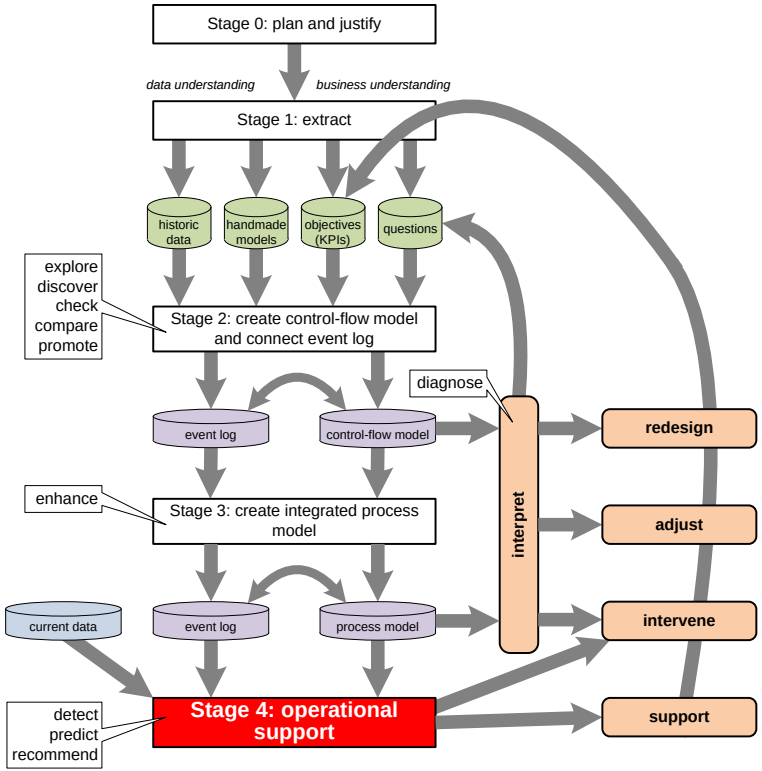
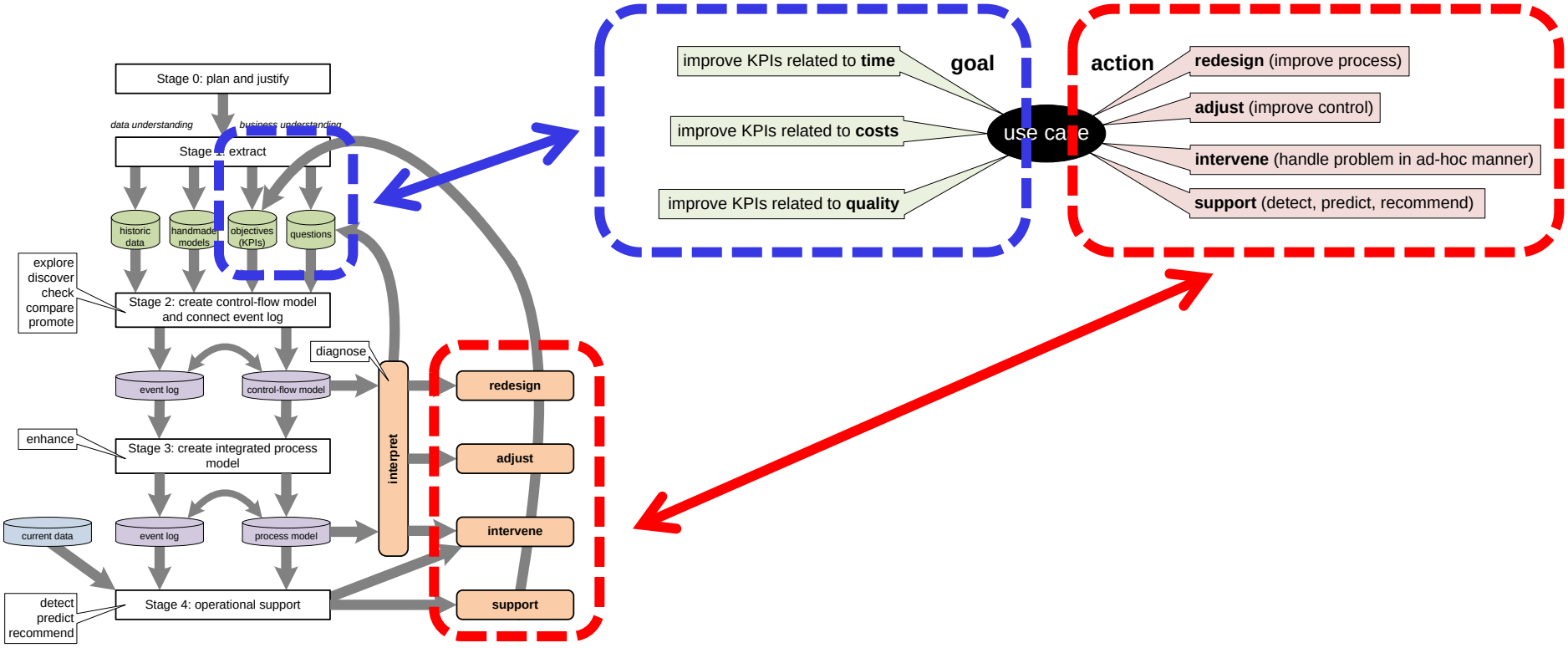
Stage 4: Operational support

