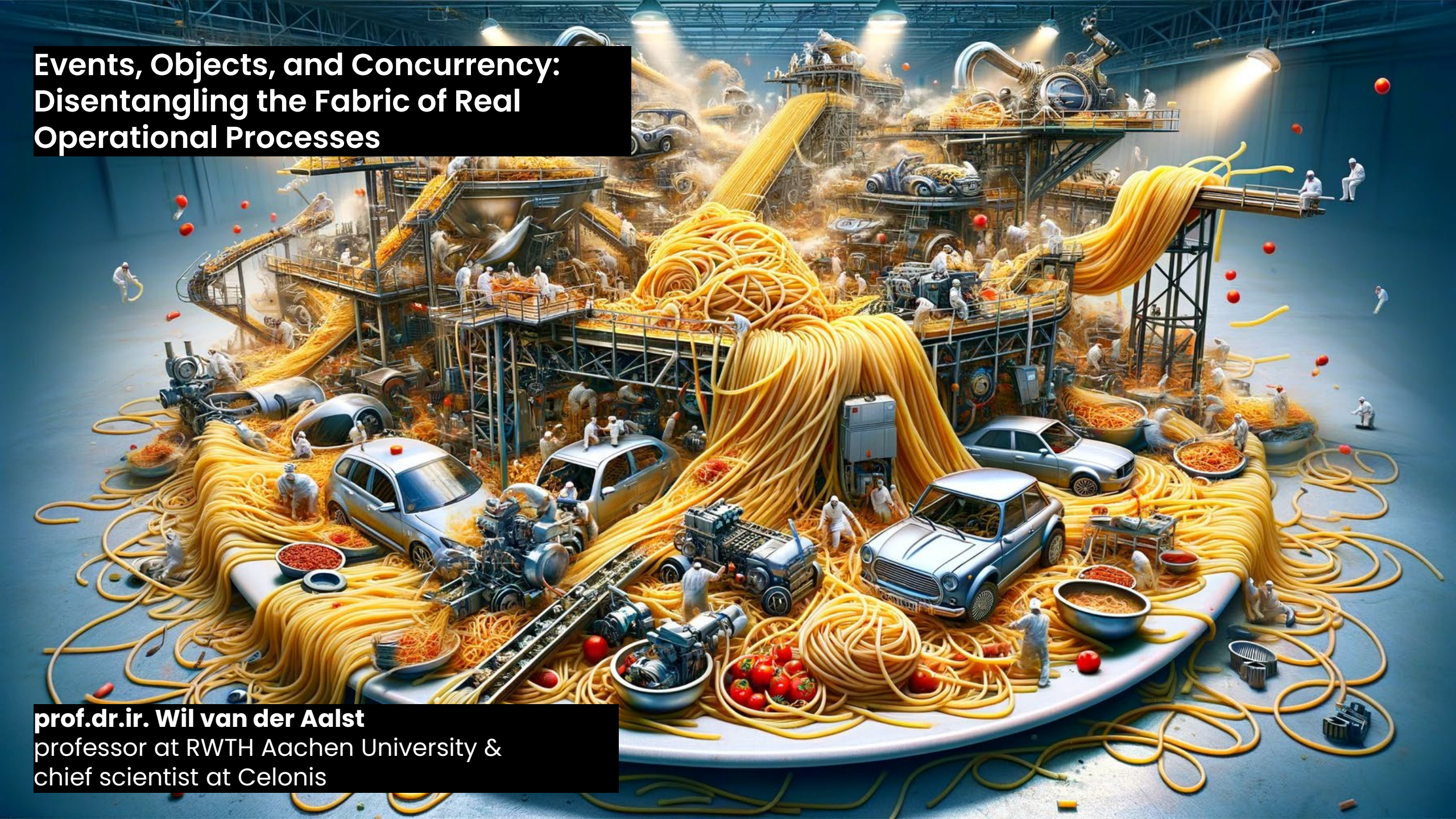
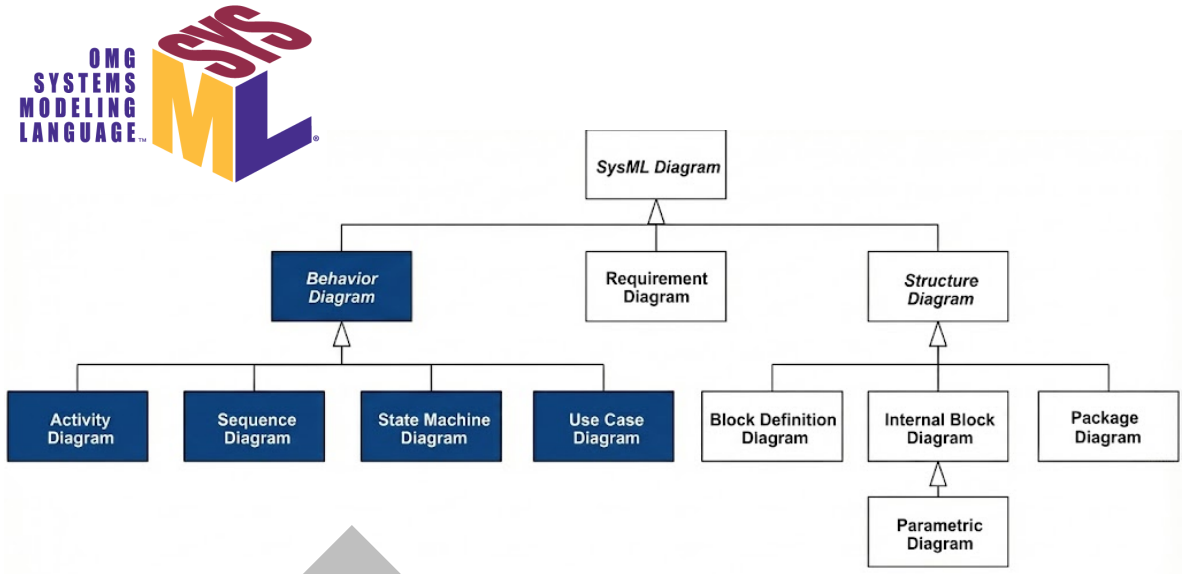
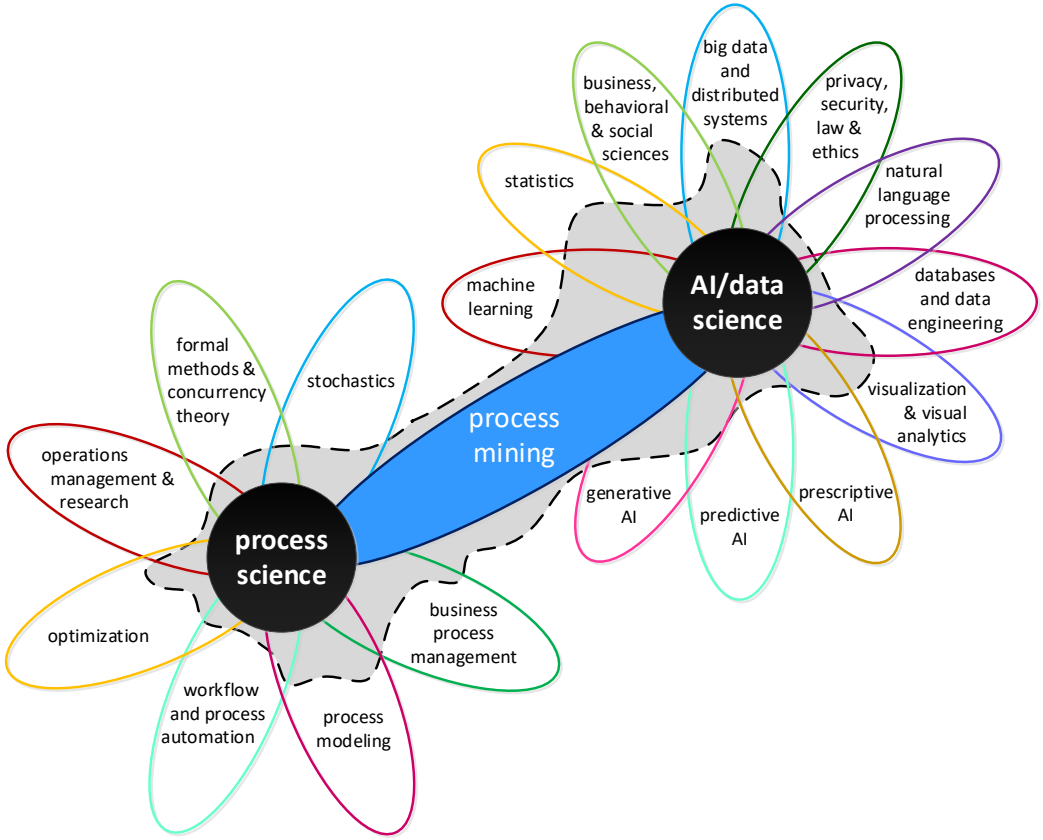
Events, Objects, and Concurrency: Disentangling the Fabric of Real Operational Processes



