

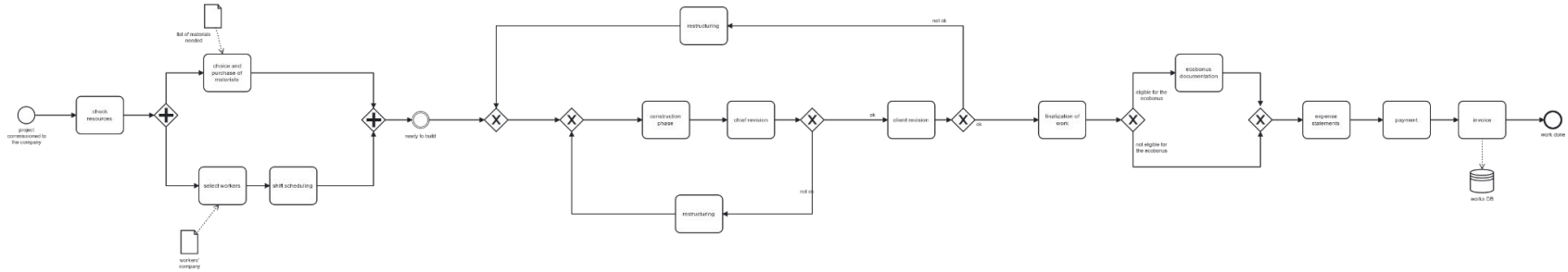
Process Mining Project

House Building

House Building

In this report, we will analyse the process of building a house, using process mining techniques. This analysis examines the process from the moment the house project is commissioned to the construction company, and ends when the house is ready. Aspects concerning the procurement of the necessary materials, the manual labour of the workers and the various fiscal practices are analysed, including, where applicable, the use of the ecobonus during payment.

House Building - BPMN Model



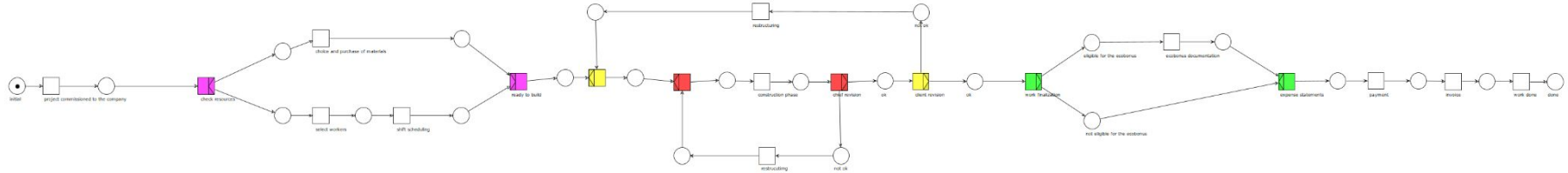
Activities : 18

XOR split/join with cycle : 2

XOR split/join without cycle : 1

AND split/join : 1

House Building - Workflow Net (PN-A)



- ✓ Qualitative analysis
 - ✓ Structural analysis
 - ✓ Soundness
 - ✓ Workflow net property
 - ✓ Initial marking
 - ✓ Wrongly marked places: 0
 - ✓ Boundedness
 - ✓ Unbounded places: 0
 - ✓ Liveness
 - ✓ Dead transitions: 0
 - ✓ Non-live transitions: 0

House Building - BIMP simulation (MXML-A)

Gateways:

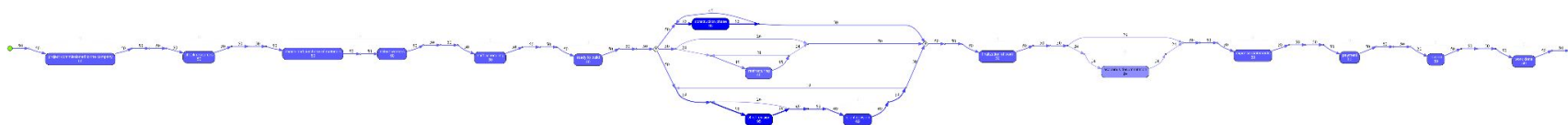
client revision 75%
restructuring 25%

ecobonus documentation 35%
not eligible for the ecobonus 65%

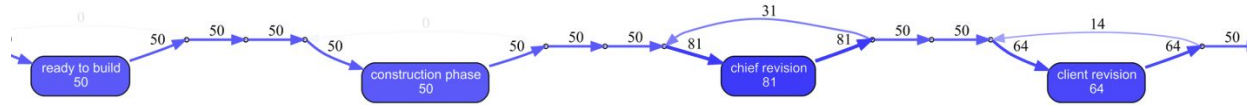
restructuring 25%
finalization of work 75%

