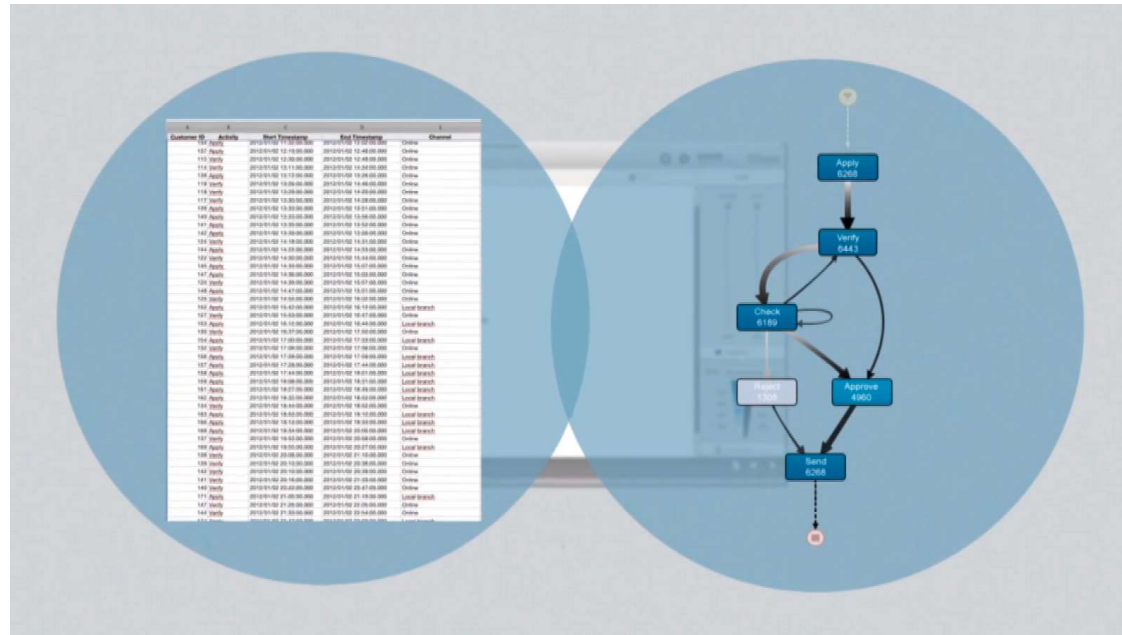
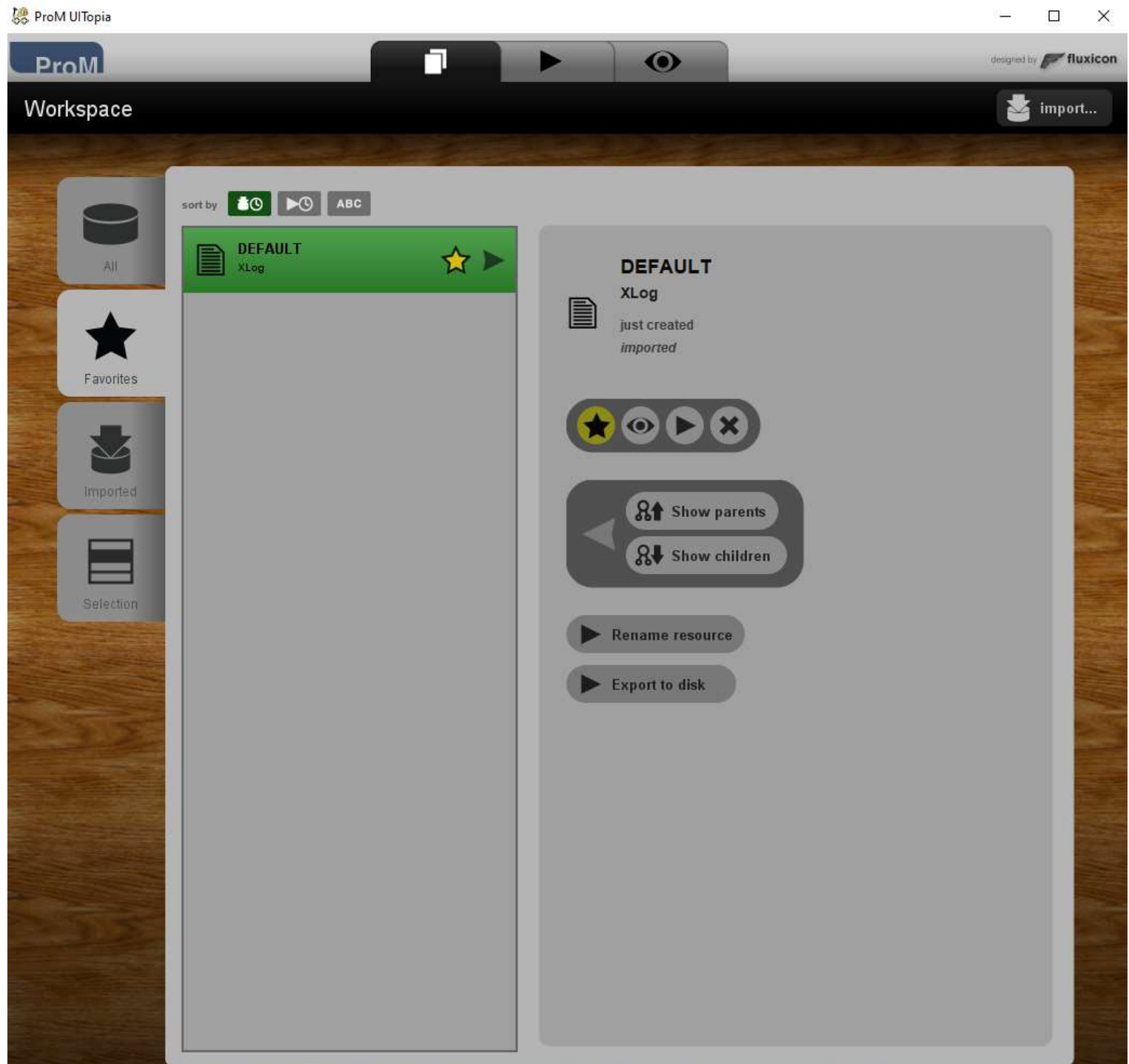


# Folyamatbányászat

## ProM

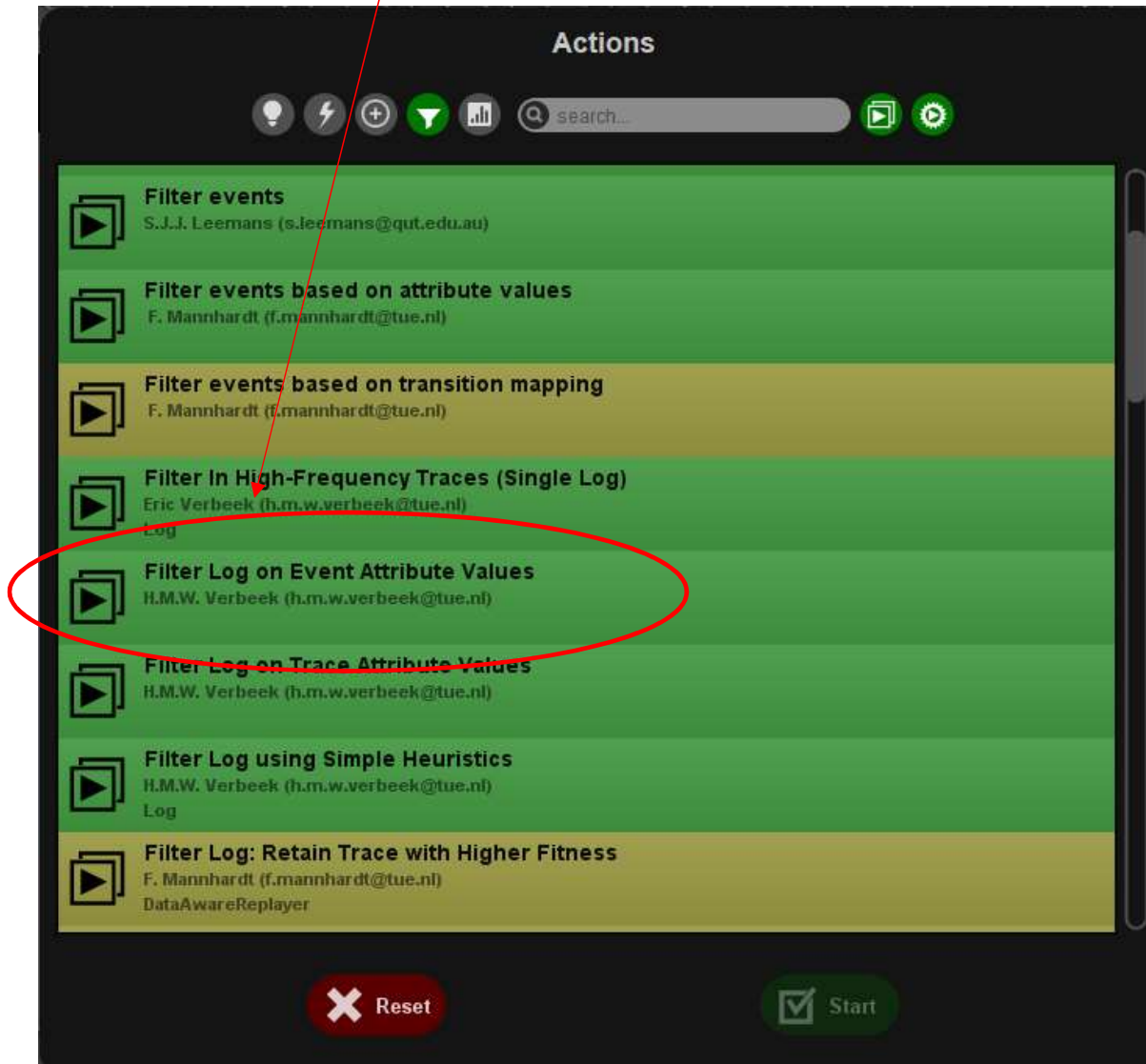


- A ProM elindítása után az Import paranccsal betöltjük a feldolgozni kívánt fájlt
- pl. repairExample.xml



# ProM használata – Log-ok tisztítása

- Miután beimportáltuk a log fájlt, különböző filtereket használhatunk, pl. Filter Log on Event Attribute Values



A kiválasztott művelet után sok féle eredményt kaphatunk, pl.:

**Configure filter (values)**

lifecycle:transition   numberRepairs   org:resource   phoneType   time:timestamp

concept:name   defectFixed   defectType

**Select values**

- Analyze Defect
- Archive Repair
- Inform User
- Register
- Repair (Complex)
- Repair (Simple)
- Restart Repair
- Test Repair

Remove if no value provided

Log name: DEFAULT (filtered on event attributes)

Remove trace if all events were removed

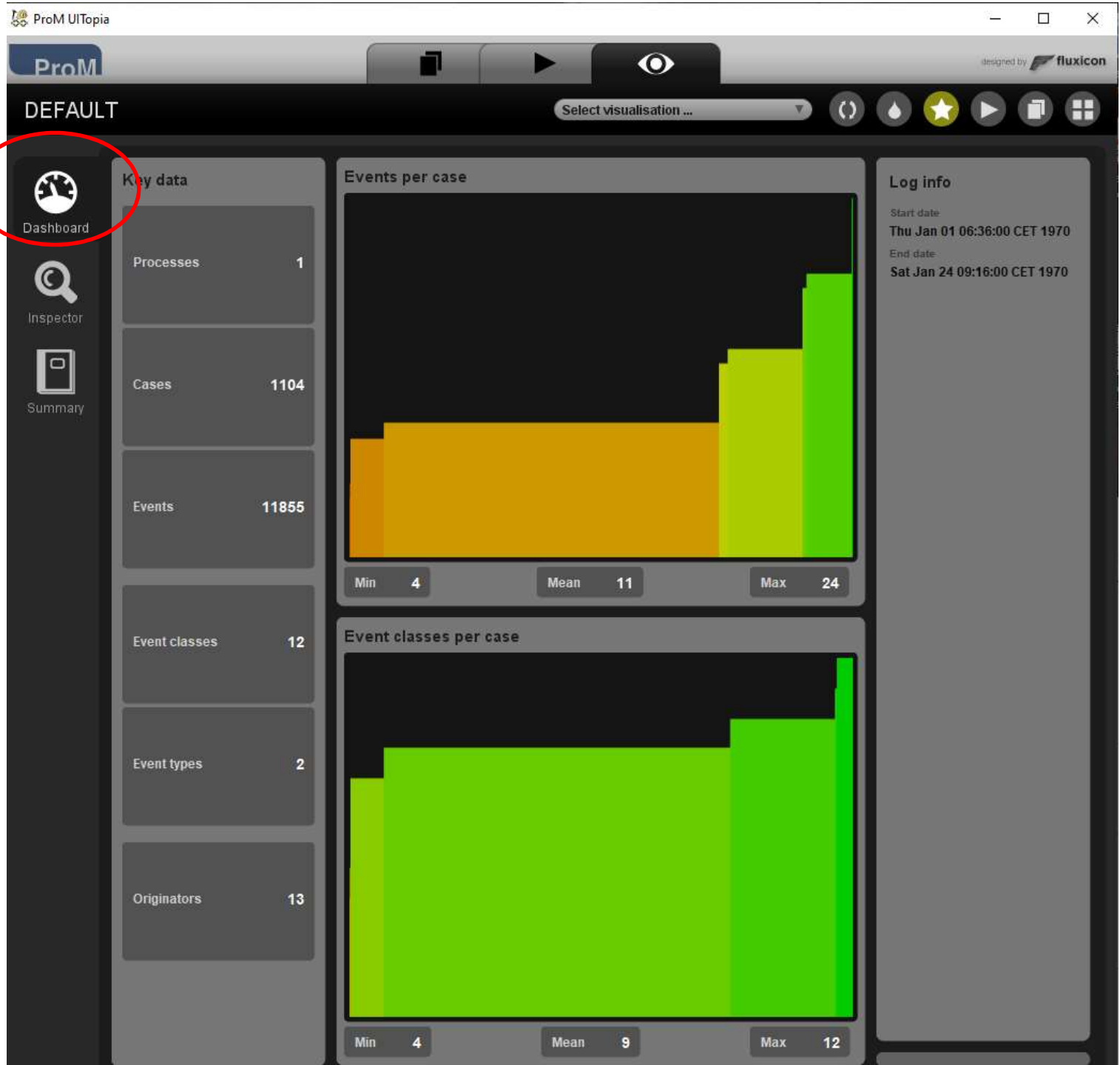
# A szűrés további eredményei



Összesített adatok, az eredményeket elmenthetjük egy HTML fájlba

The screenshot shows the ProM UI interface. The top bar includes the ProM logo, a 'DEFAULT (filtered on event attributes)' status, and a 'Select visualisation ...' dropdown. A red circle highlights the 'save HTML...' button in the top right corner. The main content area is divided into sections: 'Log Summary' with statistics (Total number of process instances: 1104, Total number of events: 11855), 'MXML Legacy Classifier' with a table of event classes, and 'Start events'.