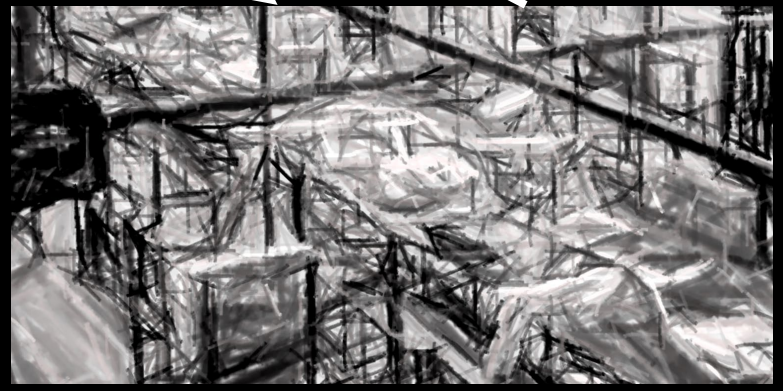
prof.dr.ir. Wil van der Aalst
professor at RWTH Aachen University &
chief scientist at Celonis

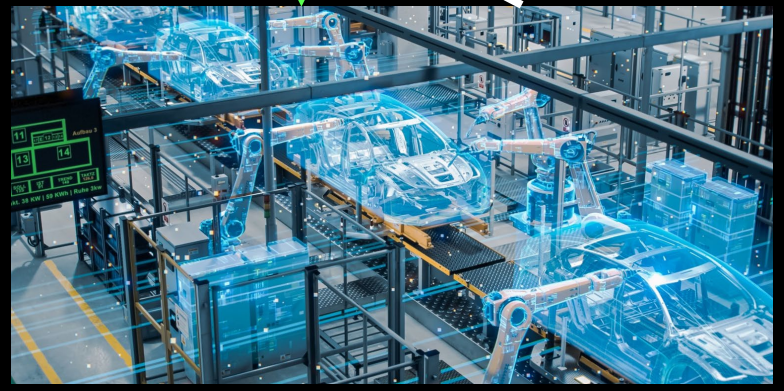
What we do:
Confronting behavioral models with reality