House Building - Model mining

Starting from MXML-A, using ProM and the plug-in Mine with Inductive Visual Miner, we obtained **VIM-A**:



House Building - Model mining (VIM-A)



thresholds:

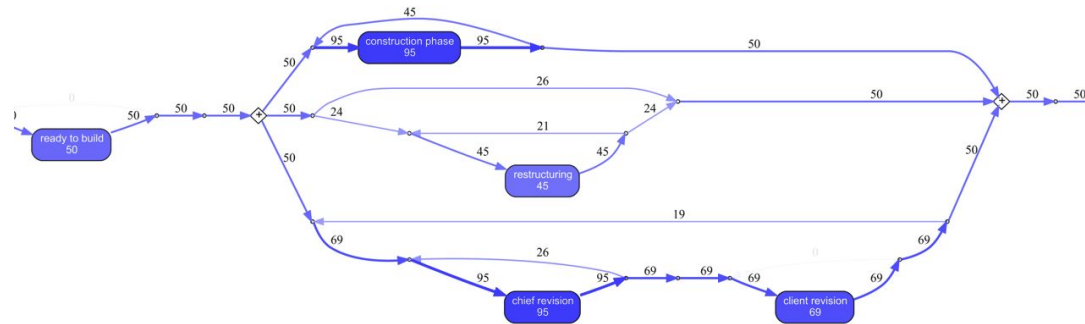
1 - activities

0.8 - paths

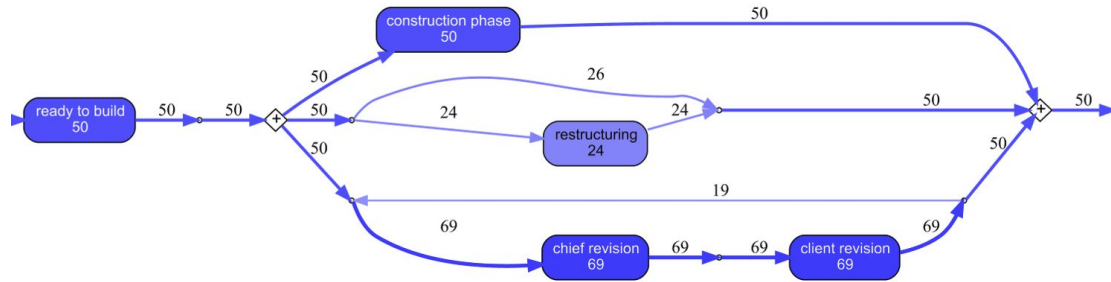
thresholds:

1 - activities

0.9 - paths



House Building - Model mining (VIM-B)



thresholds:

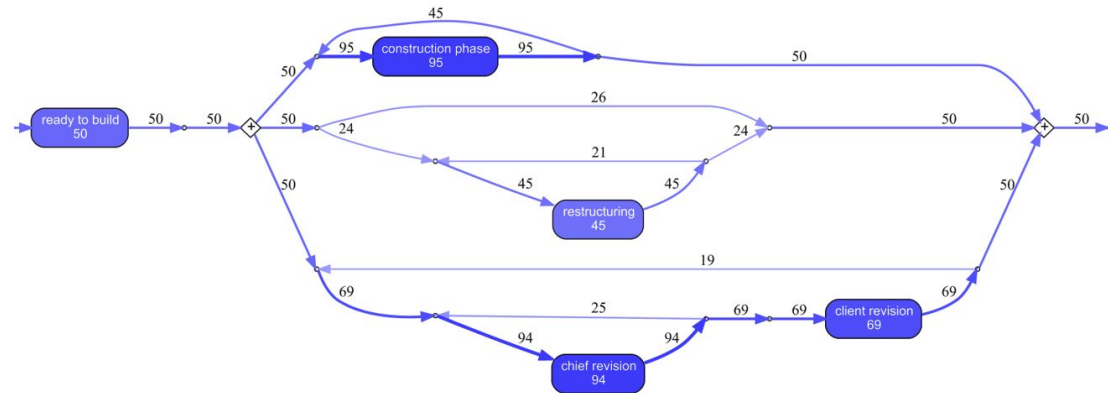
1 - activities

0.8 - paths

thresholds:

1 - activities

≈ 0.93 - paths



House Building - Conformance Checking

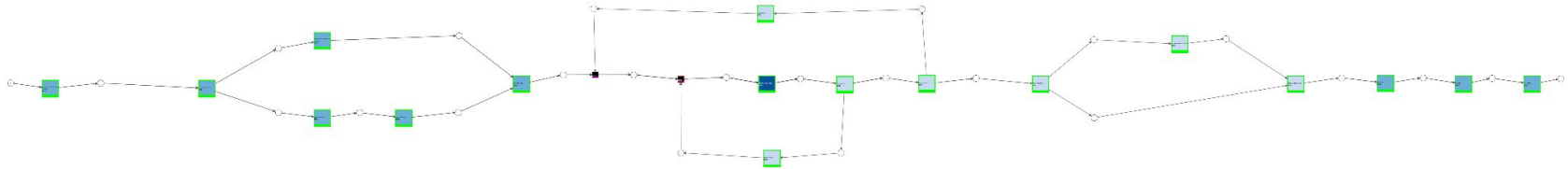
We will use:

- PN-A, (normative model) is the manually modelled workflow net
- PN-B (descriptive model) is the workflow net obtained from the noisy event log
- XES-B, is the noisy event log
- F-XES-A, is the simulated event log, filtered with the 'Filter Events' plug-in

Using the plug-in Replay a Log on Petri Net for Conformance Analysis, we performed four conformance checks, respectively:

- PN-A with F-XES-A
- PN-A with XES-B
- PN-B with F-XES-A
- PN-B with XES-B

House Building - Conformance Checking (PN-A with F-XES-A)



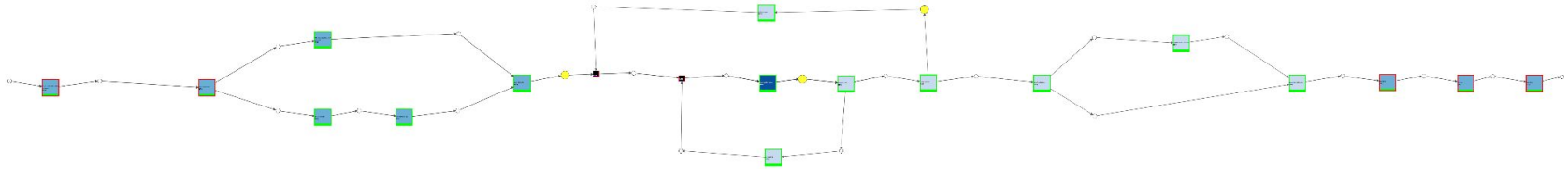
Inspector

Info Display Filter Export

- ▶ Legend
- ▶ View
- ▶ Elements Statistics
- ▼ Global Statistics (non-filtered traces)

Property	Value
Calculation Time (ms)	5.9793400000000005
Num. States	100.7
Trace Fitness	1.0
Title of Visualization	Alignments of Filtered log on ...
Exit code of alignment for tra...	1.0
Model move cost empty trace	14.0
Number of LPs solved	1.6199999999999999
Queued States	100.7
Raw Fitness Cost	0.0
Main Model Fitness	4.0

House Building - Conformance Checking (PN-A with XES-B)



Inspector

Info Display Filter Export

Legend

View

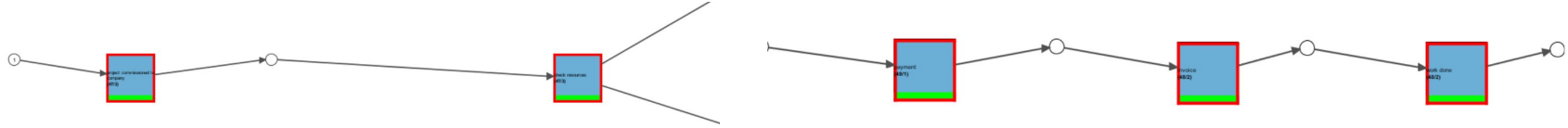
Elements Statistics

Global Statistics (non-filtered traces)

