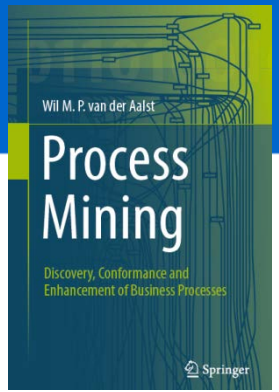
Process Mining: Data Science in Action

Combining Different Perspectives

prof.dr.ir. Wil van der Aalst
www.processmining.org



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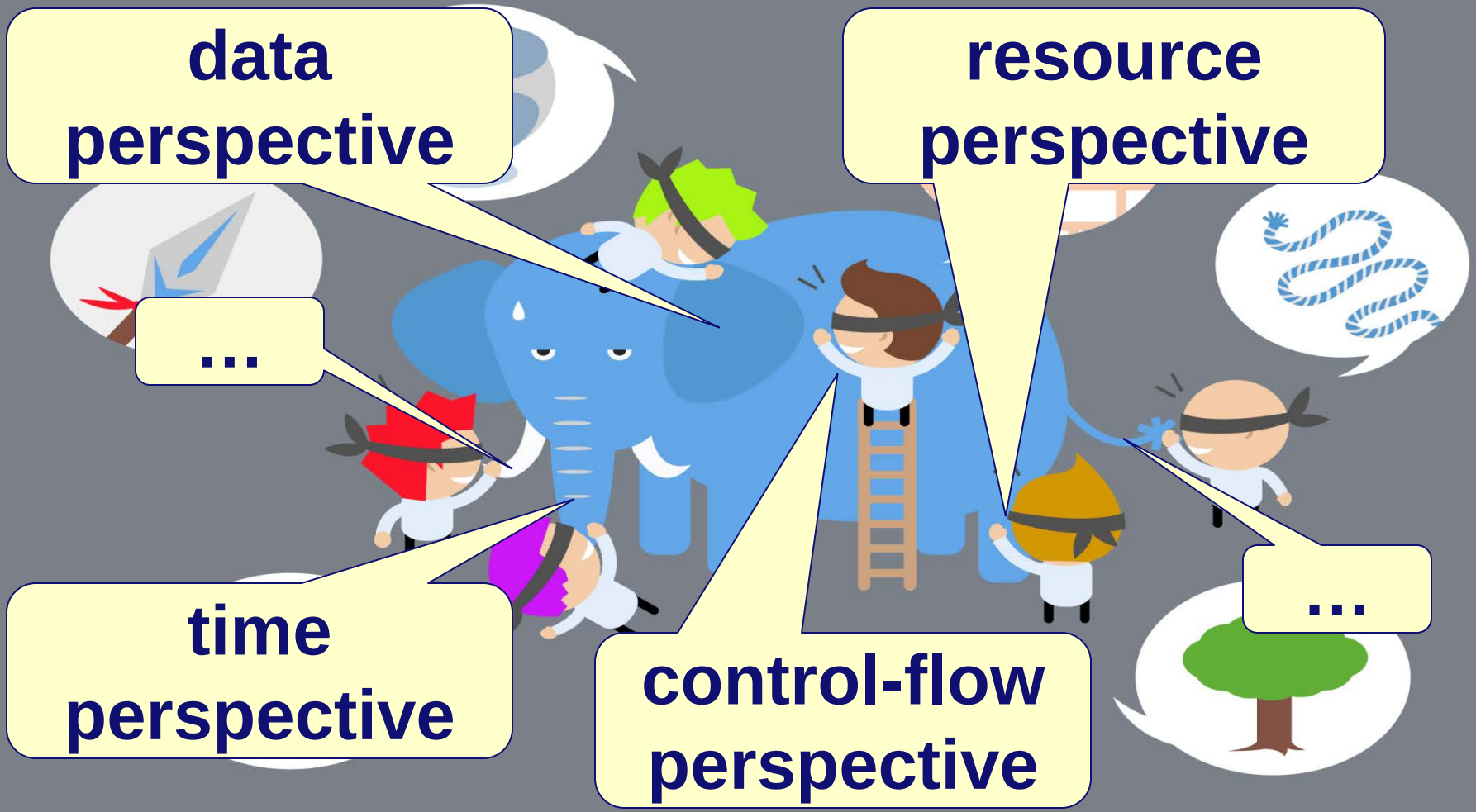
Where innovation starts