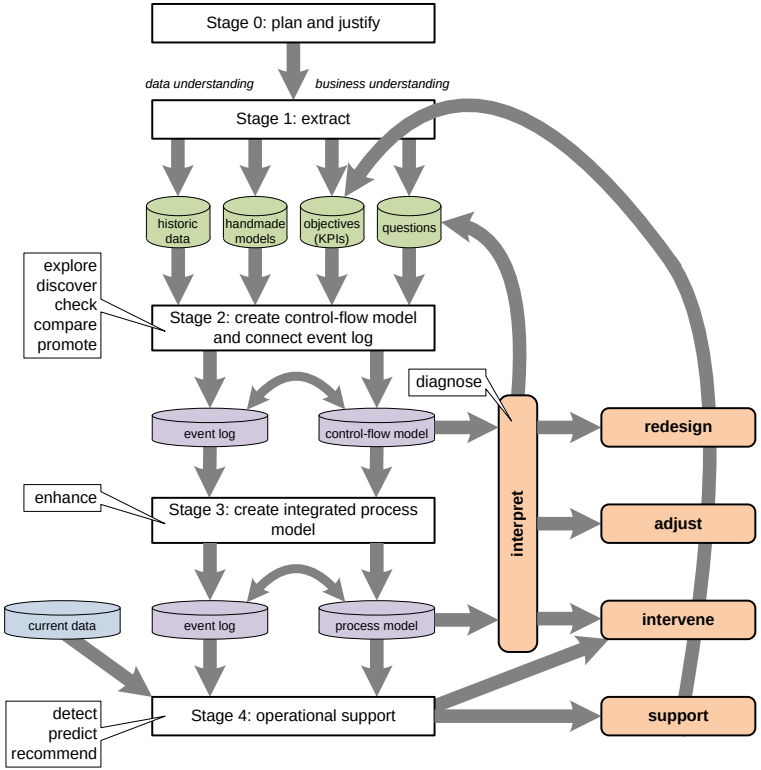


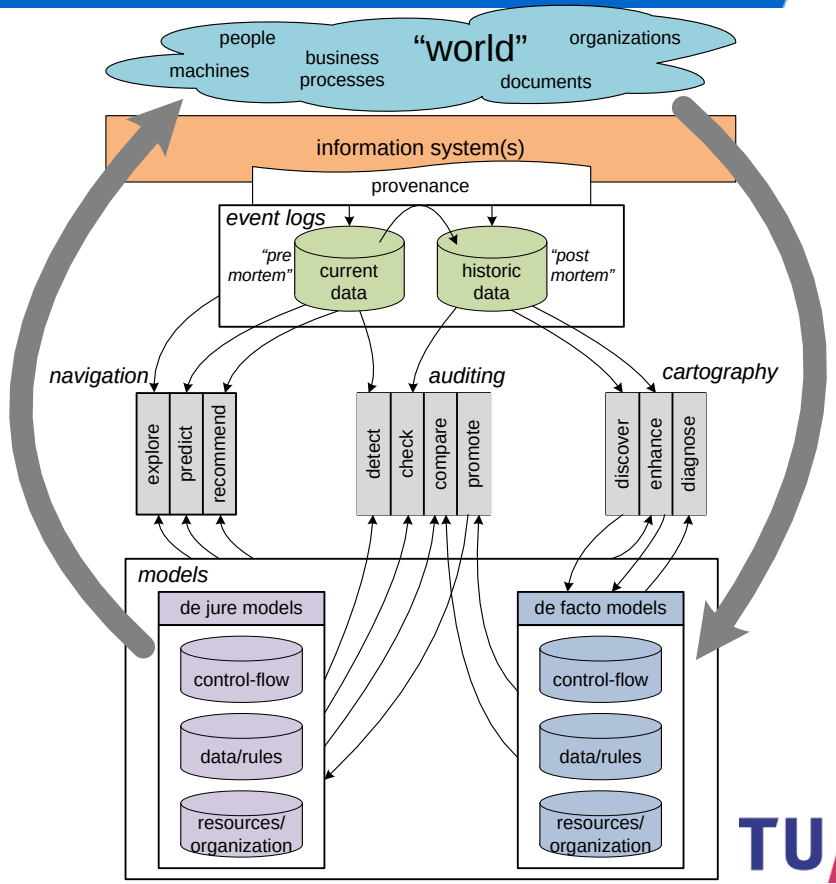
- **Use current (pre-mortem) data for on-the-fly deviation detection, predictions, and recommendations.**