Class	Occurrences (absolute)	Occurrences (relative)
Test Repair+complete	1508	12,72%
Test Repair+start	1508	12,72%
Register+complete	1104	9,313%
Analyze Defect+complete	1104	9,313%
Analyze Defect+start	1104	9,313%
Inform User+complete	1102	9,296%
Archive Repair+complete	1000	8,435%
Repair (Simple)+start	785	6,622%
Repair (Simple)+complete	785	6,622%
Repair (Complex)+start	725	6,116%
Repair (Complex)+complete	724	6,107%
Restart Repair+complete	406	3,425%



- Alapadatok megjelenítése a loghoz

The screenshot shows the ProM UI interface. At the top, there is a title bar with 'ProM UI Topia' and a 'ProM' logo. Below the title bar, there is a navigation bar with 'DEFAULT' and a 'Select visualisation ...' dropdown. The main interface is divided into three panels: 'Log inspector', 'Browser', and 'Log Attributes'. The 'Log inspector' panel is active and shows a list of instances from 1 to 104. Instance 1001 is highlighted in red. The 'Browser' panel shows the details for instance 1001, including 8 events: Register, Analyze Defect, Repair (Complex), Inform User, Repair (Complex), Test Repair, and Test Repair. The 'Log Attributes' panel shows the attributes for case 1001, including 'LITERAL TYPED', 'conceptname: 1001', and 'description: Simulated process instance'. A red circle highlights the 'Inspector' icon in the left sidebar.

ProM UI Topia

ProM

DEFAULT

Select visualisation ...

Log inspector | Browser | Explorer | Log Attributes

Dashboard

Inspector

Summary

Instances

1  
10  
100  
1000  
**1001**  
1002  
1003  
1004  
1005  
1006  
1007  
1008  
1009  
101  
1010  
1011  
1012  
1013  
1014  
1015  
1016  
1017  
1018  
1019  
102  
1020  
1021  
1022  
1023  
1024  
1025  
1026  
1027  
1028  
1029  
103  
1030  
1031  
1032  
1033  
1034  
1035  
1036  
1037  
1038  
1039  
104

1001  
8 events

Register  
#1 complete @System  
22.01.1970 07:51:00.000

Analyze Defect  
#2 start @Tester3  
22.01.1970 07:51:00.000

Analyze Defect  
#3 complete @Tester3  
22.01.1970 07:56:00.000

Repair (Complex)  
#4 start @SolverC3  
22.01.1970 08:06:00.000

Inform User  
#5 complete @System  
22.01.1970 08:35:00.000

Repair (Complex)  
#6 complete @SolverC3  
22.01.1970 08:54:00.000

Test Repair  
#7 start @Tester5  
22.01.1970 08:54:00.000

Test Repair  
#8 complete @Tester5  
22.01.1970 09:00:00.000

Attributes for case 1001

LITERAL TYPED  
conceptname: 1001  
description: Simulated process instance

- Trace-ek és azok gyakorisága, tartalma.



ProM UI Topia

ProM

DESIGN BY FLUXICON

DEFAULT

Select visualisation ...

Log inspector

Browser Explorer Log Attributes

Dashboard

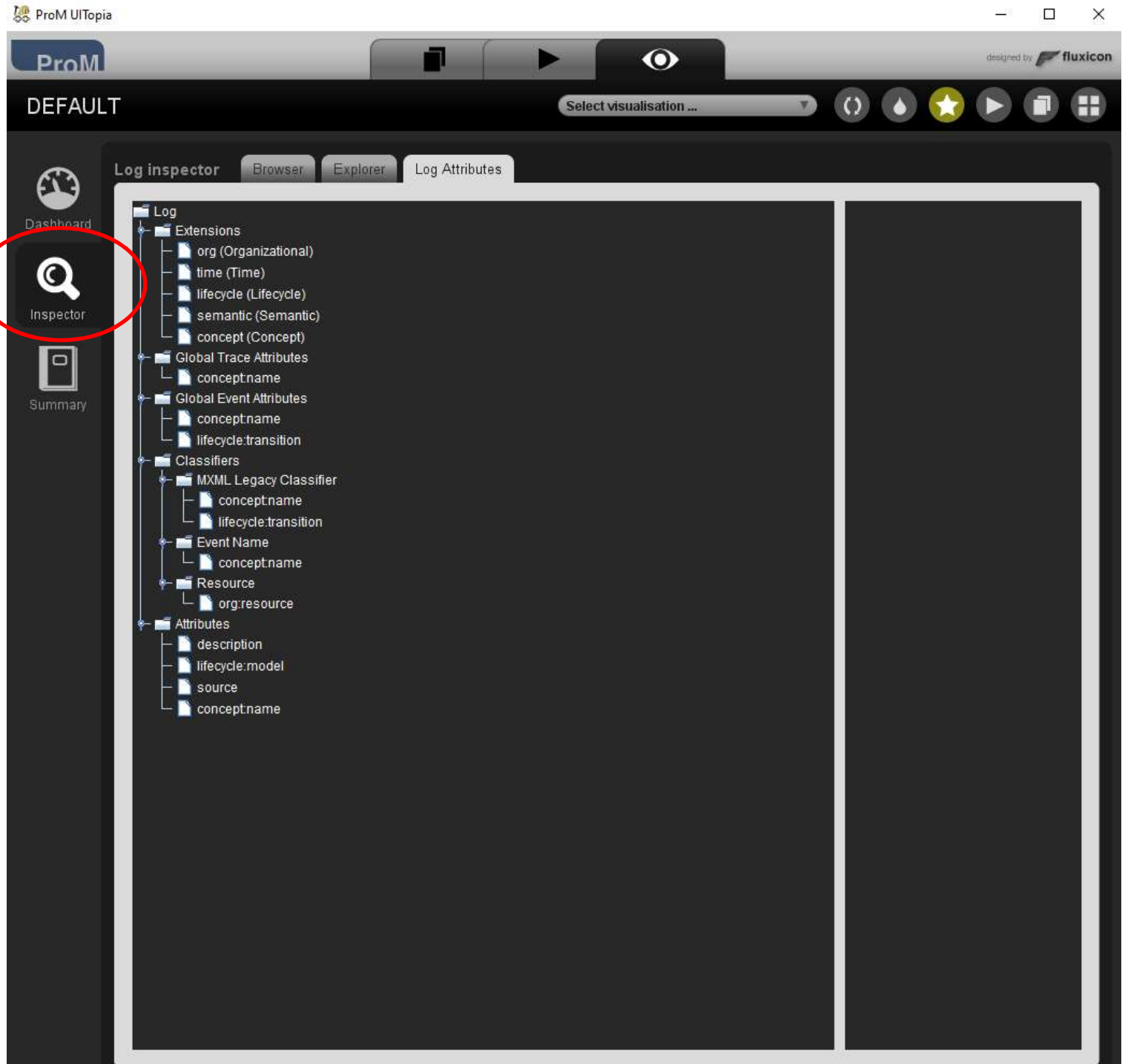
Inspector

Summary

Process Instance	Number of Events	Frequency
1	9 events	Highly frequent
10	14 events	Highly frequent
100	9 events	Highly frequent
1000	9 events	Highly frequent
1001	8 events	Highly frequent
1002	8 events	Highly frequent
1003	13 events	Highly frequent
1004	8 events	Highly frequent
1005	8 events	Highly frequent

Process instances are arranged vertically, shown as streams of triangular events. The color of events describes their frequency (green is highly frequent, red is low-frequent). Hover the mouse over events to view more information.

- A folyamat példányok függőlegesen vannak elrendezve, háromszögek jelzik az eseményeket, amelyek folyamaként jelennek meg.
- Az események színe leírja azok gyakoriságát.
- (További információk megtekintéséhez az egeret az események fölé kell vinni.)



- A log struktúrája

- Összefoglaló adatok a logban található adatokról

ProM UI Topia

ProM

DEFAULT

Select visualisation ...

Dashboard

Inspector

Summary

Log Summary

save HTML...

### Log Summary

Total number of process instances: 1104  
Total number of events: 11855

### MXML Legacy Classifier

Event classes defined by MXML Legacy Classifier  
All events

Total number of classes: 12

Class	Occurrences (absolute)	Occurrences (relative)
Test Repair+complete	1508	12,72%
Test Repair+start	1508	12,72%
Register+complete	1104	9,313%
Analyze Defect+complete	1104	9,313%
Analyze Defect+start	1104	9,313%
Inform User+complete	1102	9,296%
Archive Repair+complete	1000	8,435%
Repair (Simple)+start	785	6,622%
Repair (Simple)+complete	785	6,622%
Repair (Complex)+start	725	6,116%
Repair (Complex)+complete	724	6,107%
Restart Repair+complete	406	3,425%

### Start events

Total number of classes: 1

Class	Occurrences (absolute)	Occurrences (relative)
Register+complete	1104	100,0%



Dashboard



Inspector



Summary

Log Summary

save HTML...

### Event Name

Event classes defined by Event Name

#### All events

Total number of classes: 8

Class	Occurrences (absolute)	Occurrences (relative)
Test Repair	3016	25,441%
Analyze Defect	2208	18,625%
Repair (Simple)	1570	13,243%
Repair (Complex)	1449	12,223%
Register	1104	9,313%
Inform User	1102	9,296%
Archive Repair	1000	8,435%
Restart Repair	406	3,425%

#### Start events

Total number of classes: 1

Class	Occurrences (absolute)	Occurrences (relative)
Register	1104	100,0%

#### End events

Total number of classes: 4

Class	Occurrences (absolute)	Occurrences (relative)
Archive Repair	1000	90,58%
Test Repair	75	6,793%
Inform User	27	2,446%
Repair (Complex)	2	0,181%

#### Resource



Dashboard



Inspector



Summary

Log Summary

save HTML...

### Resource

Event classes defined by Resource

#### All events

Total number of classes: 13

Class	Occurrences (absolute)	Occurrences (relative)
System	3612	30,468%
Tester3	910	7,676%
Tester2	904	7,625%
Tester1	902	7,609%
Tester6	876	7,389%
Tester5	844	7,119%
Tester4	788	6,647%
SolverS1	592	4,994%
SolverC1	534	4,504%
SolverC2	514	4,336%
SolverS2	498	4,201%
SolverS3	480	4,049%
SolverC3	401	3,383%

#### Start events

Total number of classes: 1

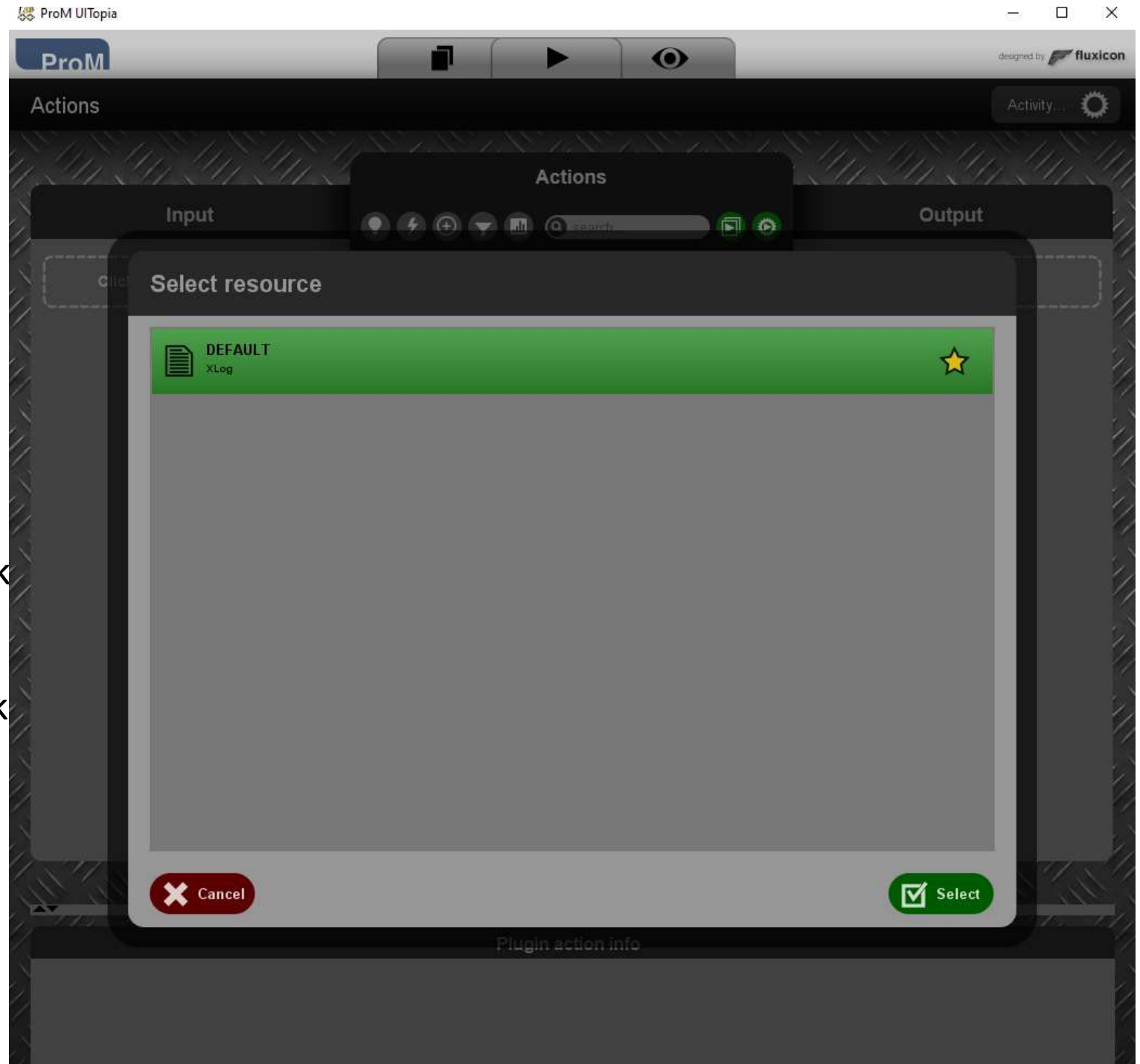
Class	Occurrences (absolute)	Occurrences (relative)
System	1104	100,0%