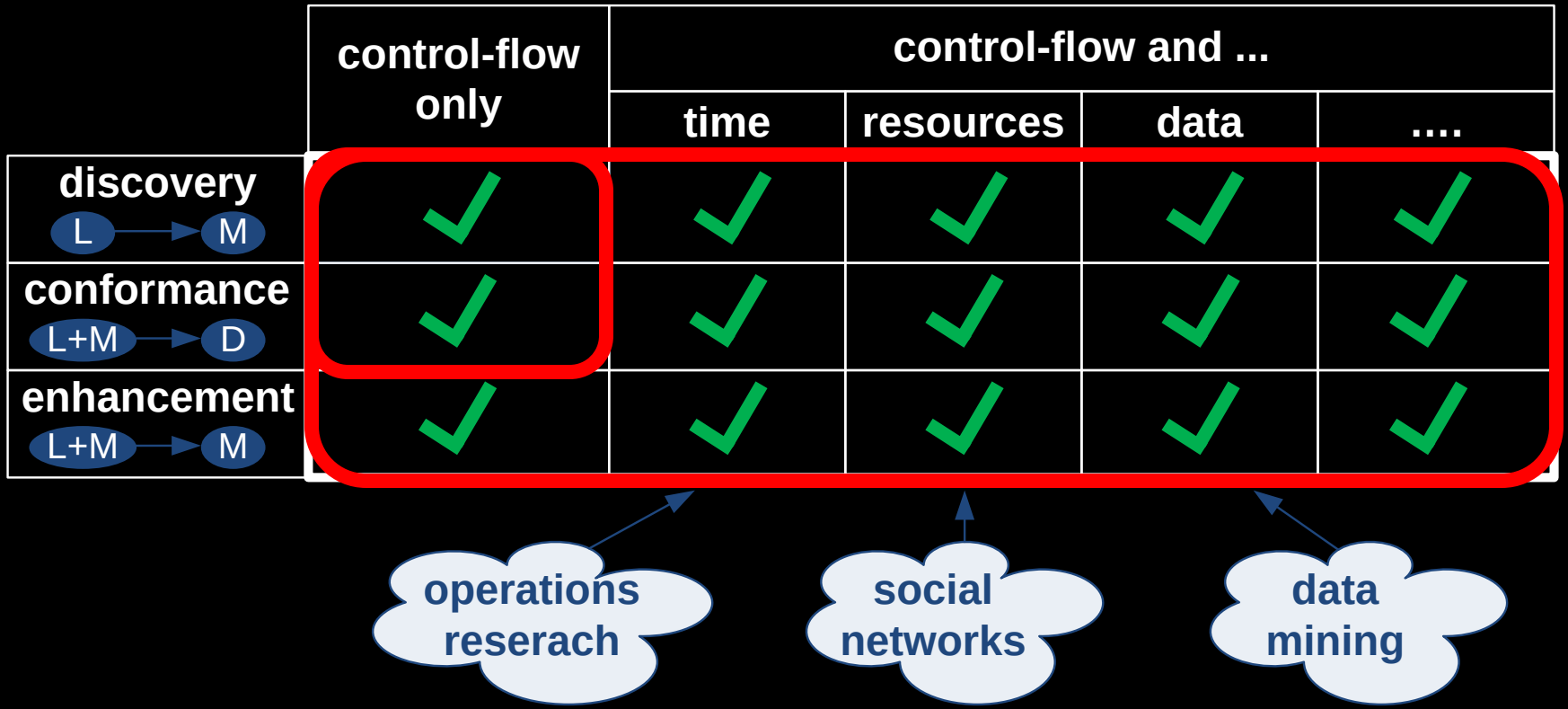

data perspective
resource perspective
...
time perspective
control-flow perspective
...