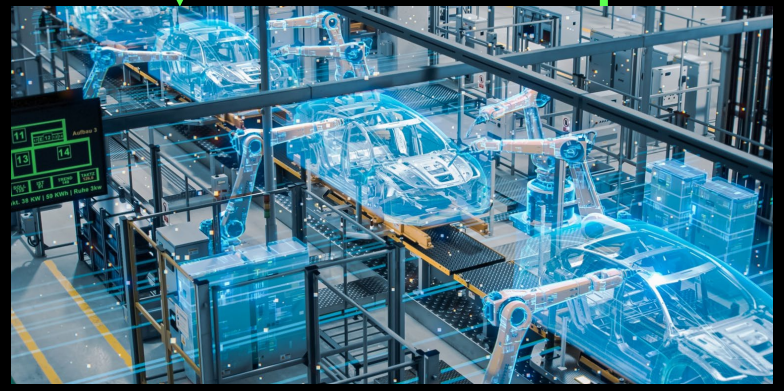




Digital Model, Digital Shadow, Digital Twin







Automated in
both directions

Digital Model

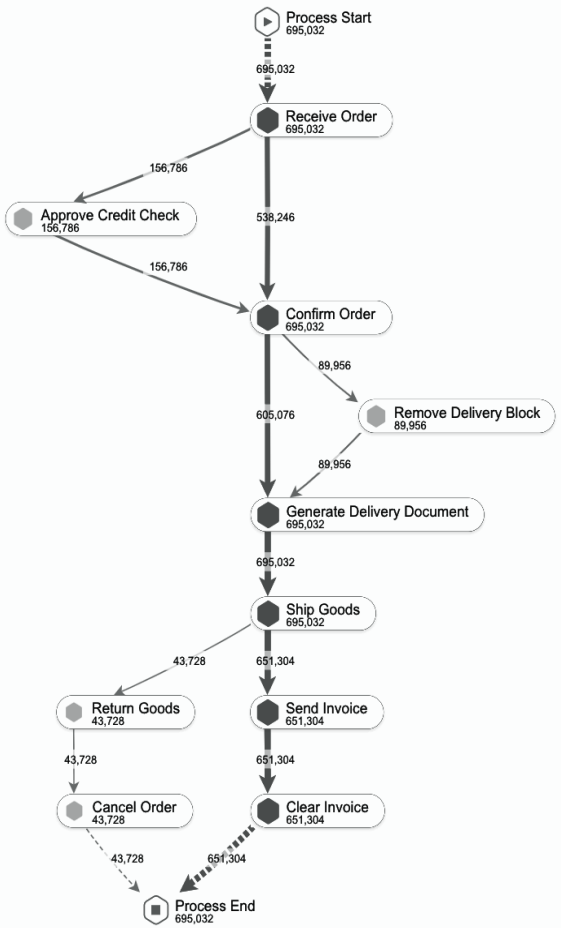
Digital Shadow

Digital Twin

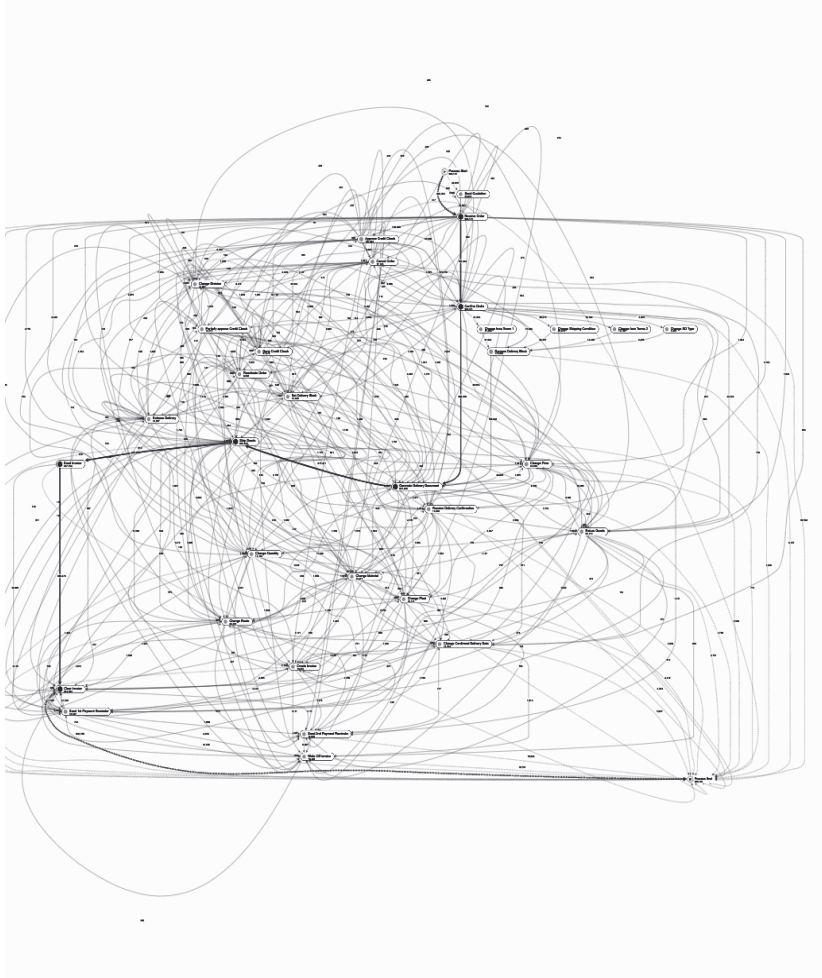
Actual processes are very different from what stakeholders think !