- **Only possible for Lasagna processes!**

Relation to use cases



Linking L* to the refined process mining framework





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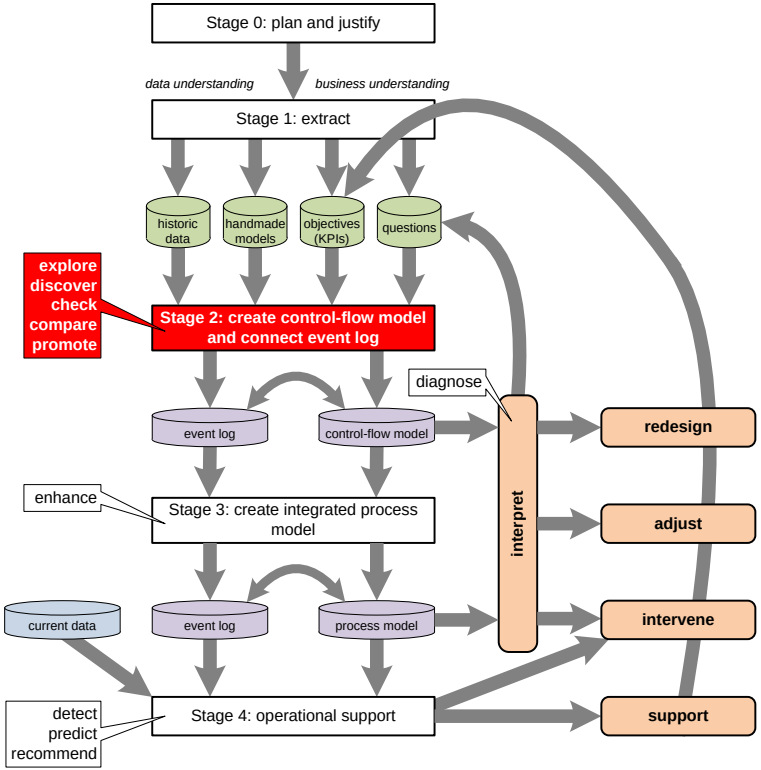