#### End events

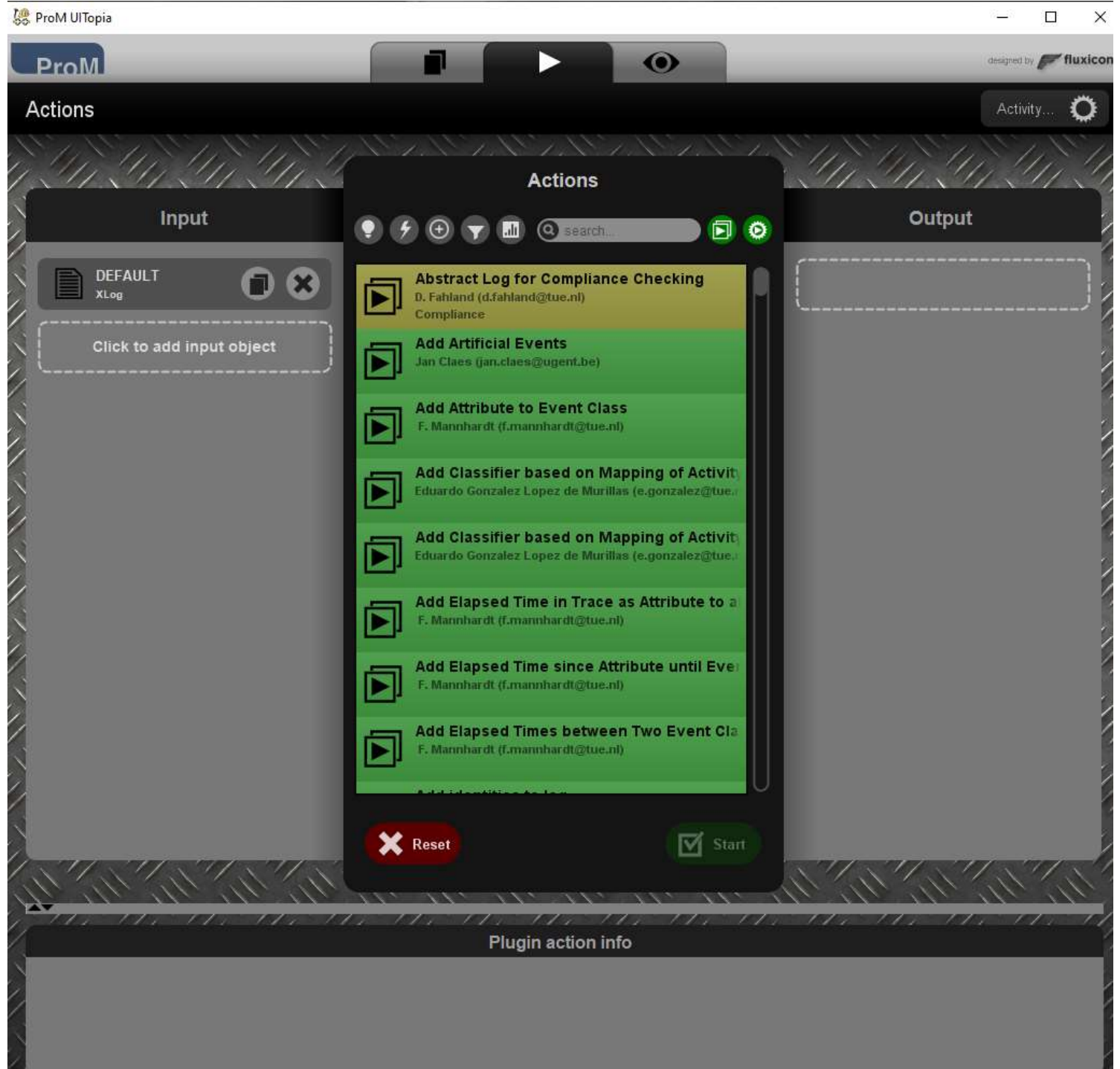
Total number of classes: 9

Class	Occurrences (absolute)	Occurrences (relative)
System	1027	93,025%

Miután a rendszer felismerte a fájl típusát megjeleníthetjük a felhasználható pluginek listáját, milyen Action-ek érhetőek el



- A listából számos plugin kiválasztható és végrehajtható. A képernyő alján, az infó boxban rövid leírás olvasható és utalás arra, hogy hol olvashatunk a plugin-ről részletesebben.





# Átmenet rendszer – Transition system

The screenshot displays a software interface with a dark theme. At the top, there is a header bar with 'Actions' on the left and 'Activity...' on the right. Below this, the interface is divided into three main sections:

- Input:** Located on the left, it shows a 'DEFAULT XLog' file icon and a close button.
- Actions:** A central panel with a search bar and several icons (lightbulb, lightning bolt, plus, funnel, bar chart). It contains a list of actions, each with a play button icon:
  - Mine Pareto front with ETMd in Live mode (J.C.A.M.Buijs)
  - Mine Pareto front with ETMr (J.C.A.M.Buijs)
  - Mine Pareto front with ETMr in Live mode (J.C.A.M.Buijs)
  - Mine Transition System** (H.M.W. Verbeek) - highlighted in green
  - Multi-perspective Process Explorer - Fitness View (F. Mannhardt)
  - Multi-perspective Process Explorer - Performance View (F. Mannhardt)
  - Multi-perspective Process Explorer - Precision View (F. Mannhardt)
  - Cluster cases over time using Markov clustering (B.F.A. Hompes)
- Output:** Located on the right, it displays the results of the selected action, showing a 'Mined Transition System' and 'Weights'.

At the bottom of the 'Actions' panel, there are 'Reset' and 'Start' buttons.



- Átmenet rendszer előállítása: a gráfban végig követhetők az egyes állapotok, mely állapotból mely művelet hatására jutottunk más állapotba, leolvashatók a lehetséges lefutások (tarce-ek).

The screenshot shows the ProM software interface. At the top, there's a 'ProM' logo and a 'fluxicon' logo. Below that, there's an 'Actions' header. The main area is divided into three panels: 'Input', 'Actions', and 'Output'. The 'Input' panel shows a 'DEFAULT XLog' file. The 'Actions' panel is a modal dialog with a list of plugins, each with a play button icon. The 'Output' panel shows the results of the actions, including 'Mined Transition System', 'Weights', 'Start states', and 'Accept states'. At the bottom of the dialog, there are 'Reset' and 'Start' buttons. Below the dialog, there's a 'Plugin action info' section for the 'Mine Transition System' plugin.

**Actions**

**Input**

DEFAULT XLog

**Actions**

- Mine Pareto front with ETMd  
J.C.A.M.Buijs (j.c.a.m.buijs@tue.nl)  
EvolutionaryTreeMiner
- Mine Pareto front with ETMd in Live mode  
J.C.A.M.Buijs (j.c.a.m.buijs@tue.nl)  
EvolutionaryTreeMiner
- Mine Pareto front with ETMr  
J.C.A.M.Buijs (j.c.a.m.buijs@tue.nl)  
EvolutionaryTreeMiner
- Mine Pareto front with ETMr in Live mode  
J.C.A.M.Buijs (j.c.a.m.buijs@tue.nl)  
EvolutionaryTreeMiner
- Mine Transition System  
H.M.W. Verbeek (h.m.w.verbeek@tue.nl)  
TransitionSystems
- Multi-perspective Process Explorer - Fitne  
F. Mannhardt (f.mannhardt@tue.nl)  
DataAwareExplorer
- Multi-perspective Process Explorer - Perfo  
F. Mannhardt (f.mannhardt@tue.nl)  
DataAwareExplorer
- Multi-perspective Process Explorer - Preci  
F. Mannhardt (f.mannhardt@tue.nl)  
DataAwareExplorer

**Output**

- Mined Transition System  
TSMinerTransitionSystem
- Weights  
DirectedGraphElementWeights
- Start states  
StartStateSet
- Accept states  
AcceptStateSet

**Reset** **Start**

**Plugin action info**

**Mine Transition System**

**Package:** TransitionSystems  
**Author:** [H.M.W. Verbeek](#)  
**Categories:** Discovery

Discovers a transition system from the given log. A state in the transition system is a combination of (1) a collection of activities, (2) a collection of activities yet to be seen, and (3) a mapping of activities to their actual values. The collections include sets, and a threshold for the distance to the current event can be specified. The transition system can be modified in some ways before it is returned.

# Beállítások

## TS Miner

### Configure key classifiers

#### Select backward keys

- MXML Legacy Classifier
- Event Name
- Resource

#### Select forward keys

- MXML Legacy Classifier
- Event Name
- Resource

Select key data attributes

✕ Cancel ◀ Previous ▶ Next

# TS Miner

## Configure key classifier collections

### Select collection type

- List
- Multiset
- Set
- Fixed Length Set

### Select collection size limit

- No limit
- Limit:  1

### Select transition system size limit

- No limit
- Limit:  200

# TS Miner

## Configure key classifier filter

### Select 'Event Name' values

- Analyze Defect
- Archive Repair
- Inform User
- Register
- Repair (Complex)
- Repair (Simple)
- Restart Repair
- Test Repair

Select top percentage:  80

 Cancel

 Previous

 Next

# TS Miner

## Configure transition label filter

### Select transition label values

- Analyze Defect+complete
- Analyze Defect+start
- Archive Repair+complete
- Inform User+complete
- Register+complete
- Repair (Complex)+complete
- Repair (Complex)+start
- Repair (Simple)+complete
- Repair (Simple)+start
- Restart Repair+complete
- Test Repair+complete
- Test Repair+start

Select top percentage:  80

 Cancel

 Previous

 Next

## TS Miner

### Configure post-mining conversions

- Remove self loops
- Improve diamond structure (may be extremely slow)
- Merge states with identical inflow
- Merge states with identical outflow
- Add artificial start and end states

 Cancel

 Previous

 Next

# TS Miner

## Check configuration

- TS Miner configuration
  - Key classifiers
  - Transition label filter
  - Post-mining conversions