Happy path

Expected paths

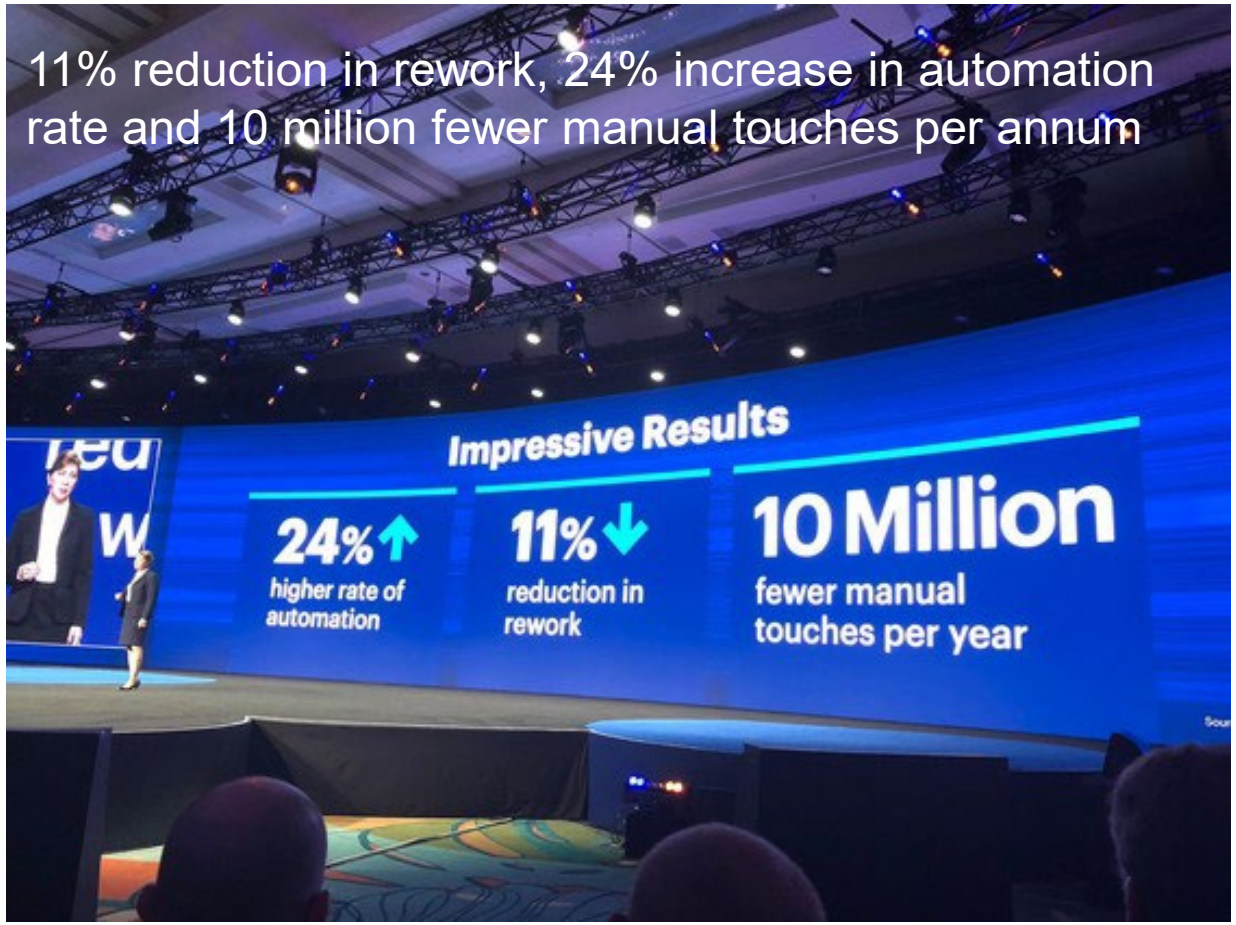


Reality



An example from Siemens: 70 million sales order items - 1.5 million process variants

# Sales Order Items	Statistical Transactional Value in EUR
70,286,004	232,797,668,141
# Activities	# Process Variants
411,462,971	1,511,644
Digital FIT Rate	SAP Systems
2.18	28
Automation Rate	# Conutries
63%	90
Rework Rate	# AREs
36%	255
eBiz Rate All-in	# Customers
64%	257,236
Total Cycle Time (average)	# Materials
48 Days	1,728,677