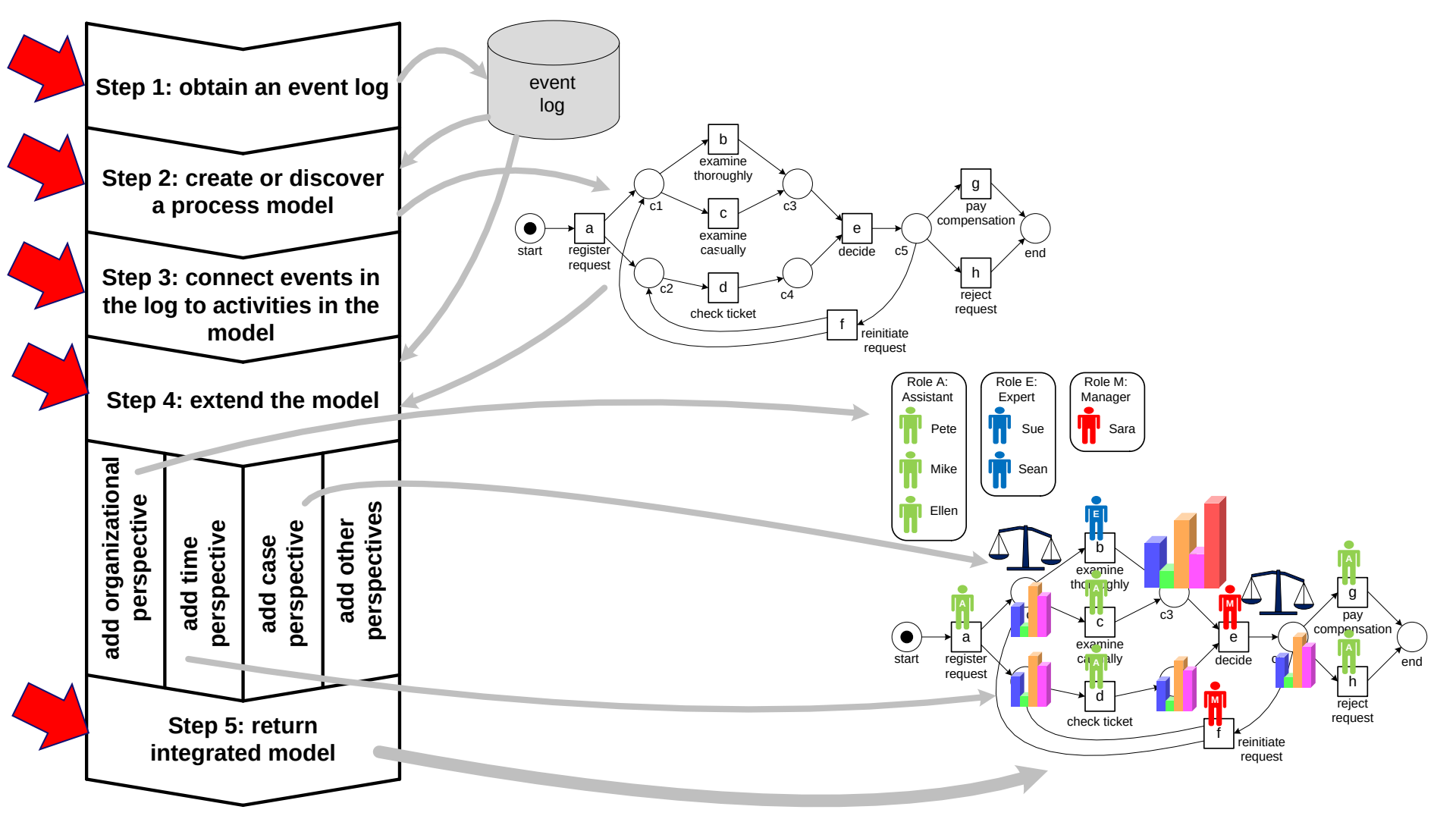
process model

- control-flow
- data
- resources
- time
- ...