 Cancel

 Previous

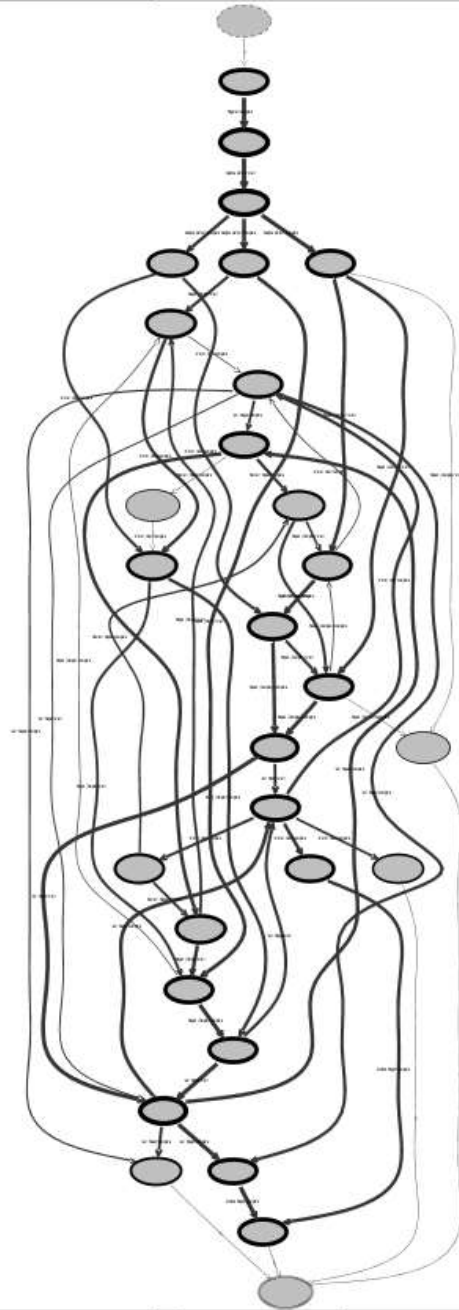
 Finish

# PTS (mined from DEFAULT)



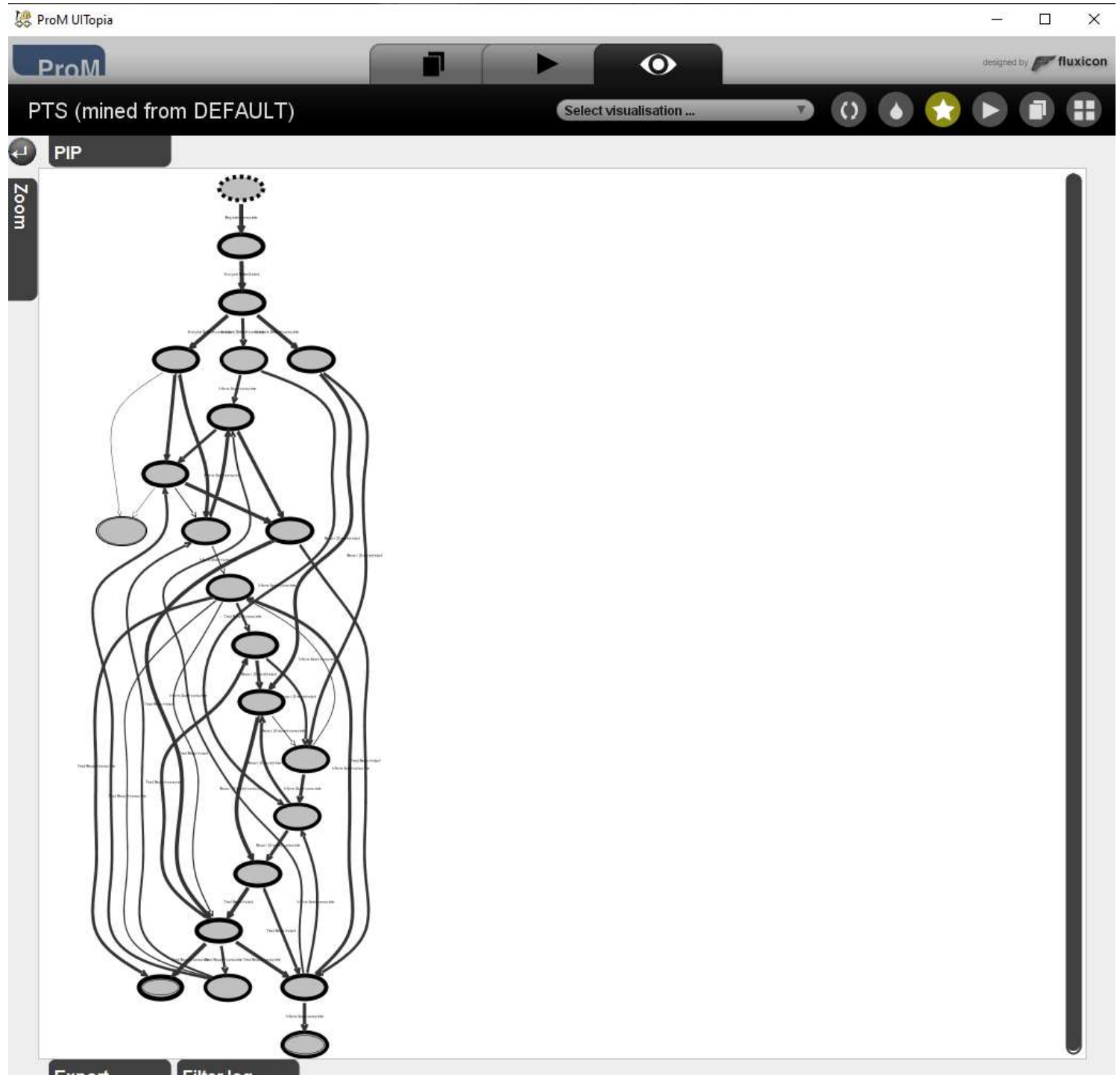
PIP

Zoom

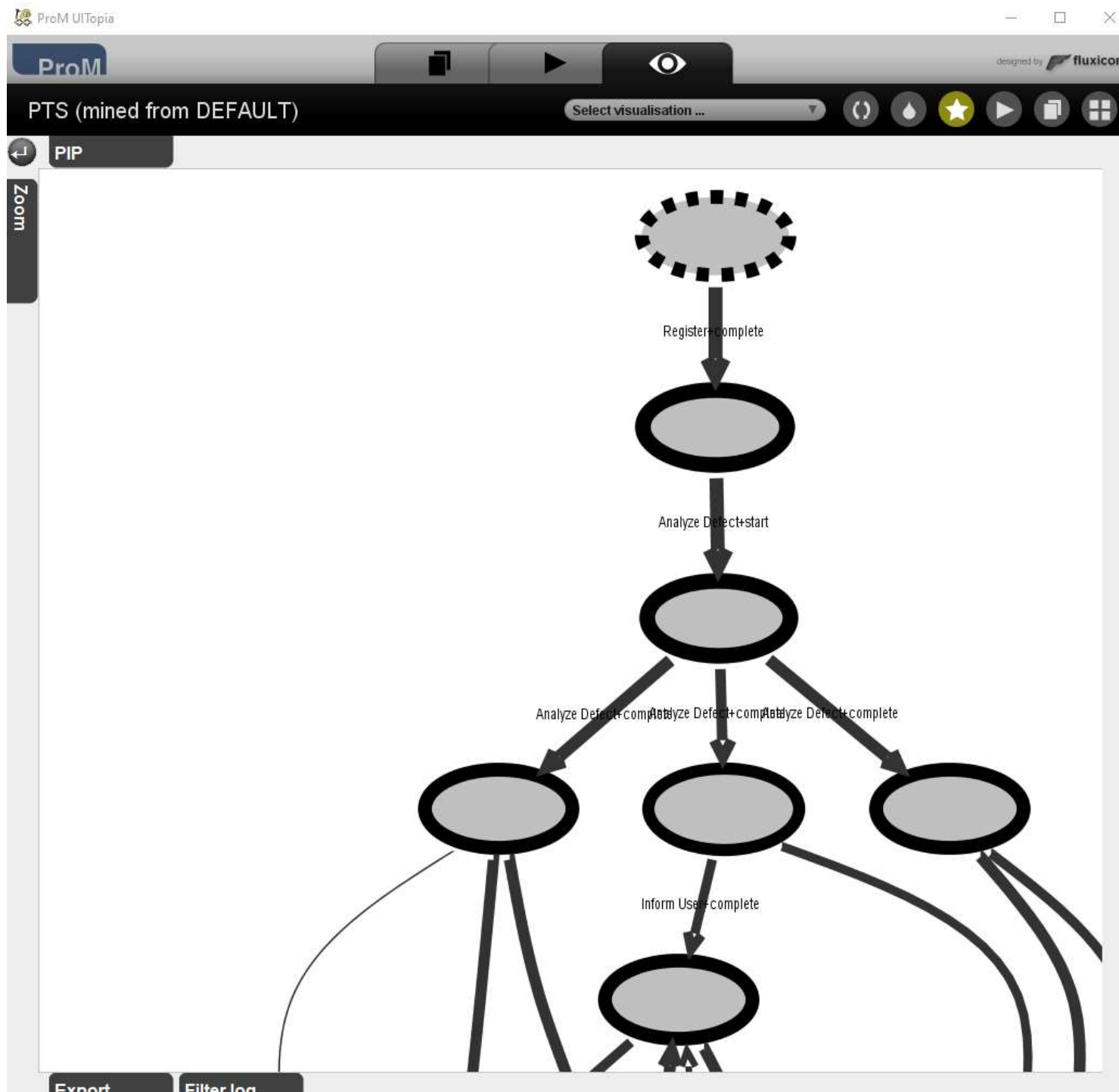




- Átmenet rendszerhez tartozó gráf



- Átmenet rendszer egy részlete kinagyítva a Zoom funkcióval. A PIP lehetőséggel ablakot nyithatunk a gráfra és végig pásztázhatjuk.



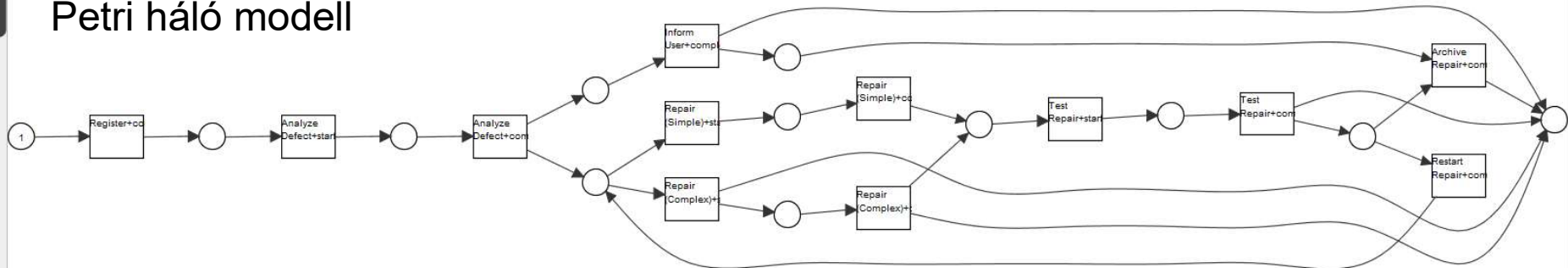
# ProM Alpha algoritmus használata

The screenshot shows the ProM software interface. At the top, there is a 'ProM' logo and a 'fluxicon' logo. Below the logo, there are navigation icons (back, play, eye) and an 'Activity...' button. The main interface is divided into three panels: 'Input', 'Actions', and 'Output'. The 'Input' panel shows a 'DEFAULT XLog' file. The 'Actions' panel is the central focus, displaying a list of actions. The 'Alpha Miner' action is highlighted with a red circle. The 'Output' panel shows 'Petri net' and 'Marking' options. At the bottom of the 'Actions' panel, there are 'Reset' and 'Start' buttons.

**Actions List:**

- Align Log And Model for Repair (global costs) - D. Fahland (d.fahland@tue.nl) - ModelRepair
- Align Log to Model - D. Fahland (d.fahland@tue.nl) - oma
- Alpha Miner** - S.J. van Zelst, B.F. van Dongen, L.M.A. T. Maer (s.j.v.zelst@tue.nl)
- Animate Event Log in Fuzzy Instance - H. Verbeek (h.m.w.verbeek@tue.nl) - Fuzzy
- Anonymize Event Log - F. Mannhardt (f.mannhardt@tue.nl)
- Anonymize: Obfuscate event attribute names - F. Mannhardt (f.mannhardt@tue.nl)
- Anonymize: Obfuscate literal event attribute values - F. Mannhardt (f.mannhardt@tue.nl)
- Anonymize: Obfuscate literal trace attribute values - F. Mannhardt (f.mannhardt@tue.nl)

## Petri háló modell



- Az Alpha Miner kiválasztása a felkínált pluginek közül

The screenshot displays the ProM (Process Mining) software interface. At the top, the title bar reads 'ProM UI Topia' and 'ProM'. Below the title bar, there are navigation icons (back, play, eye) and a 'designed by fluxicon' logo. The main interface is divided into three sections: 'Input', 'Actions', and 'Output'. The 'Input' section shows a 'DEFAULT XLog' file. The 'Actions' section is a central panel with a search bar and a list of plugins. The 'Output' section shows 'Petri net' and 'Marking' options. The 'Alpha Miner' plugin is highlighted in green in the Actions list. At the bottom, there is a 'Plugin action info' section for 'Alpha Miner'.

**Input**

DEFAULT XLog

**Actions**

Align Log And Model for Repair (find loops)  
D. Fahland (d.fahland@tue.nl)  
ModelRepair

Align Log And Model for Repair (global cos...  
D. Fahland (d.fahland@tue.nl)  
ModelRepair

Align Log to Model  
D. Fahland (d.fahland@tue.nl)  
Uma

**Alpha Miner**  
S.J. van Zelst, B.F. van Dongen, L.M.A. Tonnaer (s.j.v.z...)

Animate Event Log in Fuzzy Instance  
H. Verbeek (h.m.w.verbeek@tue.nl)  
Fuzzy

Anonymize Event Log  
F. Mannhardt (f.mannhardt@tue.nl)

Anonymize: Obfuscate event attribute nam...  
F. Mannhardt (f.mannhardt@tue.nl)

Anonymize: Obfuscate literal event attribut...  
F. Mannhardt (f.mannhardt@tue.nl)