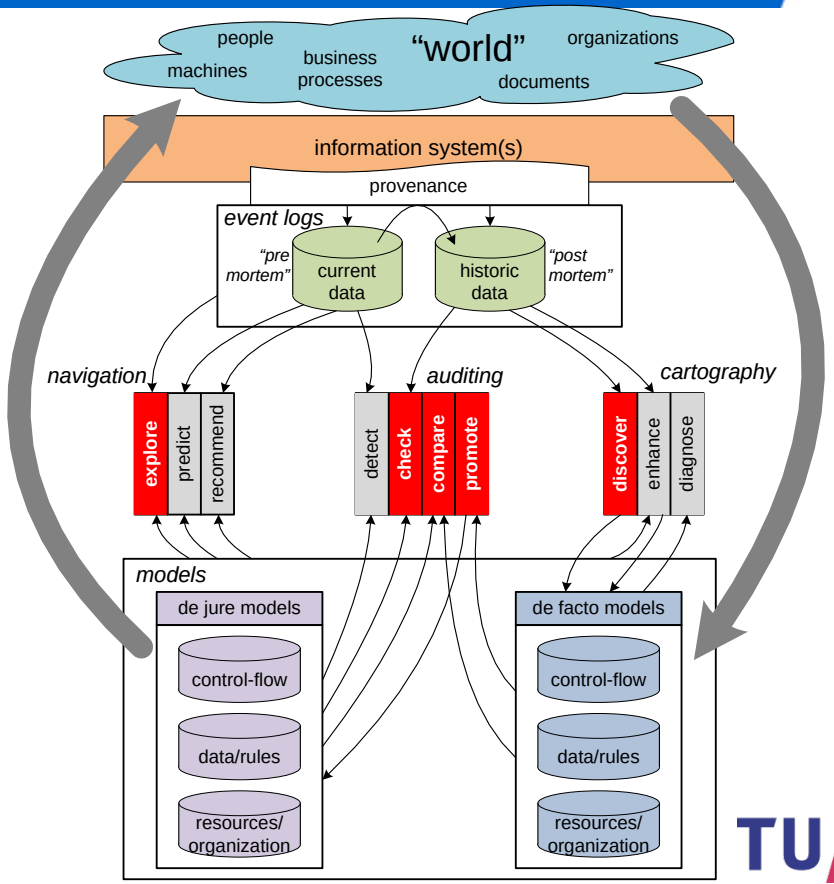

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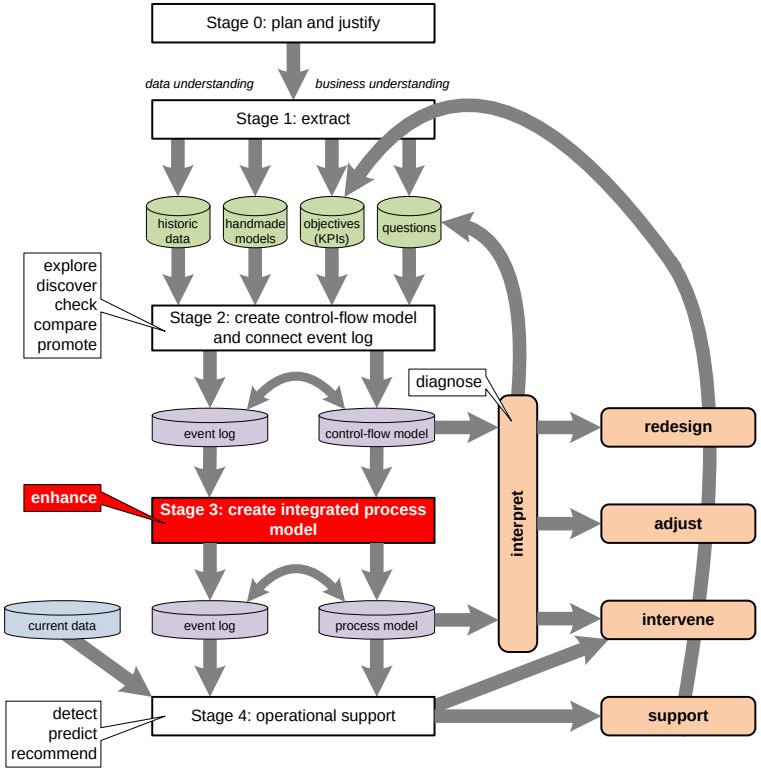