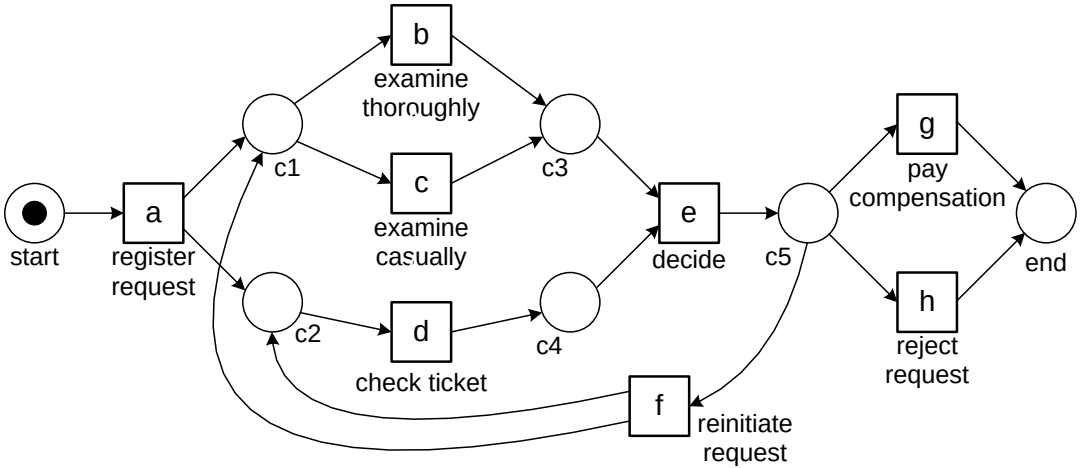
backbone

Bigger picture



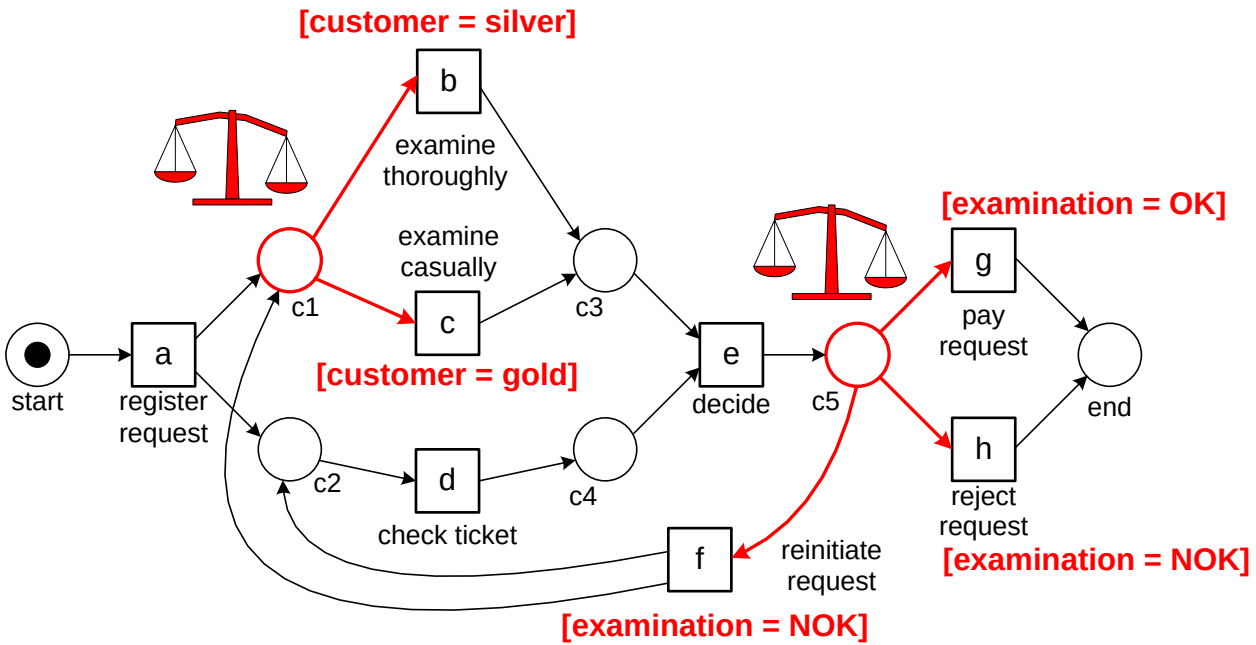

Step 1: obtain an event log
Step 2: create or discover a process model
Step 3: connect events in the log to activities in the model
Step 4: extend the model
add organizational perspective
add time perspective
add case perspective
add other perspectives
Step 5: return integrated model
event log
start
a
register request
b
examine thoroughly
c
examine casually
d
check ticket
e
decide
f
reinitiate request
g
pay compensation
h
reject request
end
c1
c2
c3
c4
c5
Role A: Assistant
Pete
Mike
Ellen
Role E: Expert
Sue
Sean
Role M: Manager
Sara

Starting point: Control-flow



- **Discovered or made by hand.**
- **Should be aligned with event log.**

Adding the data perspective



- Decision tree learning can be used to create guards.
- Not shown:
  - variables
  - read & write arcs