Reset Start

**Output**

Petri net  
Petri net

Marking  
Marking

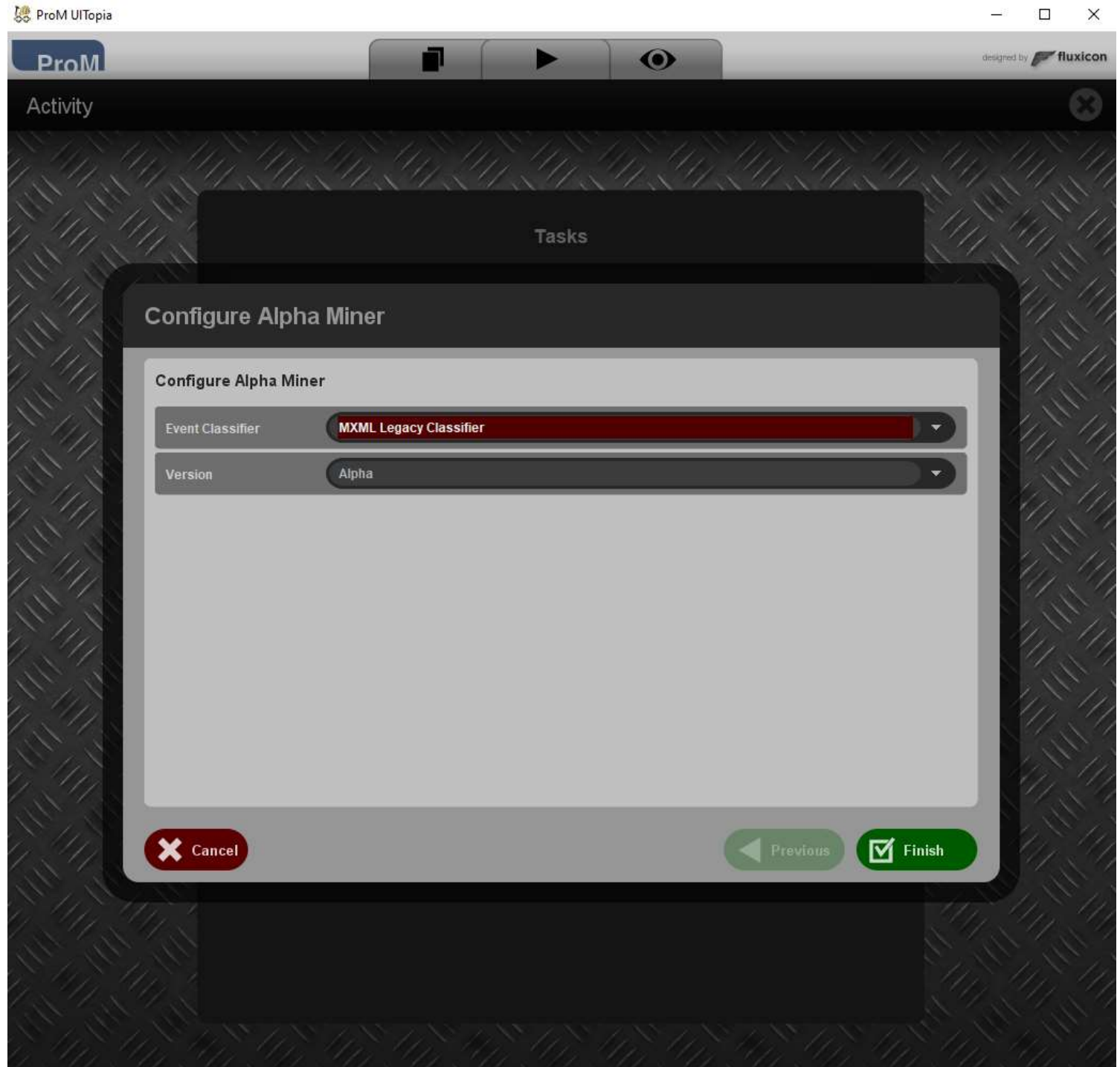
**Plugin action info**

**Alpha Miner**

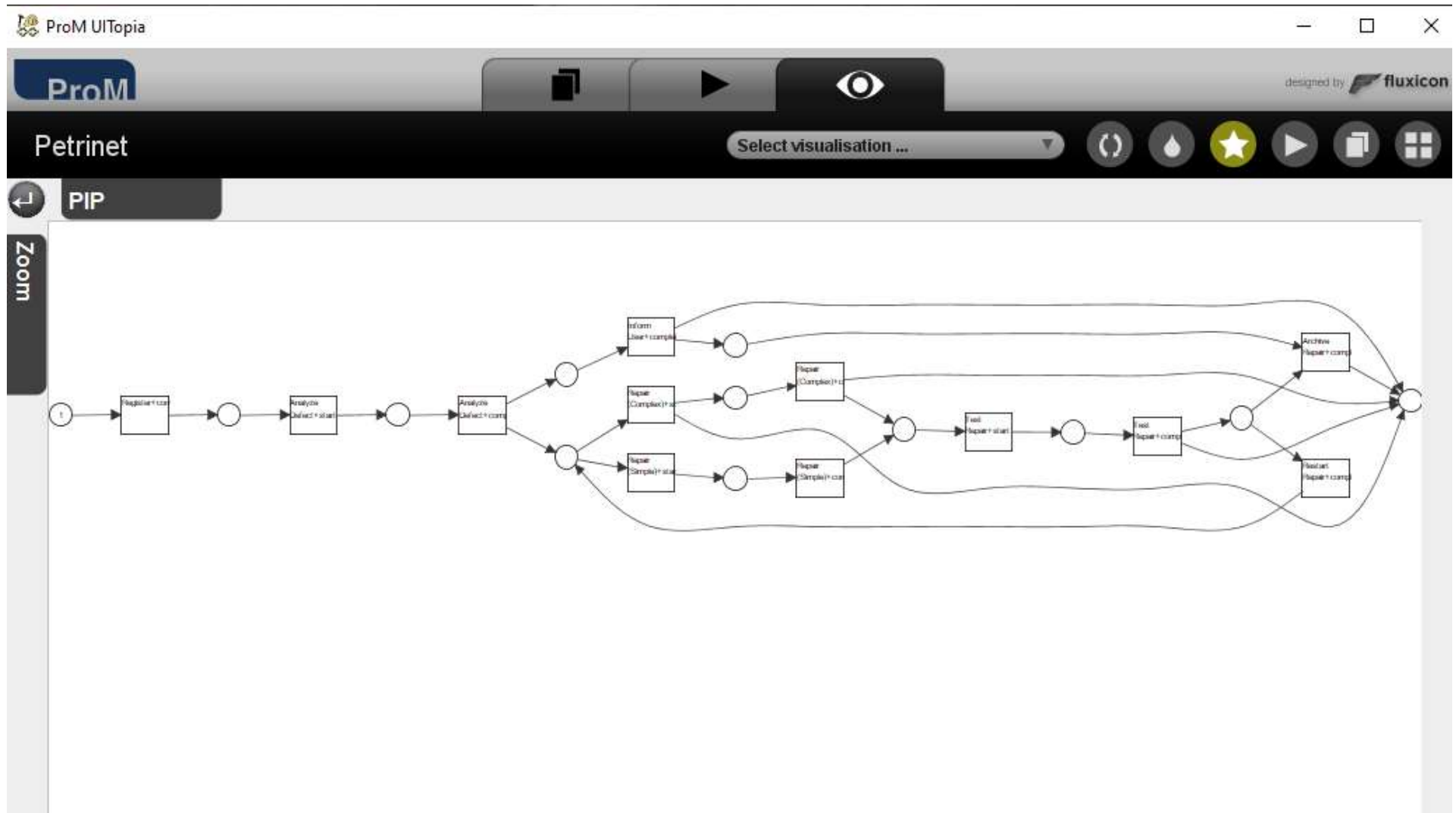
Author: S.J. van Zelst, B.F. van Dongen, L.M.A. Tonnaer  
Categories: Discovery

The Alpha Miner Plugin implements a collection of algorithms: the "Alpha Family". All algorithms take an event log as an input Petri net with an initial marking. The algorithms are based on papers:  
- Alpha (Classic): "Workflow Mining: Discovery Process Mode Logs"; Aalst, W.M.P. van der, Weijters, A.J.M.M., and, Maruster

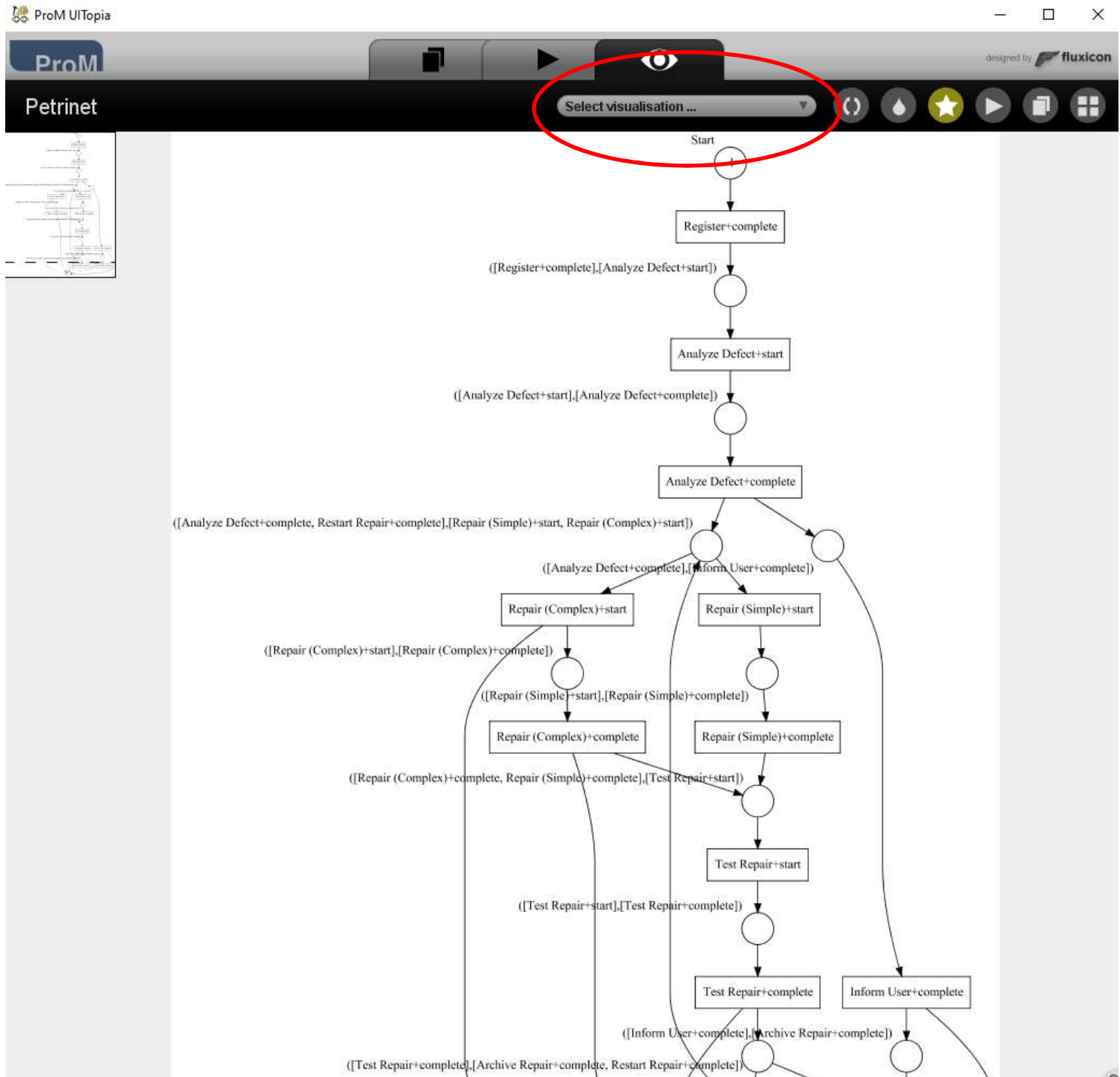
- Az Alpha algoritmus konfigurálása (az algoritmusnak vannak már különböző változatai)



# A Logból kibányászott folyamati modell

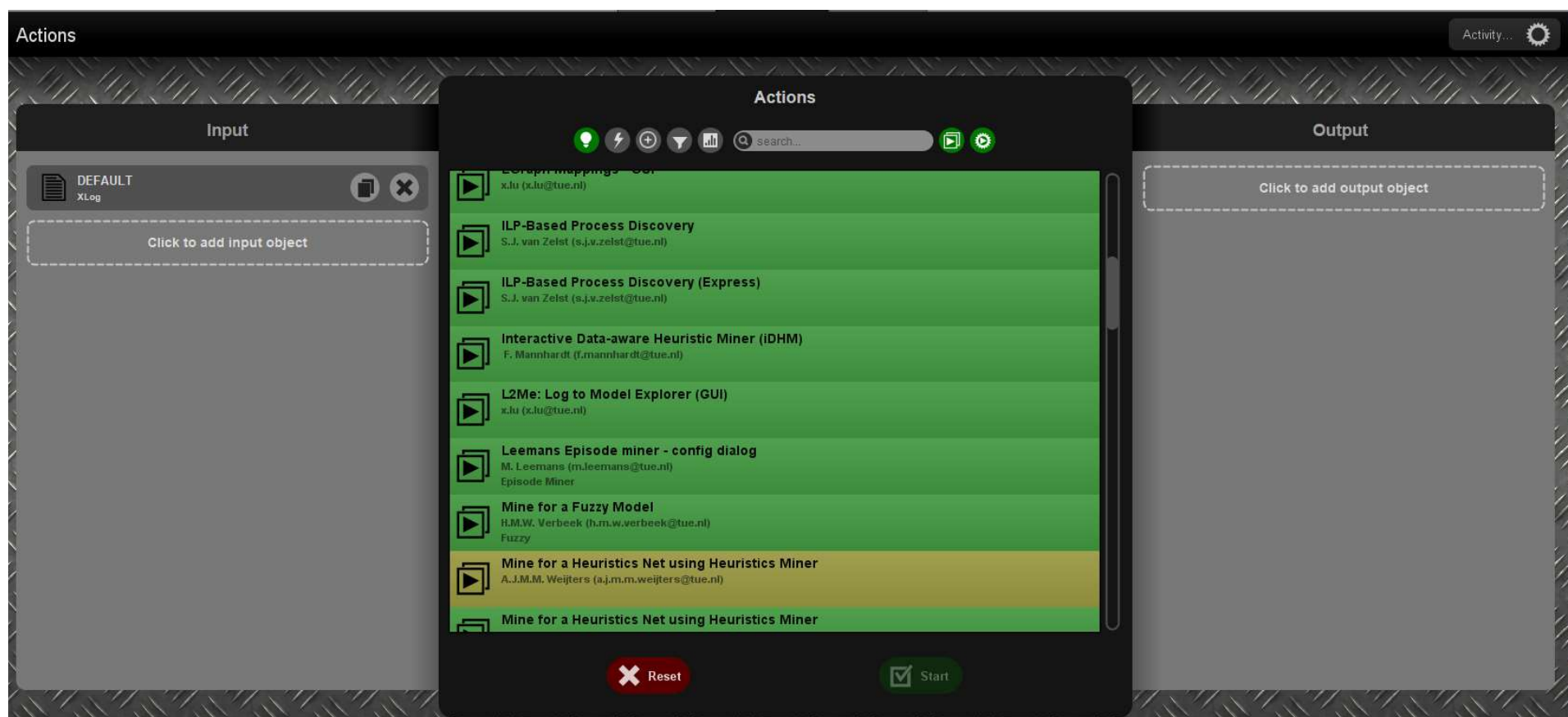






- Az Alpha algoritmussal kibányászott modell más megjelenítésben.