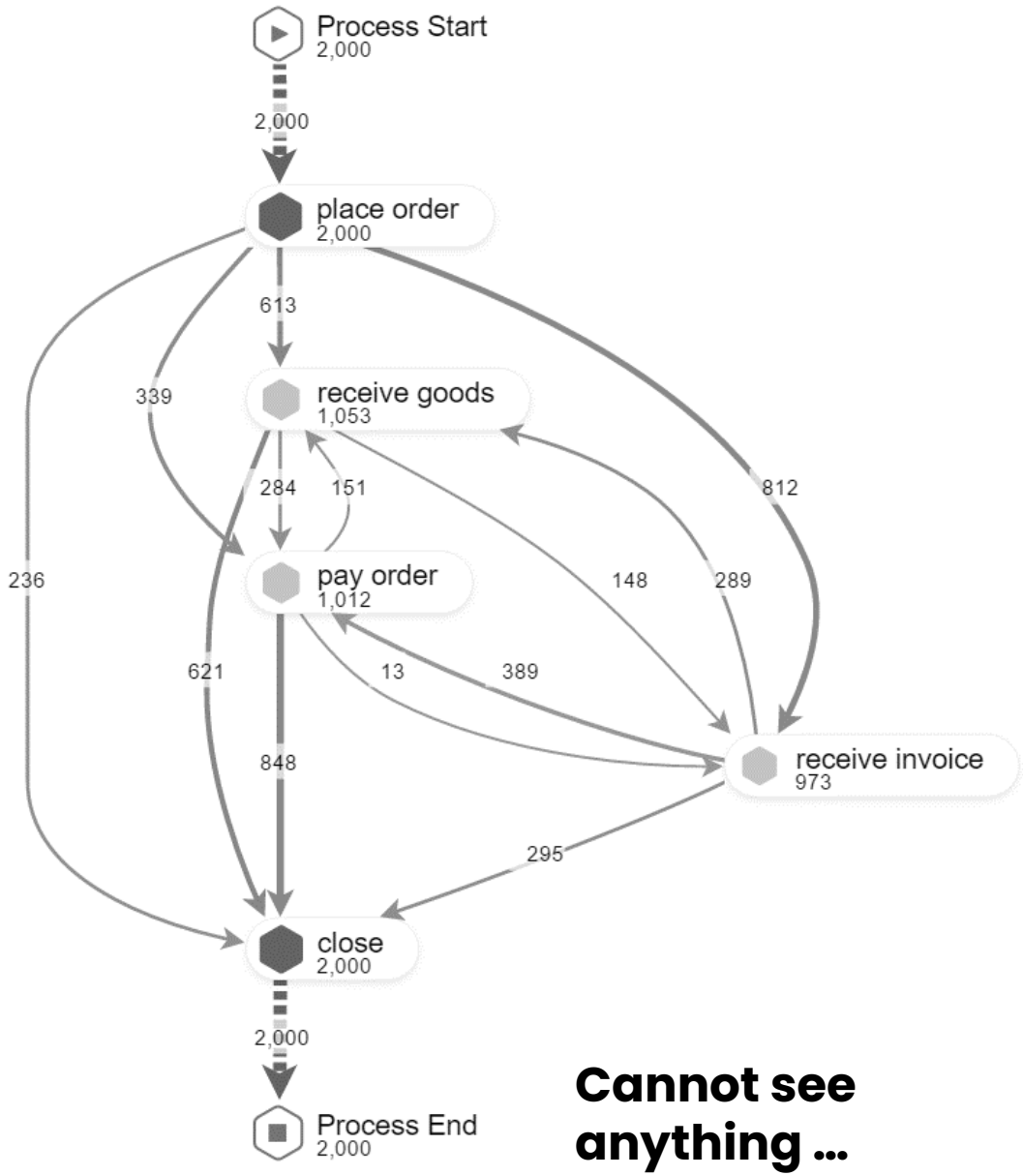
Ghi-Thi Nguyen / Lars Reinkemeyer

Gia-Thi Nguyen, Siemens: Driving Global Change with the Digital Fit Rate in Order2Cash, in Process Mining in Action, edited by Lars Reinkemeyer

intra-object concurrency

200 orders grouped per variant

285 traces **14.25%**	place order	receive goods	close	
251 traces **12.55%**	place order	pay order	close	
238 traces **11.90%**	place order	receive Invoice	pay order	close
236 traces **11.80%**	place order	close		
216 traces **10.80%**	place order	receive goods	close	
183 traces **9.15%**	place order	receive Invoice	receive goods	close
177 traces **8.85%**	place order	receive goods	pay order	close
103 traces **5.15%**	place order	receive Invoice	receive goods	pay order	close
79 traces **3.95%**	place order	receive goods	receive Invoice	pay order	close
78 traces **3.90%**	place order	pay order	receive goods	close
72 traces **3.60%**	place order	receive Invoice	pay order	receive goods	close
68 traces **3.40%**	place order	receive goods	receive Invoice	close
6 traces **0.30%**	place order	pay order	receive Invoice	close
4 traces **0.20%**	place order	receive goods	pay order	receive Invoice	close
3 traces **0.15%**	place order	pay order	receive Invoice	receive goods	close
1 trace **0.05%**	place order	pay order	receive goods	receive Invoice	close



Cannot see anything ...

Using a proper discovery algorithm

285 traces **14.25%**	place order	receive goods	close	
251 traces **12.55%**	place order	pay order	close	
238 traces **11.90%**	place order	receive Invoice	pay order	close
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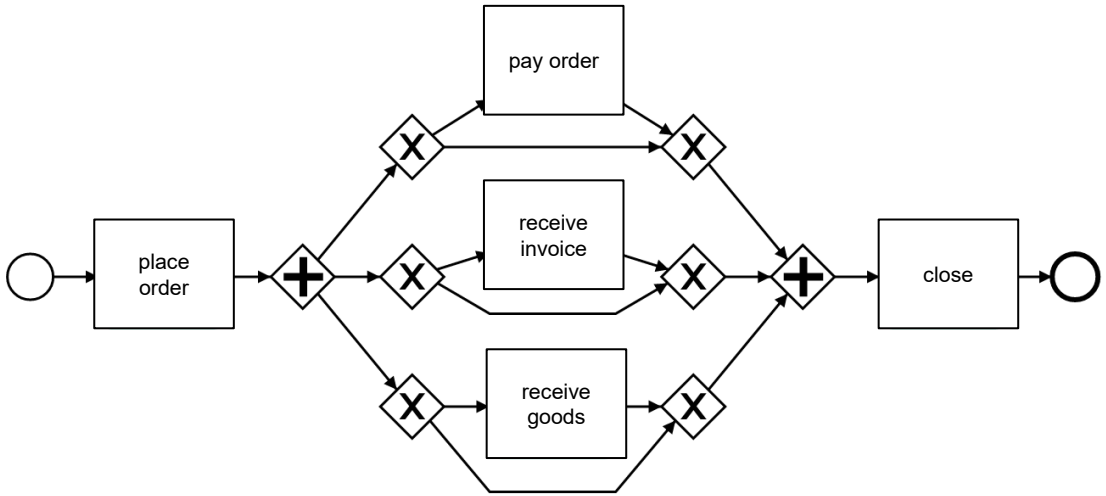


Model discovered by the inductive mining technique first implemented in ProM and later added to Celonis.

problem solved?

not really ...