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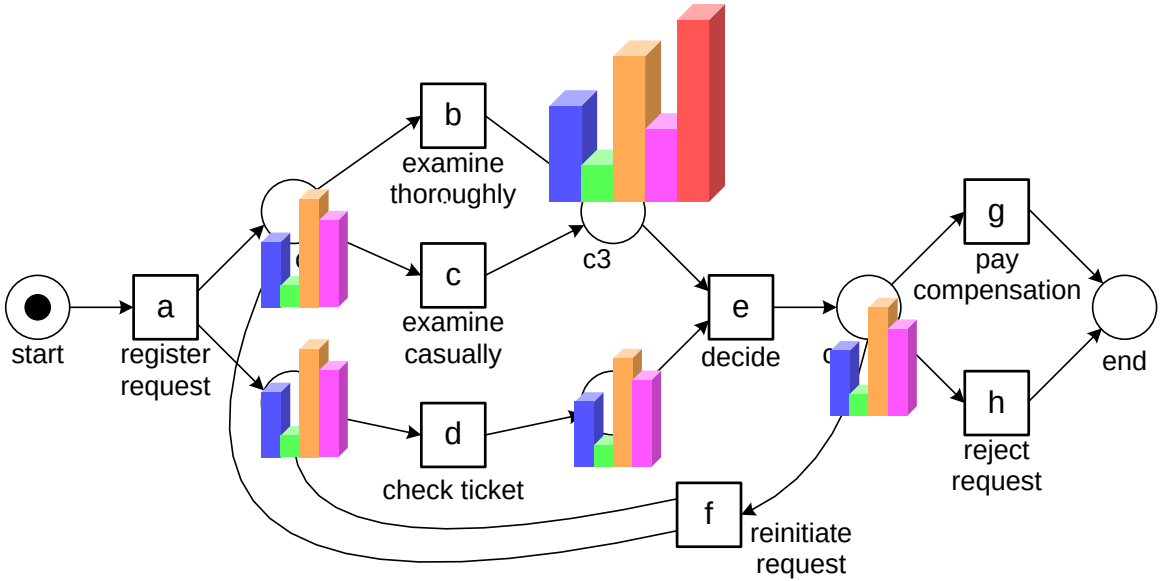
Adding the time perspective



- Replay event log to compute waiting times and service times (distribution or just mean and variance).
- Also capture routing probabilities.

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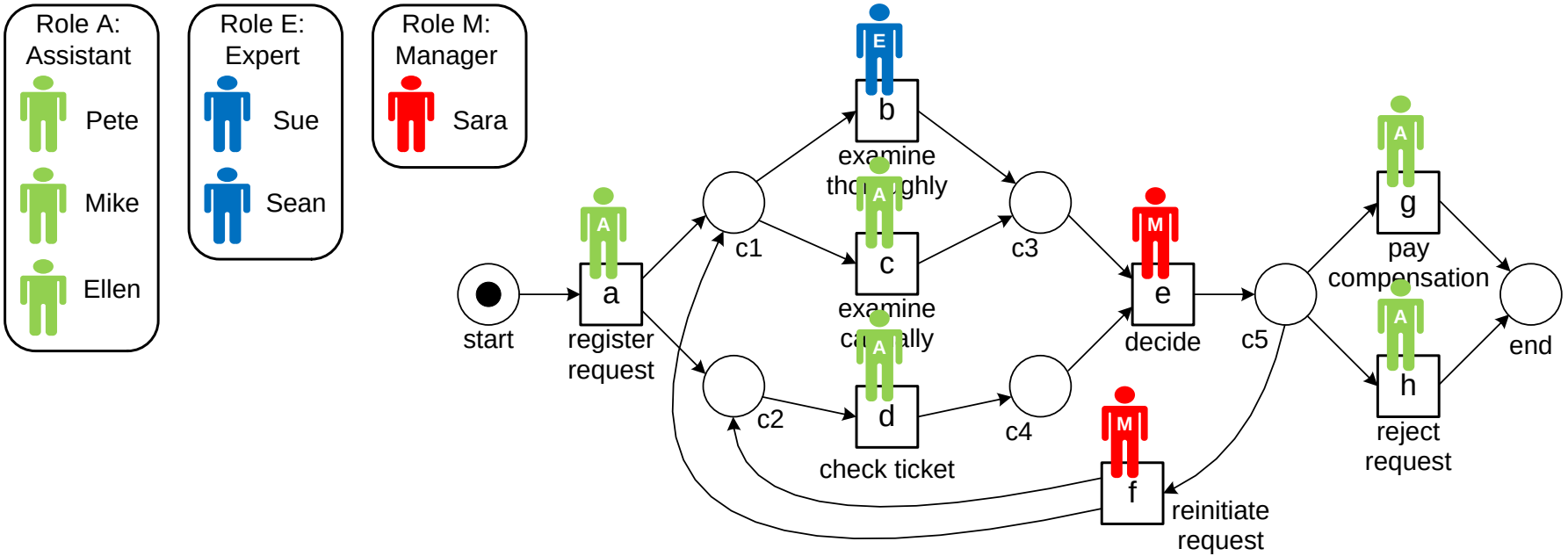
Adding the resource perspective



Roles are discovered automatically (e.g., clustering based on resource-activity matrix) or obtained from information system.