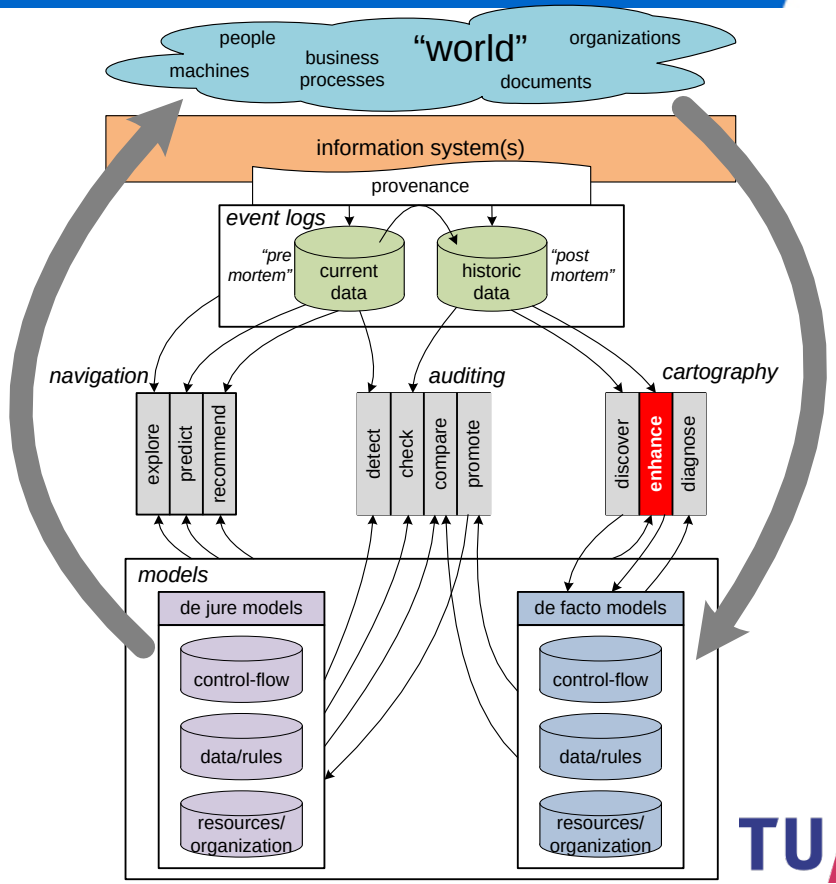

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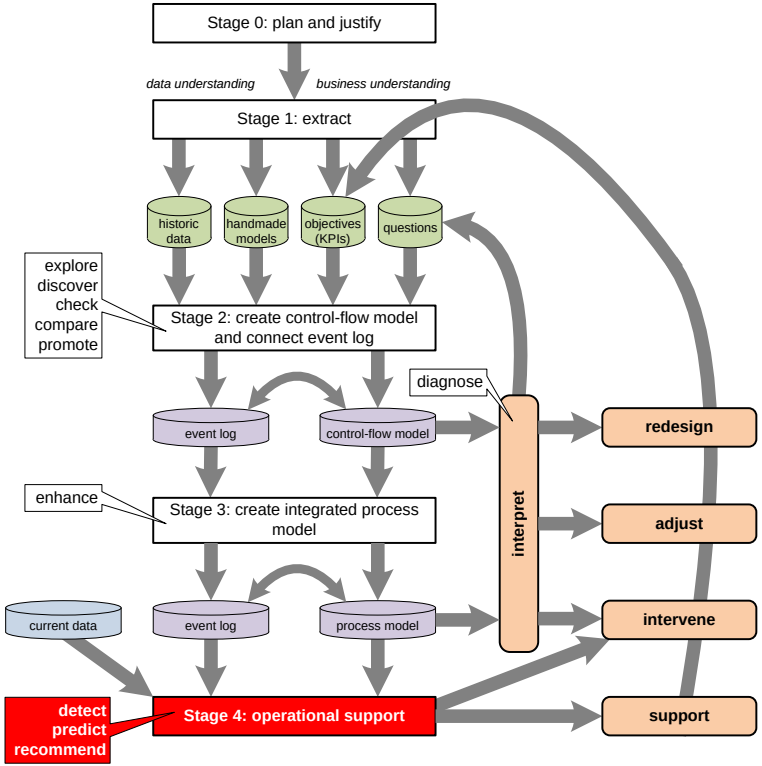