inter-object concurrency

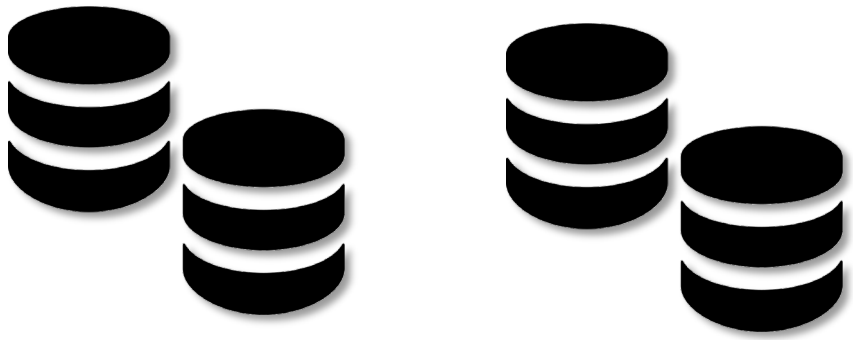
OCPM

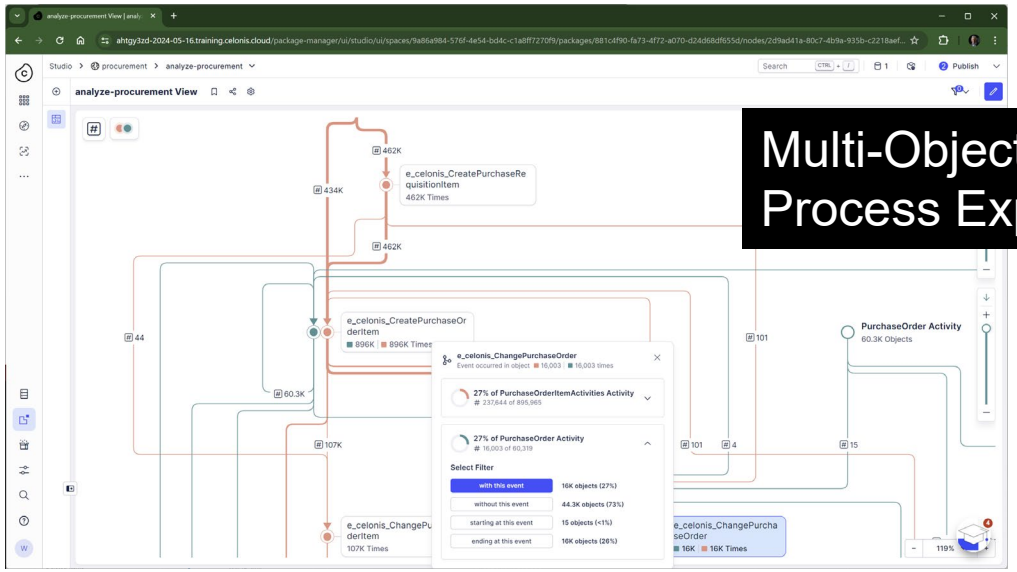
Objects & Events Are Everywhere!

Image generated using DALL E3

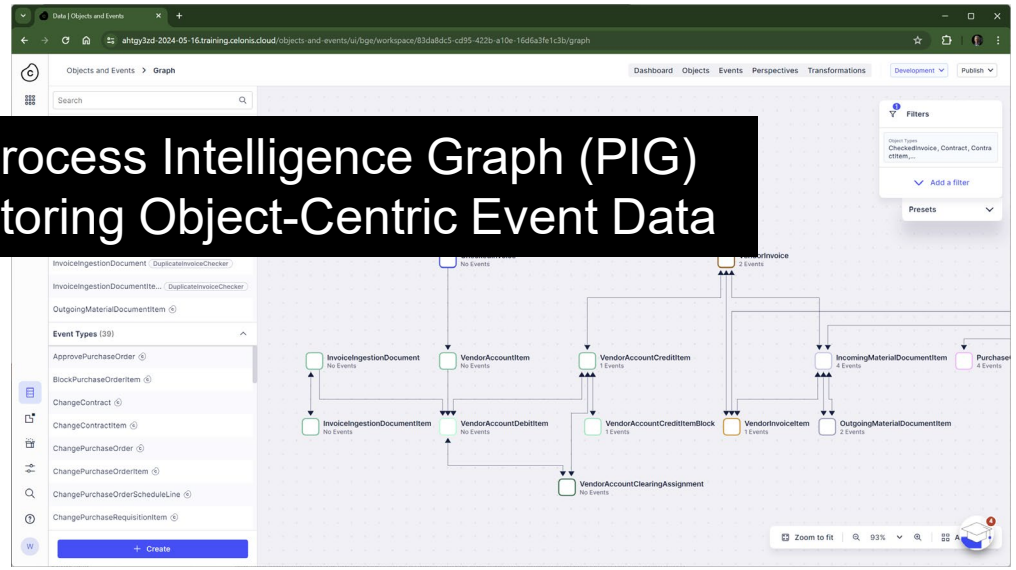

We cannot squeeze this reality into cases, we need a multitude of interconnected objects and events
Image generated using DALL E3