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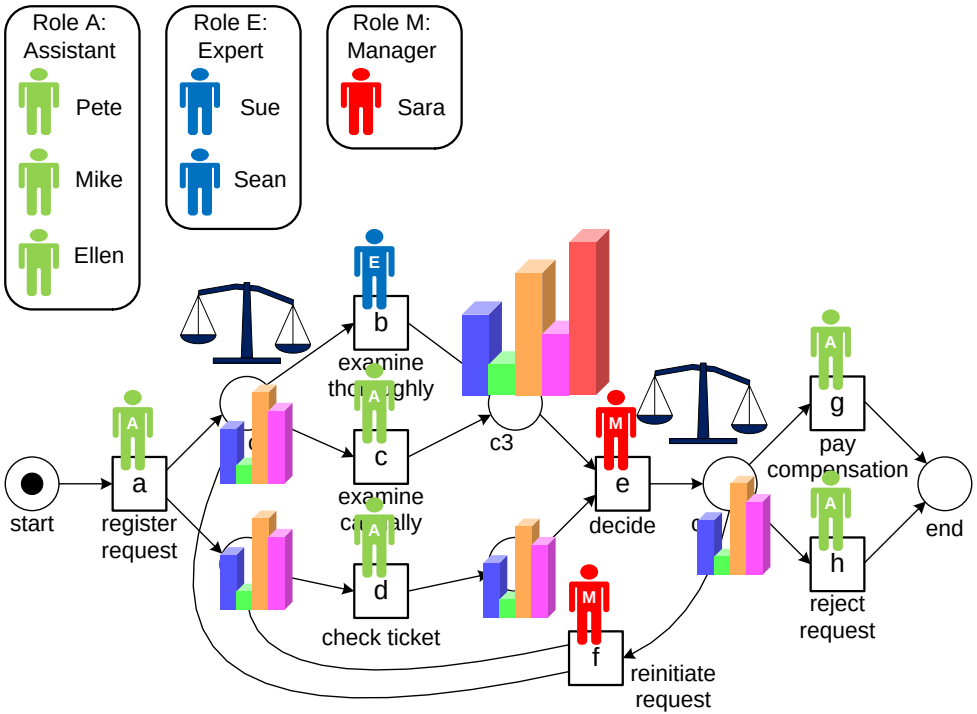
Integrated model



- **Input for**
  - **(holistic) diagnosis**
  - **reengineering**
  - **operational support**
- **Example: simulation.**
- **Be aware of limitations model (over- or under-fitting), descriptive (not normative), etc.**

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from "as is"

to "to be"

What if ?

More on simulation

- Repeatedly "playing out a model" to better understand the modeled process.
- Can be used to explore different alternative designs or policies.
  - What is the effect of making the process more concurrent?
  - What is the effect of adding resources?
- Requires a model of the process and its environment.
- Input from process mining!!