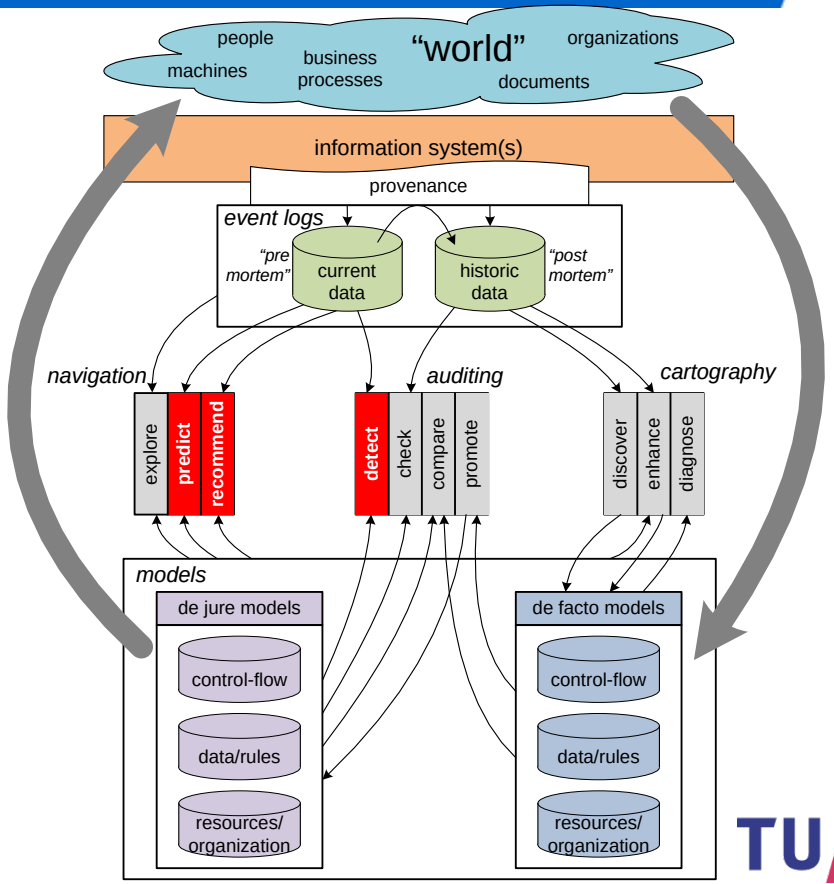

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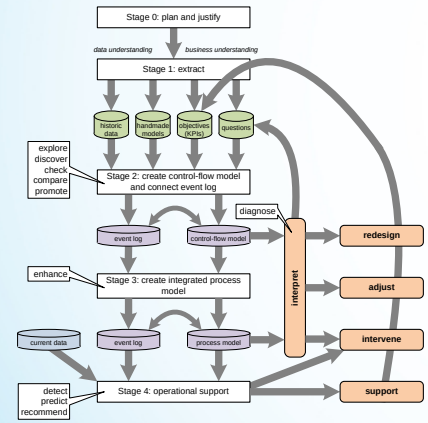


Part I: Preliminaries

- Chapter 1: Introduction
- Chapter 2: Process Modeling and Analysis
- Chapter 3: Data Mining

Part II: From Event Logs to Process Models

- Chapter 4: Getting the Data
- Chapter 5: Process Discovery: An Introduction
- Chapter 6: Advanced Process Discovery Techniques

Part III: Beyond Process Discovery

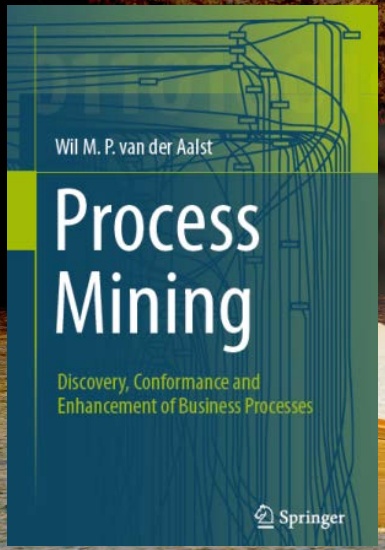
- Chapter 7: Conformance Checking
- Chapter 8: Mining Additional Perspectives
- Chapter 9: Operational Support

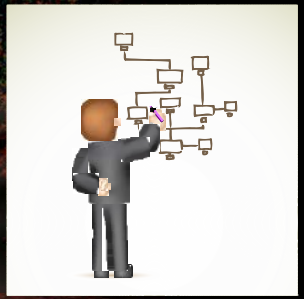
Part IV: Putting Process Mining to Work

- Chapter 10: Tool Support
- Chapter 11: Analyzing "Lasagna Processes"
- Chapter 12: Analyzing "Spaghetti Processes"

Part V: Reflect

- Chapter 13: Cartography and Navigation
- Chapter 14: Epilogue





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