Our Open-Source Tools (ProM, PM4Py, OCPQ, OC-PM, etc.) and Celonis Support OCPM

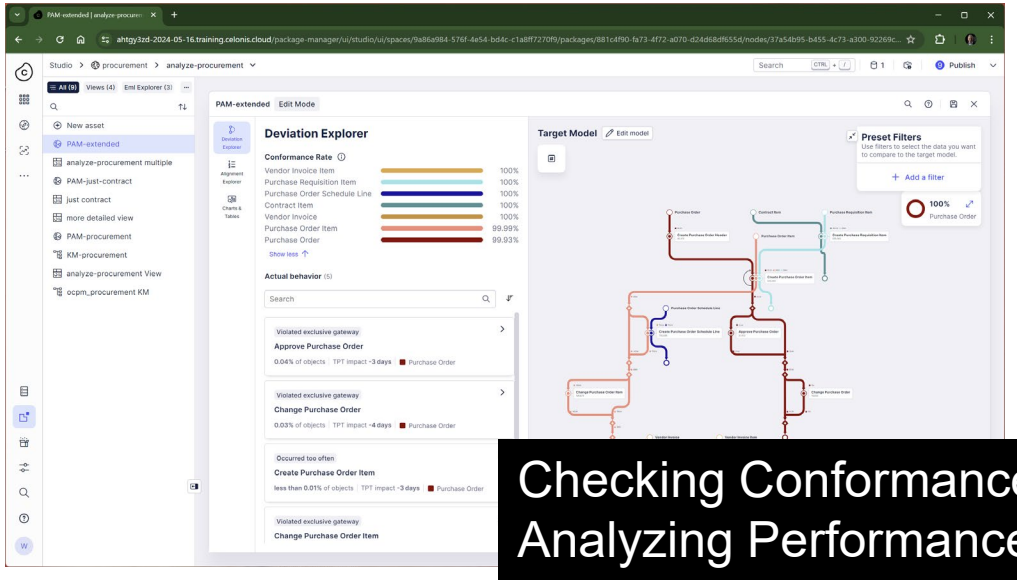




Multi-Object Process Explorer

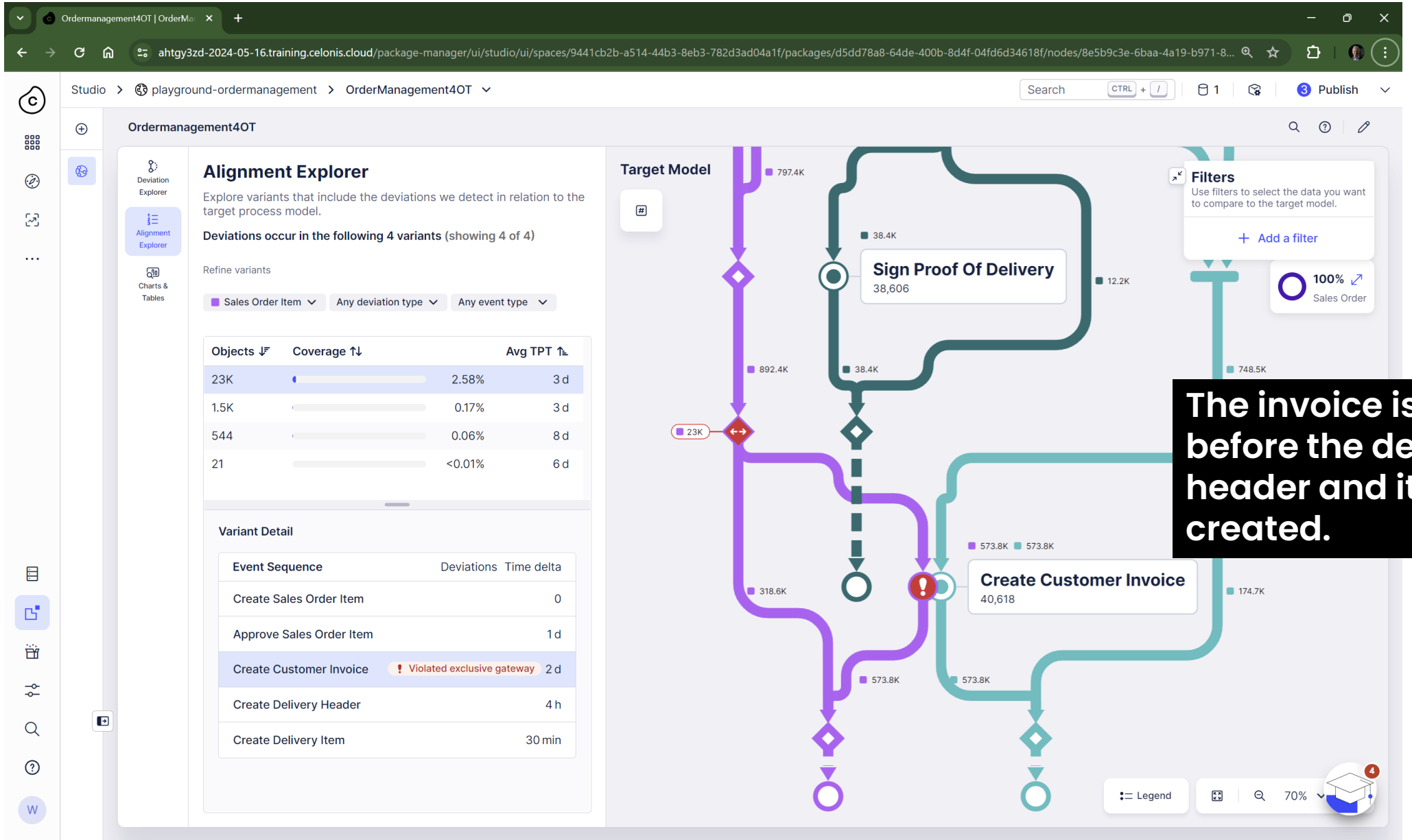


Process Intelligence Graph (PIG) Storing Object-Centric Event Data



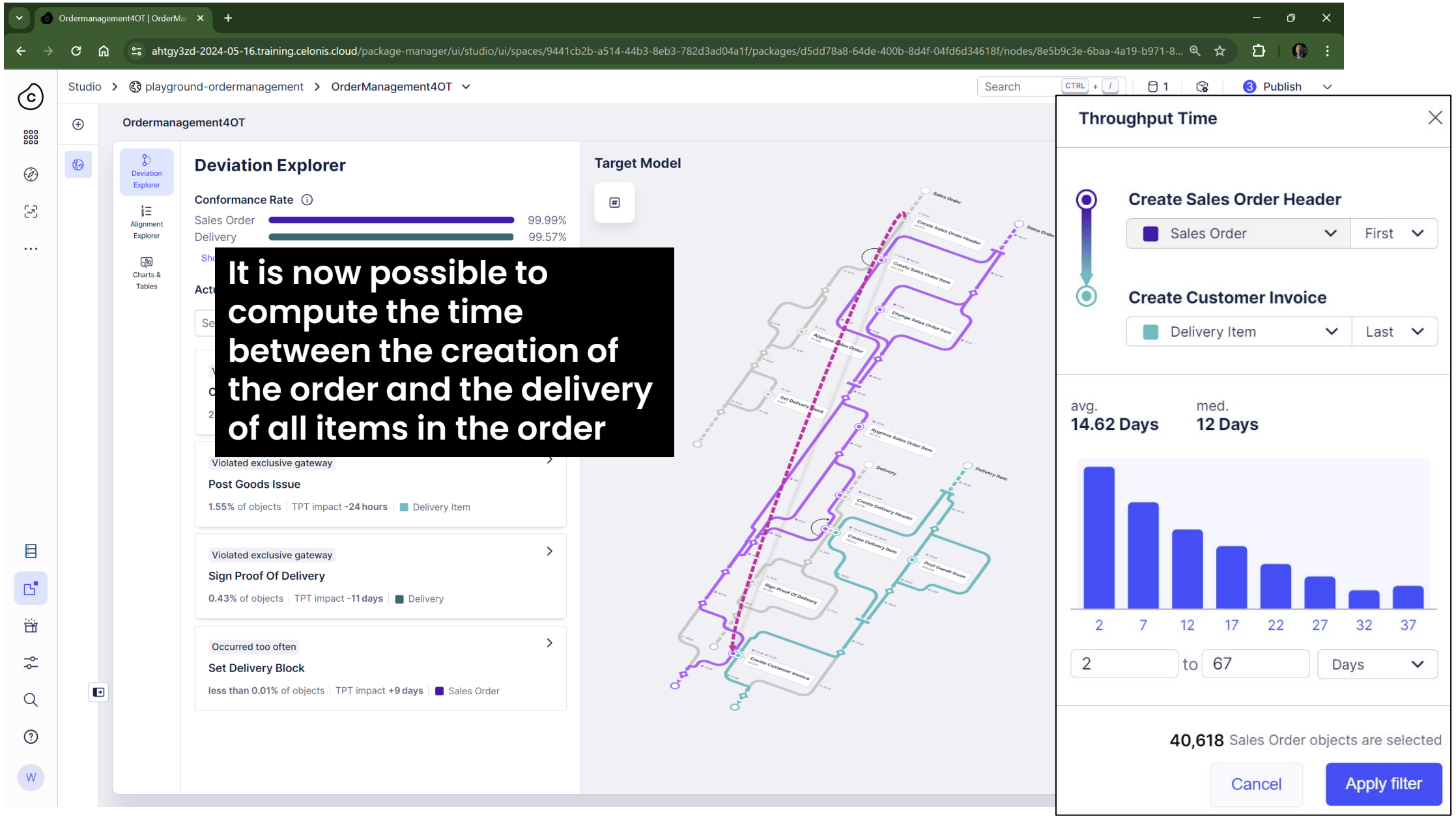
Checking Conformance and Analyzing Performance