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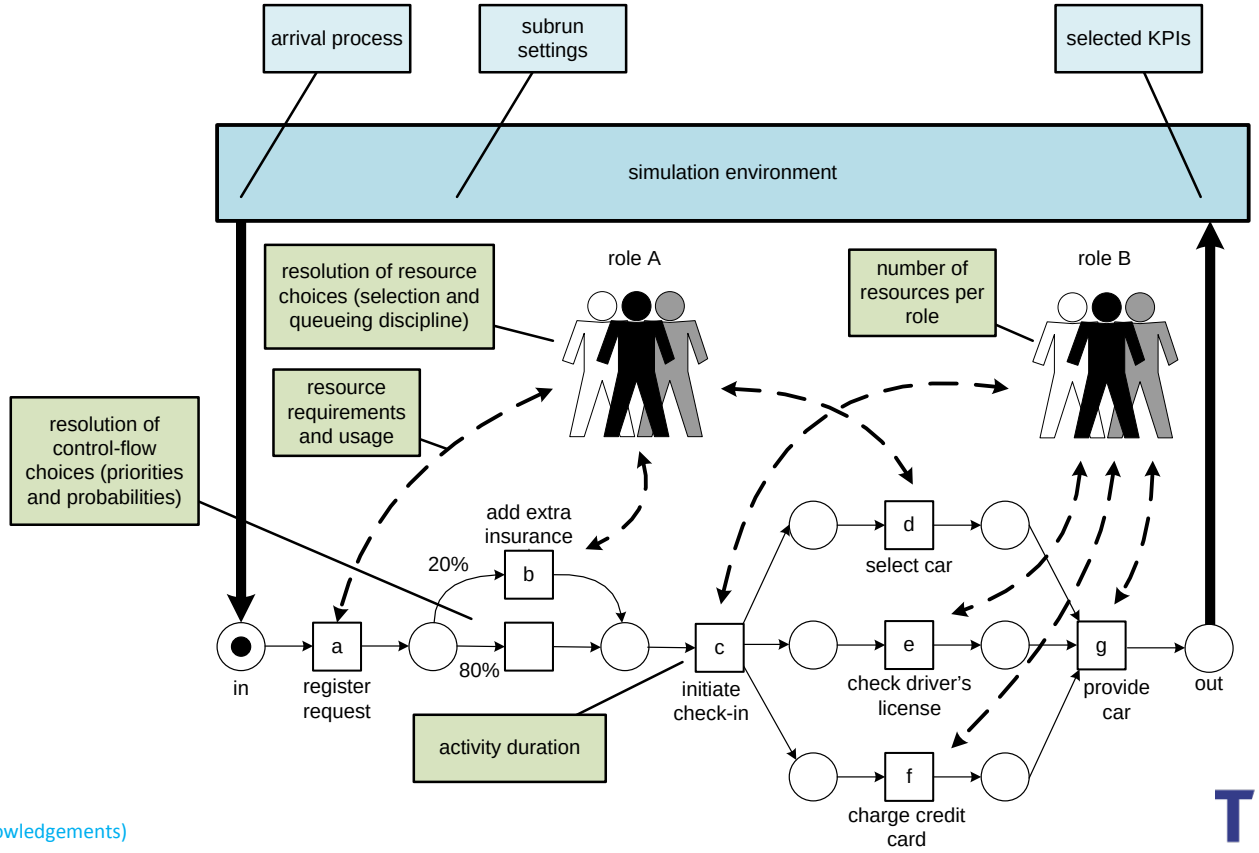
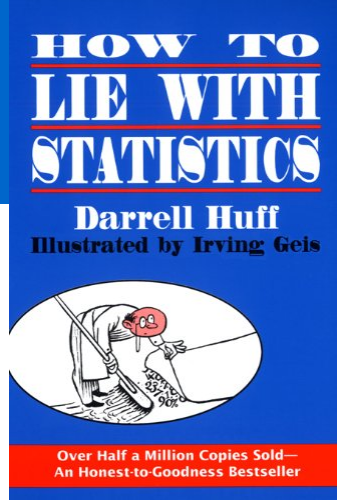
Ingredients