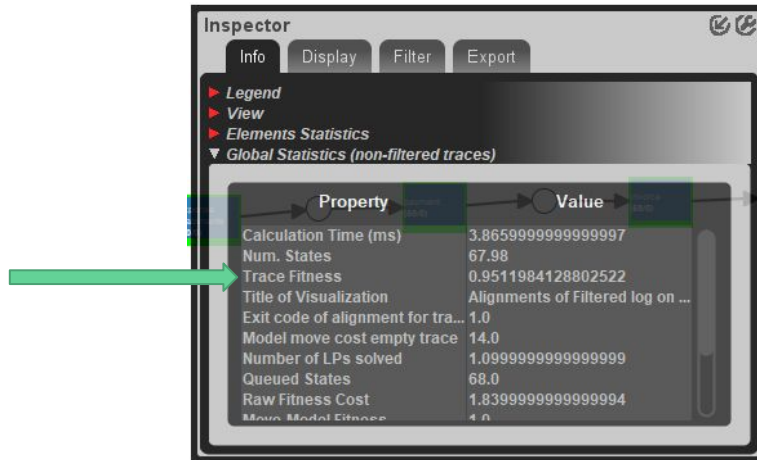
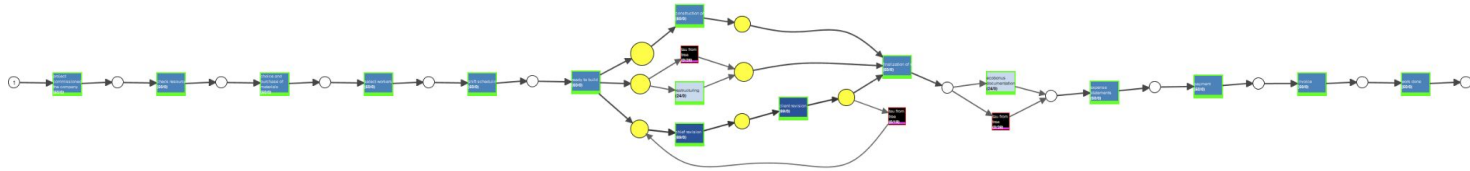
Property	Value
Calculation Time (ms)	3.7374200000000006
Num. States	92.1
Trace Fitness	0.9904419844861021
Title of Visualization	Alignments of Filtered log on ...
Exit code of alignment for tra...	1.0
Model move cost empty trace	14.0
Number of LPs solved	1.5000000000000002
Queued States	92.1
Raw Fitness Cost	0.28
Mean Model Fitness	0.0050467004377644

House Building - Conformance Checking (PN-A with XES-B)

issues:



House Building - Conformance Checking (PN-B with F-XES-A)

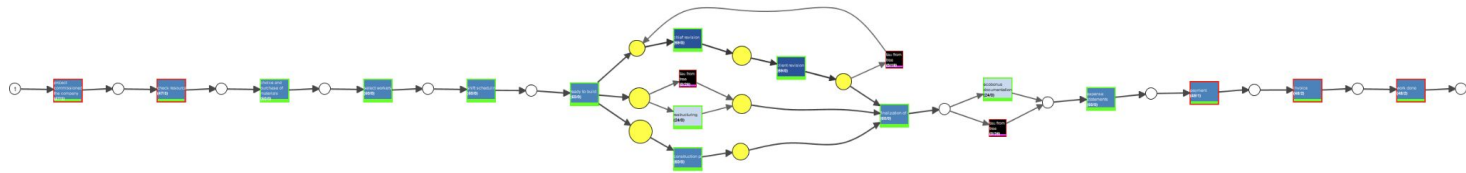


House Building - Conformance Checking (PN-B with F-XES-A)

issues:



House Building - Conformance Checking (PN-B with XES-B)



Inspector

Info Display Filter Export

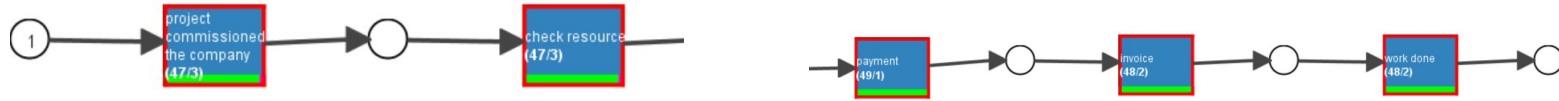
Legend
View
Elements Statistics

Global Statistics (non-filtered traces)

Property	Value
Calculation Time (ms)	2.2674199999999995
Num. States	67.55999999999999
Trace Fitness	0.9433352539803287
Title of Visualization	Alignments of Filtered log on ...
Exit code of alignment for tra...	1.0
Model move cost empty trace	14.0
Number of LPs solved	1.0799999999999996
Queued States	67.6
Raw Fitness Cost	2.0599999999999996
Mean Model Fitness	0.0067750407644457

House Building - Conformance Checking (PN-B with XES-B)

issues:



House Building - Conclusions

Petri Net and Event Log	Trace Fitness
PN-A and F-XES-A	1
PN-A and XES-B	0.99
PN-B and F-XES-A	0.95
PN-B and XES-B	0.94

Thank you!