Conformance Checking Using Alignments

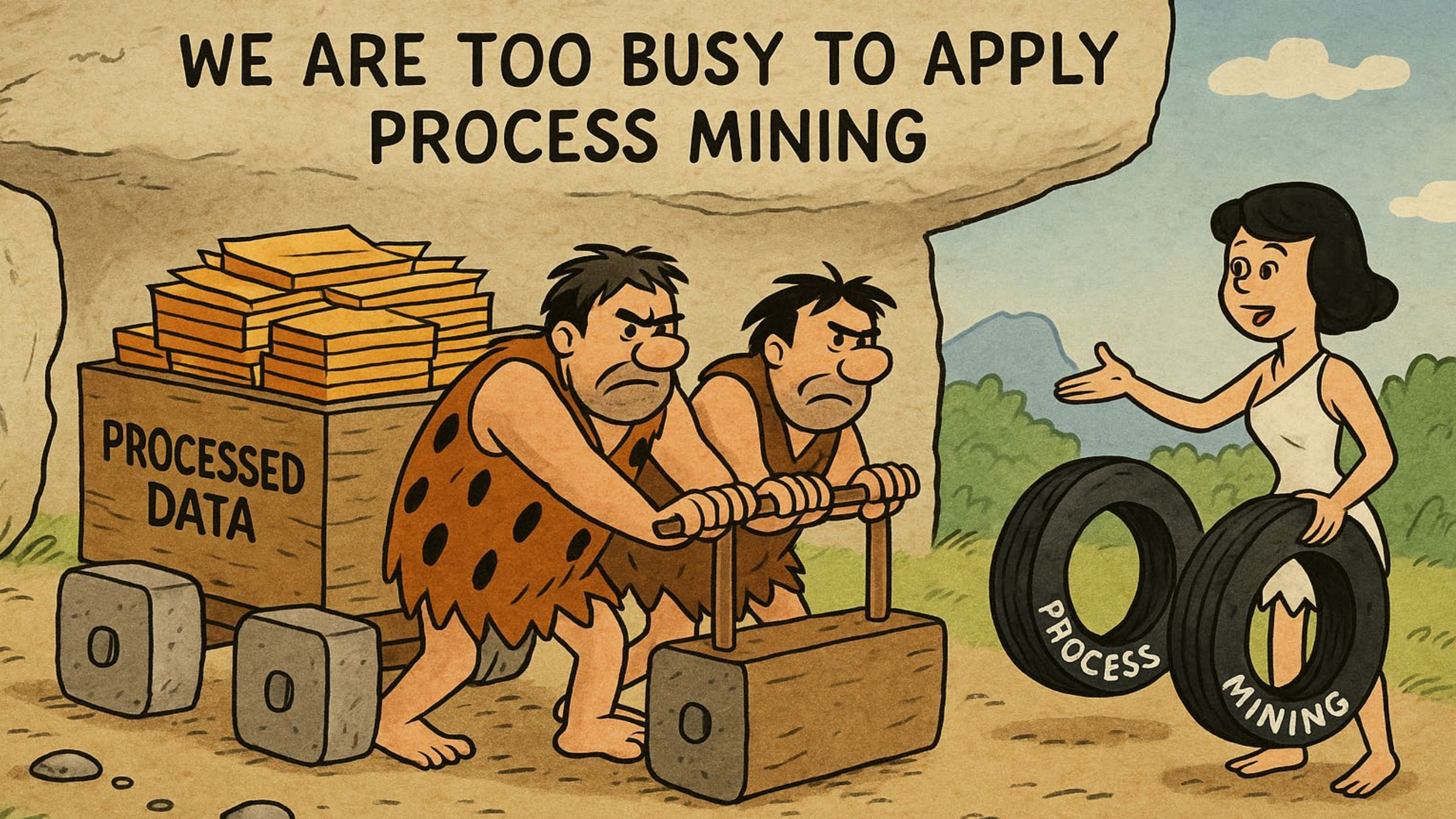


The invoice is created before the delivery header and item are created.

End-to-End Performance Analysis




We can disentangle your Spaghetti whether it is colored or not!
Great transfer from academia to industry. Why not use it more?


WE ARE TOO BUSY TO APPLY PROCESS MINING
PROCESSED DATA
PROCESS MINING