# További modell típusok előállítására: Mine for a Fuzzy Model

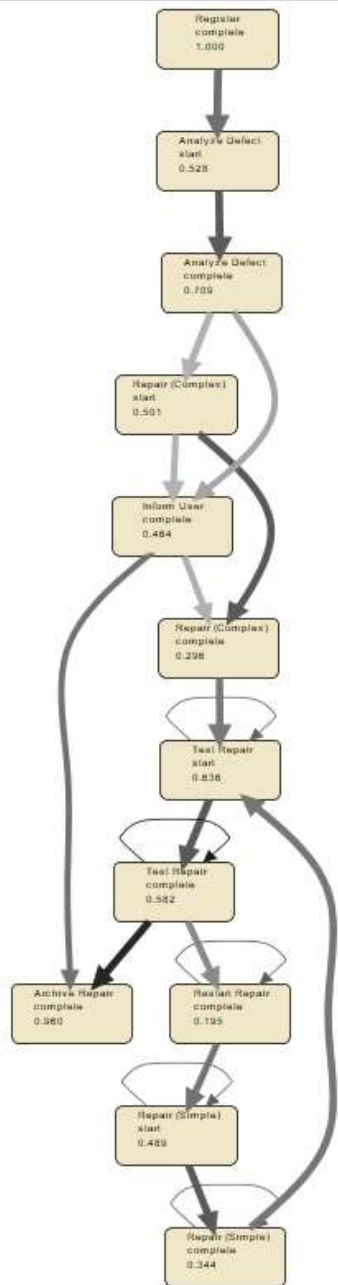




# Fuzzy Model

PIP

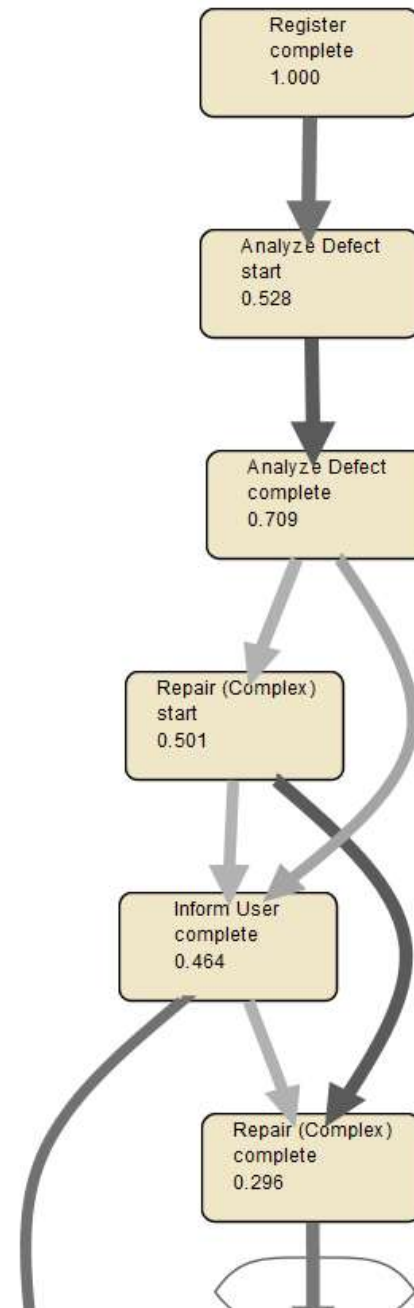
Zoom



# Fuzzy Model

PIP

Zoom



# ProM 5.2 – néhány plugin itt működik igazán jól

Betöltjük azt a fájlt, amelyet vizsgálni szeretnénk (.mxml)

The screenshot displays the ProM 5.2 software interface. The title bar shows 'ProM [5.2]'. The menu bar includes 'File', 'Mining', 'Analysis', 'Conversion', 'Exports', 'Window', and 'Help'. The toolbar contains icons for file operations, search, and analysis. The main window title is 'log\_garazskapu\_hibamentes\_es\_hibas.mxml (2)'. The dashboard is titled 'log\_garazskapu\_hibamentes\_es\_hibas.mxml' and features a sidebar with icons for 'Dashboard', a funnel, a magnifying glass, and a document. The dashboard content is organized into several panels:

- Key data:** A table showing summary statistics.

Metric	Value
Processes	1
Cases	3
Events	26
Event classes	12
Event types	2
Originators	2
- Events per case:** A horizontal bar chart showing a distribution of events per case. Below the chart, the statistics are: Min 8, Mean 8, Max 9.
- Event classes per case:** A horizontal bar chart showing a distribution of event classes per case. Below the chart, the statistics are: Min 8, Mean 8, Max 9.
- Log info:** A panel providing details about the log file.
  - Source: MXML generator
  - Source program: MXML generator
  - Start date: 2010-02-10 13:46:25
  - End date: 2010-02-10 15:50:35
  - Description: Created by manual, using an existing Petri net

At the bottom right of the dashboard, there is a button labeled 'start analyzing this log'.

Használhatjuk az **Analysis** menü **Trace Comparison** lehetőségét

Össze tudjuk hasonlítani a traceket műveleti szinten.

A különbségek **pirossal** kiemelésre kerülnek.

ProM [5.2]

File Mining Analysis Conversion Exports Window Help

Analysis - Trace Comparison

### Trace Diff Analysis

1 9 events	2 9 events
auto_beall #1 normal @Auto 10.02.2010 13:46:25.000	auto_beall #1 normal @Auto 10.02.2010 14:46:02.000
automata_gombnyomasra_var #2 normal @Automata 10.02.2010 13:47:00.000	automata_gombnyomasra_var #2 normal @Automata 10.02.2010 14:47:00.000
gombnyomas #3 normal @Auto 10.02.2010 13:47:10.000	gombnyomas #3 normal @Auto 10.02.2010 14:47:10.000
<b>jegykiadas</b> #4 normal @Automata 10.02.2010 13:47:15.000	<b>jegykiadas_rosszul</b> #4 hibas @Automata 10.02.2010 14:47:15.000
jegyelvetel #5 normal @Auto 10.02.2010 13:47:20.000	jegyelvetel #5 normal @Auto 10.02.2010 14:47:20.000
sorompo_fel #6 normal @Automata 10.02.2010 13:47:30.000	sorompo_fel #6 normal @Automata 10.02.2010 14:47:30.000
behajtas #7 normal @Auto 10.02.2010 13:47:55.000	behajtas #7 normal @Auto 10.02.2010 14:47:55.000
sorompo_le #8 normal @Automata 10.02.2010 13:48:25.000	sorompo_le #8 normal @Automata 10.02.2010 14:48:25.000
parkolas #9 normal @Auto 10.02.2010 13:50:35.000	parkolas #9 normal @Auto 10.02.2010 14:50:35.000

Jump to Difference: Previous Next Go Back

Egy másik össze-  
hasonlítás:  
A hiányzó  
műveletek **zölddel**  
vannak kiemelve.

ProM [5.2]

File Mining Analysis Conversion Exports Window Help

Analysis - Trace Comparison (2)

### Trace Diff Analysis

1 9 events		3 8 events
auto_beall #1 normal @Auto 10.02.2010 13:46:25.000		auto_beall #1 normal @Auto 10.02.2010 15:46:02.000
automata_gombnyomasra_var #2 normal @Automata 10.02.2010 13:47:00.000		automata_gombnyomasra_var #2 normal @Auto 10.02.2010 15:47:10.000
<b>gombnyomas</b> #3 normal @Auto 10.02.2010 13:47:10.000	↔	jegy_mar_kiadva #3 hibas @Automata 10.02.2010 15:47:15.000
jegykiadas #4 normal @Automata 10.02.2010 13:47:15.000	↔	jegyvetel_rossz #4 hibas @Auto 10.02.2010 15:47:20.000
<b>jegyvetel</b> #5 normal @Auto 10.02.2010 13:47:20.000	←	
sorompo_fel #6 normal @Automata 10.02.2010 13:47:30.000		sorompo_fel #5 normal @Automata 10.02.2010 15:47:30.000
behajtas #7 normal @Auto 10.02.2010 13:47:55.000		behajtas #6 normal @Auto 10.02.2010 15:47:55.000
sorompo_le #8 normal @Automata 10.02.2010 13:48:25.000		sorompo_le #7 normal @Automata 10.02.2010 15:48:25.000
parkolas #9 normal @Auto 10.02.2010 13:50:35.000		parkolas #8 normal @Auto 10.02.2010 15:50:35.000

Jump to Difference: Previous Next Go Back

Ahhoz, hogy használhassuk a **Footprint Similarity** plugint, először be töltjük azt a két .mxml állományt, amelyeket össze akarunk hasonlítani.

A betöltés után számos információt azonnal megtudhatunk a logok tartalmáról.

The screenshot shows the ProM 5.2 software interface. The top window, titled 'log\_garazskapu\_hibamentes.mxml', displays a dashboard with the following data:

Key data	
Processes	1
Cases	1
Events	9

The 'Events per case' chart shows a single bar with a value of 9. The 'Log info' panel indicates the source is 'MXML generator', the start date is '2010-02-10 13:46:25', and the end date is '2010-02-10 13:50:35'.

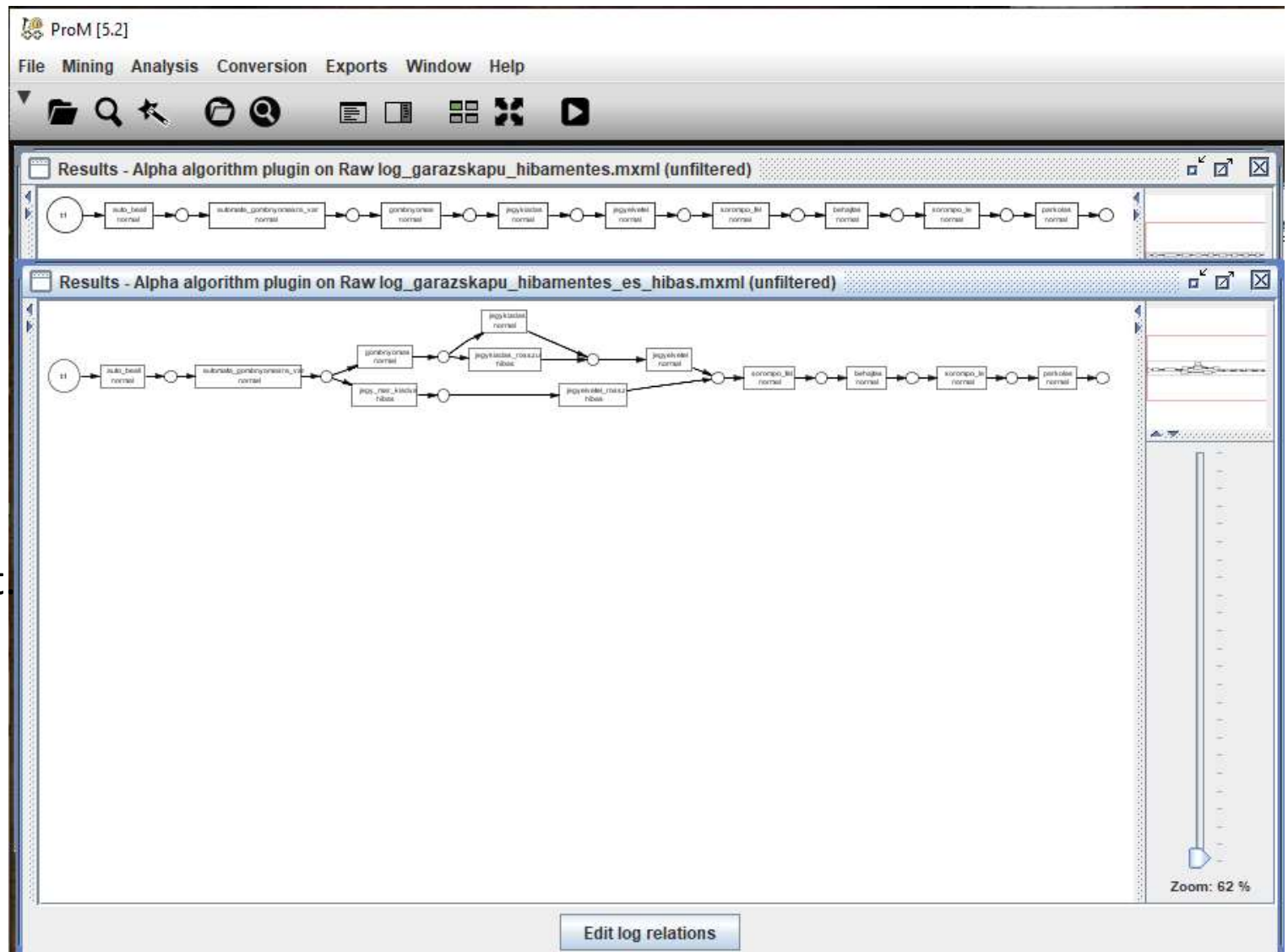
The bottom window, titled 'log\_garazskapu\_hibamentes\_es\_hibas.mxml (2)', displays a dashboard with the following data:

Key data	
Processes	1
Cases	3
Events	26
Event classes	12
Event types	2
Originators	2

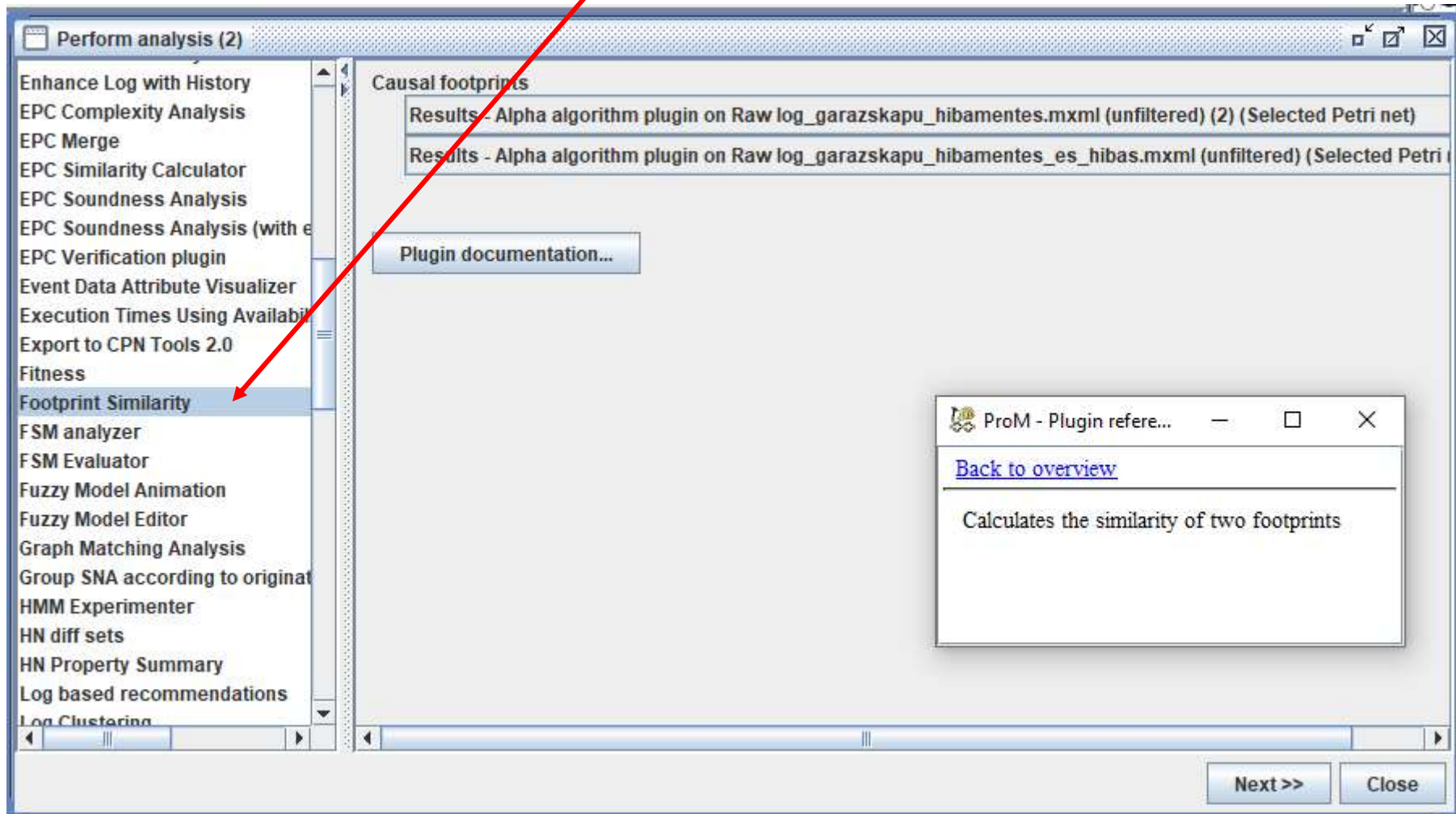
The 'Events per case' chart shows three bars with a mean value of 8. The 'Event classes per case' chart shows three bars with a mean value of 8. The 'Log info' panel indicates the source is 'MXML generator', the start date is '2010-02-10 13:46:25', the end date is '2010-02-10 15:50:35', and the description is 'Created by manual, using an existing Petri net'. A button labeled 'start analyzing this log' is visible at the bottom right.



Ahhoz, hogy használhassuk a **Footprint Similarity** plugint, másodszor mindkét .mxml állományon lefuttatjuk az Alpha algoritmust. Ezt elérhetjük a **Mining** menü keresztül **Alpha algorithm plugin** néven.



A Footprint Similarity algoritmust az **Analysis** menü keresztül a **More Analysis** csoportban érhetjük el



# Eredmény a két modell összehasonlítása után

The screenshot displays the 'Footprint Similarity' application window. On the left, 'modell 1' is shown with a simple flow diagram. On the right, 'modell 2' is shown with a more complex flow diagram. The central panel lists elements from both models for comparison:

Element from left model	Element from right model
auto_beall (normal)	auto_beall (normal)
automata_gombnyomasra_var (normal)	automata_gombnyomasra_v...
behajtas (normal)	behajtas (normal)
gombnyomas (normal)	gombnyomas (normal)
jegyelvetel (normal)	jegyelvetel (normal)
jegykiadas (normal)	jegykiadas (normal)
parkolas (normal)	parkolas (normal)
sorompo_fel (normal)	sorompo_fel (normal)
sorompo_le (normal)	sorompo_le (normal)

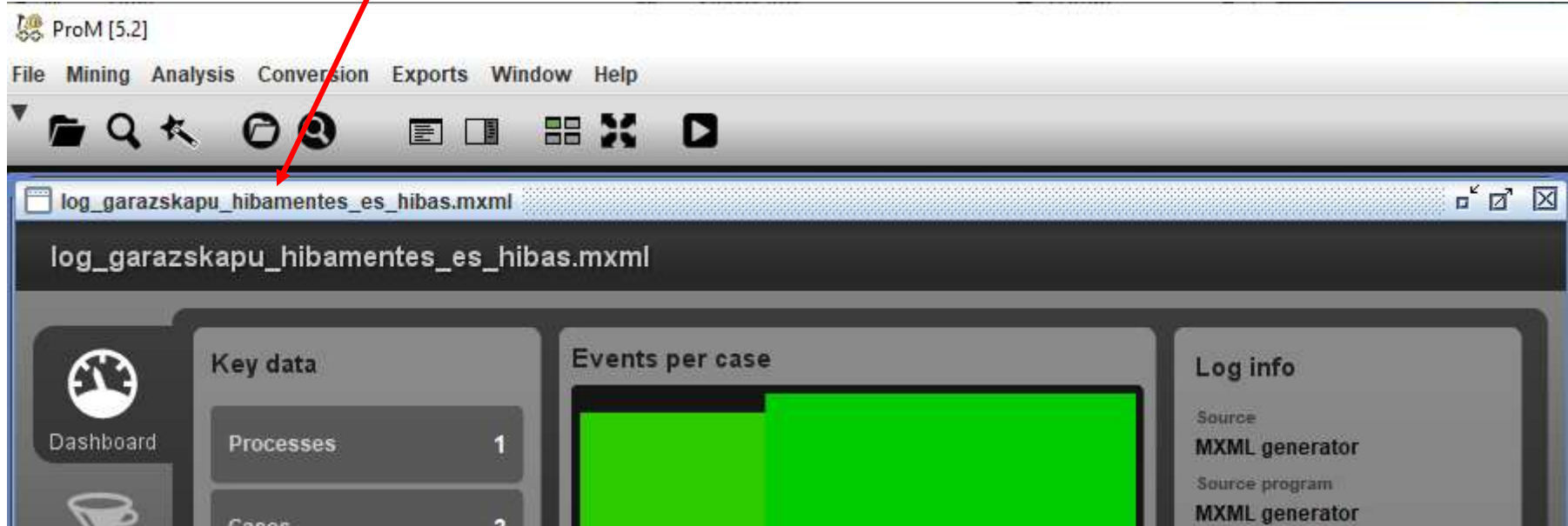
Below the list is a red-bordered button labeled 'Calculate Similarity'. To its right, the similarity percentage '58,81 %' is displayed in a green circle. A red arrow points to the button with the text 'Kattintás a gombra!'.

Zoom: 50 %

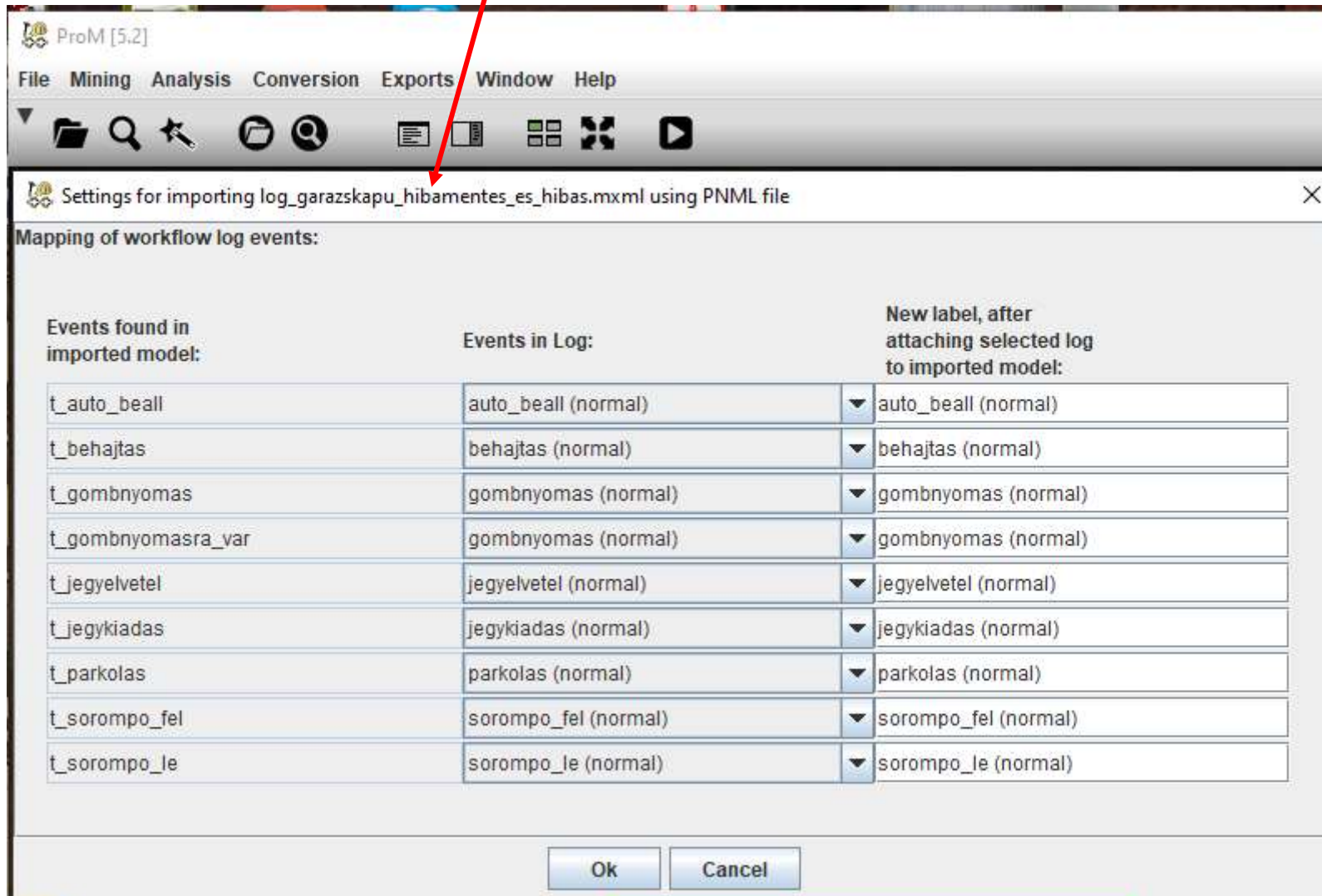


# Token alapú egyezőség vizsgálata:

Betöltöttük a .mxml fájlt



Betöltöttük a hibamentes modellt a hibás loggal  
Ehhez használjuk a **File menü Open PNML file**  
parancsát



# Nem egyezett a modell és a log, megváltoztatjuk:

Settings for importing log\_garazskapu\_hibamentes\_es\_hibas.mxml using PNML file

Mapping of workflow log events:

Events found in imported model:	Events in Log:	New label, after attaching selected log to imported model:
t_auto_beall	auto_beall (normal)	auto_beall (normal)
t_behajtas	behajtas (normal)	behajtas (normal)
t_gombnyomas	gombnyomas (normal)	gombnyomas (normal)
t_gombnyomasra_var	gombnyomas (normal)	gombnyomas (normal)
t_jegyvetel	jegyvetel (normal)	jegyvetel (normal)
t_jegykiadas	jegykiadas (normal)	jegykiadas (normal)
t_parkolas	parkolas (normal)	parkolas (normal)
t_sorompo_fel	sorompo_fel (normal)	sorompo_fel (normal)
t_sorompo_le	sorompo_le (normal)	sorompo_le (normal)