setting up the experiment

learn from process mining



Challenges in a simulation project



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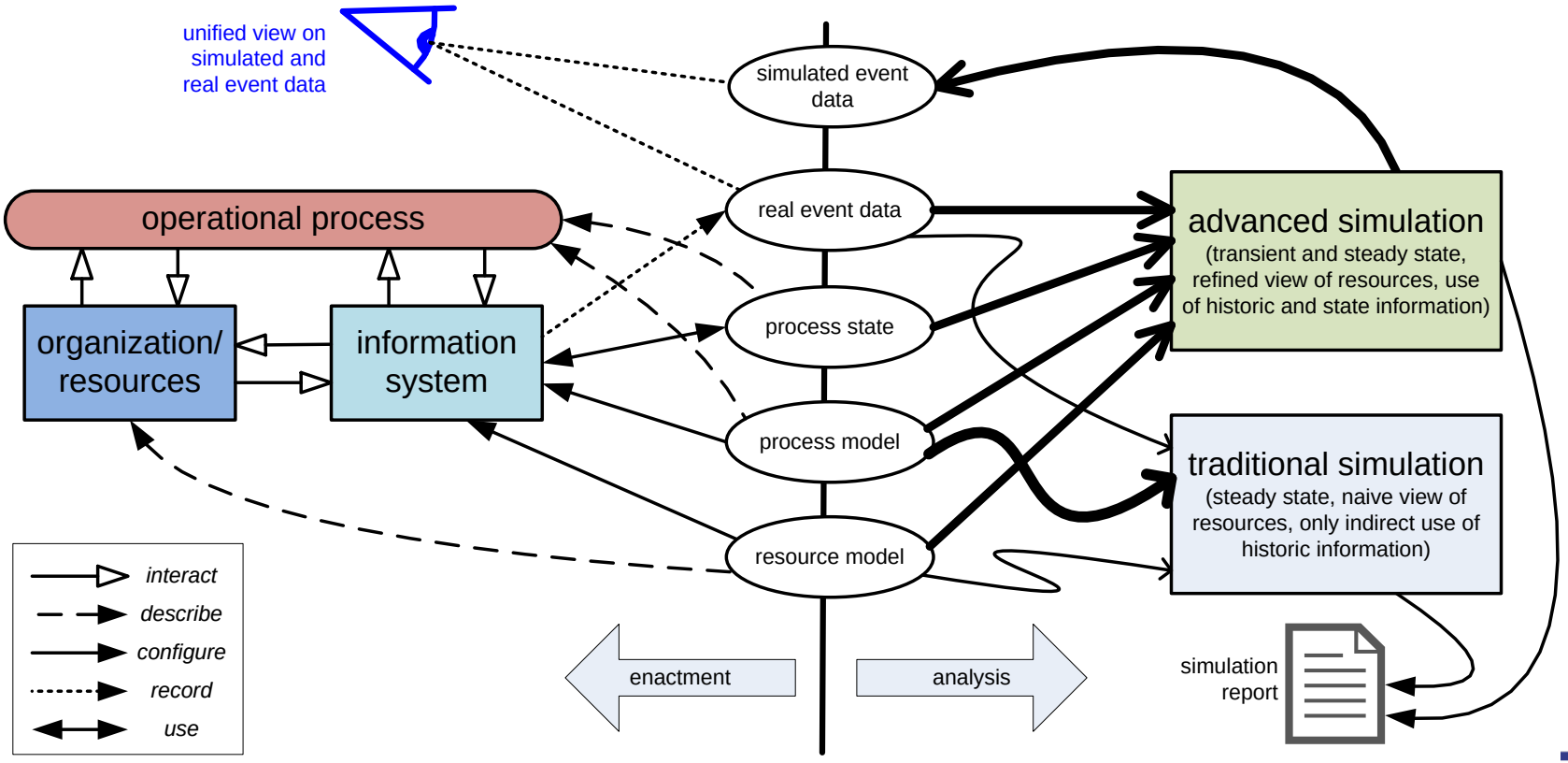
Beyond traditional simulation



Combining different perspectives in "complete" process models

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

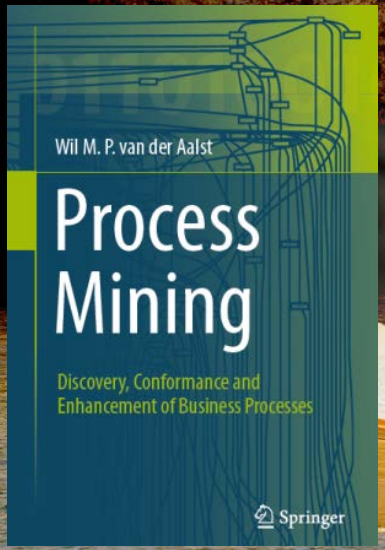
- Chapter 7 Conformance Checking
- Chapter 8 Mining Additional Perspectives
- Chapter 9 Operational Support

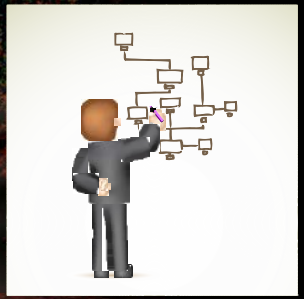
Part IV: Putting Process Mining to Work

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

Part V: Reflection

- Chapter 13 Cartography and Navigation
- Chapter 14 Epilogue





For more details see:
W.M.P. van der Aalst. Business Process Simulation Survival Guide. BPM Center Report BPM-13-11, BPMcenter.org, 2013

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