Ok Cancel

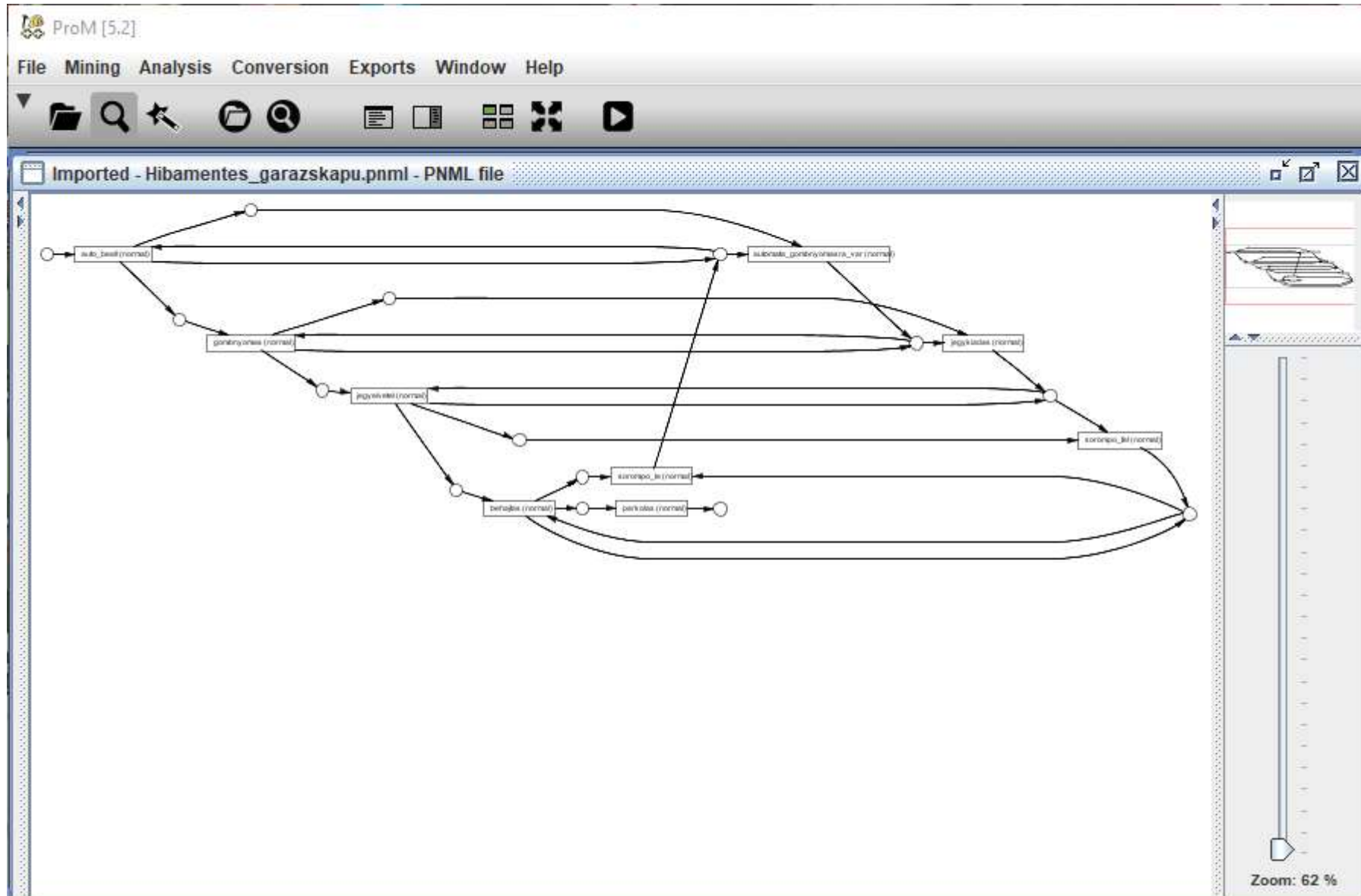
Settings for importing log\_garazskapu\_hibamentes\_es\_hibas.mxml using PNML file

Mapping of workflow log events:

Events found in imported model:	Events in Log:	New label, after attaching selected log to imported model:
t_auto_beall	auto_beall (normal)	auto_beall (normal)
t_behajtas	behajtas (normal)	behajtas (normal)
t_gombnyomas	gombnyomas (normal)	gombnyomas (normal)
t_gombnyomasra_var	automata_gombnyomasra_var (normal)	automata_gombnyomasra_var (normal)
t_jegyvetel	jegyvetel (normal)	jegyvetel (normal)
t_jegykiadas	jegykiadas (normal)	jegykiadas (normal)
t_parkolas	parkolas (normal)	parkolas (normal)
t_sorompo_fel	sorompo_fel (normal)	sorompo_fel (normal)
t_sorompo_le	sorompo_le (normal)	sorompo_le (normal)

Ok Cancel

# Modell betöltése





# Beállíthatjuk, hogy mit szeretnénk kiszámolni, látni:

ProM [5.2]

File Mining Analysis Conversion Exports Window Help

Analysis - Conformance Checker

The Conformance Checker has automatically determined the maximum search depth needed to transparently fire invisible tasks during the replay of your model (if any). In the case of computability problems, one might want to decrease the search depth to get a response (setting it to 0 will result in not searching at all). However, this is likely to yield pessimistic measurements.

Restrict search depth for invisible tasks Maximum depth:

Choose best shortest sequence of invisible tasks

Furthermore, you can choose which kind of analysis you would like to perform. The computation process may speed up if you deselect the categories (fitness, precision, structure), or specific metrics, in which you are not interested.

- Fitness** Fitness evaluates whether the observed process *complies with* the control flow specified by the process. One way to investigate the fitness is to replay the log in the Petri net. The log replay is carried out in a non-blocking way, i.e., if there are tokens missing to fire the transition in question they are created artificially and replay proceeds. While doing so, diagnostic data is collected and can be accessed afterwards.
  - f** The token-based **fitness** metric  $f$  relates the amount of missing tokens during log replay with the amount of consumed ones and the amount of remaining tokens with the produced ones. If the log could be replayed correctly, that is, there were no tokens missing nor remaining, it evaluates to 1.
  - pSE** The **successful execution** metric  $p_{SE}$  determines the fraction of successfully executed process instances (taking the number of occurrences per trace into account).
  - pPC** The **proper completion** metric  $p_{PC}$  determines the fraction of properly completed process instances (taking the number of occurrences per trace into account).
- Precision** Precision, or Behavioral Appropriateness, evaluates *how precisely* the model describes the observed process.
  - saB** The **simple behavioral appropriateness** metric  $sa_B$  is based on the mean number of enabled transitions during log replay (the greater the value the less behavior is allowed by the process model and the more precisely the behavior observed in the log is captured). Note that this metric should only be used as a comparative means for models without alternative duplicate tasks. Note further that in order to determine the mean number of enabled tasks in the presence of invisible tasks requires to build the state space from the current marking after each replay step. Since this may greatly decrease the performance of the computational process, you might want to switch this feature off.
  - aaB** The **advanced behavioral appropriateness** metric  $aa_B$  is based on successorship relations among activities with respect the event relations observed in the log (the greater the value the more precisely the behavior observed in the log is captured).
- Structure** Structural Appropriateness evaluates whether the model describes the observed process in a *structurally suitable way*.
  - saS** The **simple structural appropriateness** metric  $sa_S$  is a simple metric based on the graph size of the model (the greater the value the more compact is the model). Note that this metric should only be used as a comparative means for models allowing for the same amount of behavior.
  - aaS** The **advanced structural appropriateness** metric  $aa_S$  is based on the detection of redundant invisible tasks (simply superfluous) and alternative duplicate tasks (list alternative behavior rather than expressing it in a meaningful way).

Help... Start Analysis

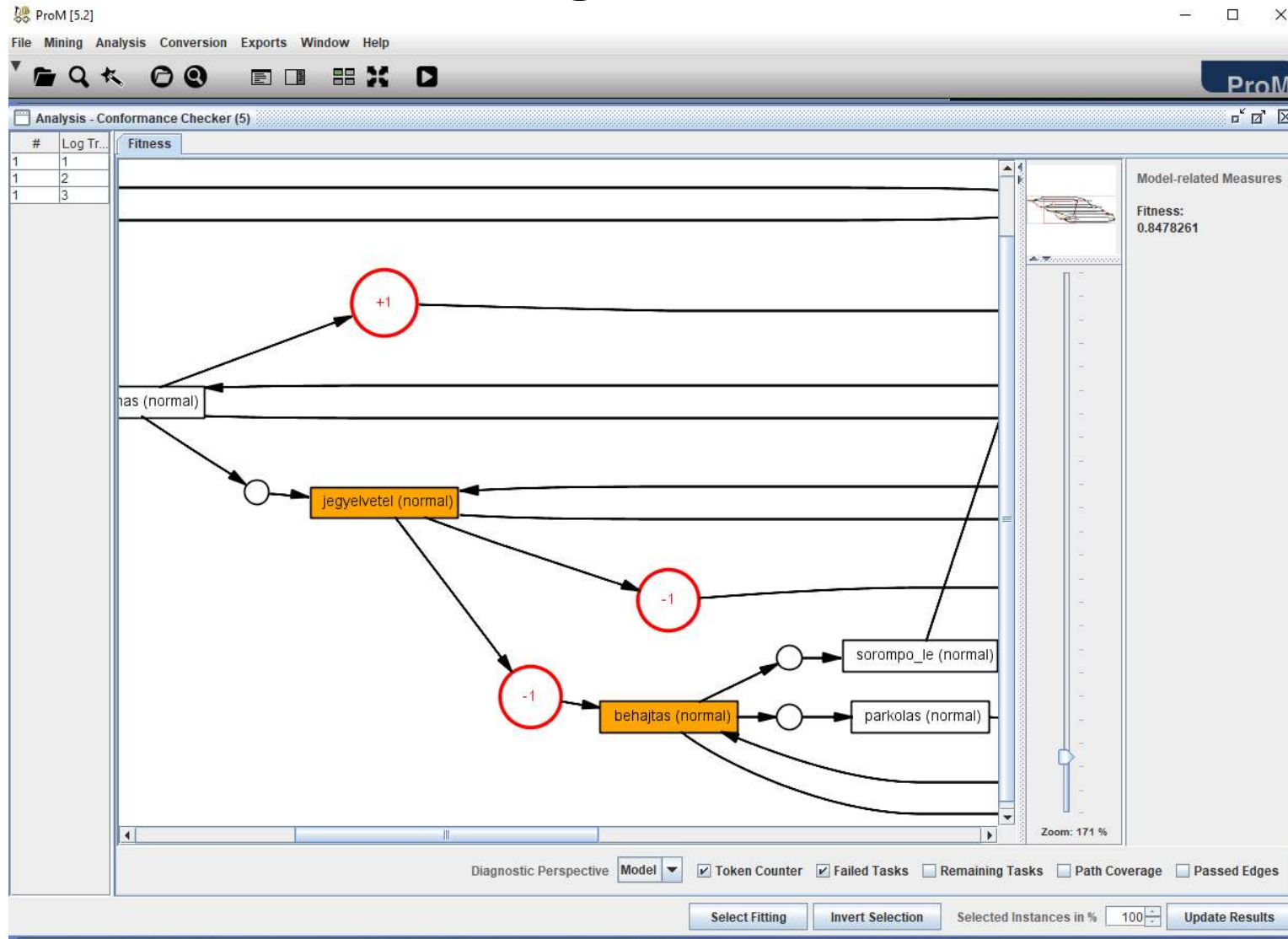
# Az összehasonlítás eredménye:

The screenshot displays the ProM [5.2] software interface for a Petri net analysis. The main window is titled 'Analysis - Conformance Checker (5)'. On the left, there is a table with the following data:

#	Log Tr...
1	1
1	2
1	3

The central area shows a Petri net diagram with several transitions (rectangles) and places (circles). Some transitions are highlighted in orange, and some places are highlighted in red. The 'Fitness' tab is selected. On the right side, the 'Model-related Measures' panel displays 'Fitness: 0.8478261', which is circled in red. Below this panel is a vertical slider and the text 'Zoom: 63 %'. At the bottom of the interface, there is a diagnostic perspective section with a dropdown menu set to 'Model' and several checked options: 'Token Counter', 'Failed Tasks', 'Remaining Tasks', 'Path Coverage', and 'Passed Edges'. There are also buttons for 'Select Fitting', 'Invert Selection', and 'Update Results', along with a 'Selected Instances in %' field set to 100.

Megtekinthetjük, hogy hol volt hiányzó token, hol keletkezett megmaradt token:





Egy másik példa, ami betölthető a ProM 6.9-be: Lfull.mxml betöltése

The screenshot shows the ProM 6.9 software interface. The title bar reads 'ProM UITopia'. The main window has a 'Workspace' header with an 'import...' button. On the left, there are navigation buttons: 'All', 'Favorites', 'Imported', and 'Selection'. The central workspace shows a resource named 'L-conf XLog' with a star icon and a play button. A red arrow points from the text above to this resource. A tooltip on the right displays the log content, which is a list of cases and their associated letters.

455x Case1 a c d e h  
191x Case2 a b d e g  
177x Case3 a d c e h  
144x Case4 a b d e h  
111x Case5 a c d e g  
82x Case6 a d c e g  
56x Case7 a d b e h  
47x Case8 a c d e f d b e h  
38x Case9 a d b e g  
33x Case10 a c d e f b d e h  
14x Case11 a c d e f b d e g  
11x Case12 a c d e f d b e g  
9x Case13 a d c e f c d e h  
8x Case14 a d c e f d b e h  
5x Case15 a d c e f b d e g  
3x Case16 a c d e f b d e f d b e g  
2x Case17 a d c e f d b e g  
2x Case18 a d c e f b d e f b d e g  
1x Case19 a d c e f d b e f b d e h  
1x Case20 a d b e f b d e f d b e g  
1x Case21 a d c e f d b e f c d e f d b e g

Ez a log tartalma

# N1.tpn vagy N2.tpn betöltése

ProM UI Topia

ProM

Workspace

import...

sort by [refresh] [play] [stop] ABC

- All
- Favorites
- Imported
- Selection

N1.tpn  
Petri net

L-conf  
XLog

L-conf  
XLog  
created about a mi...  
imported

Show parents

Show children

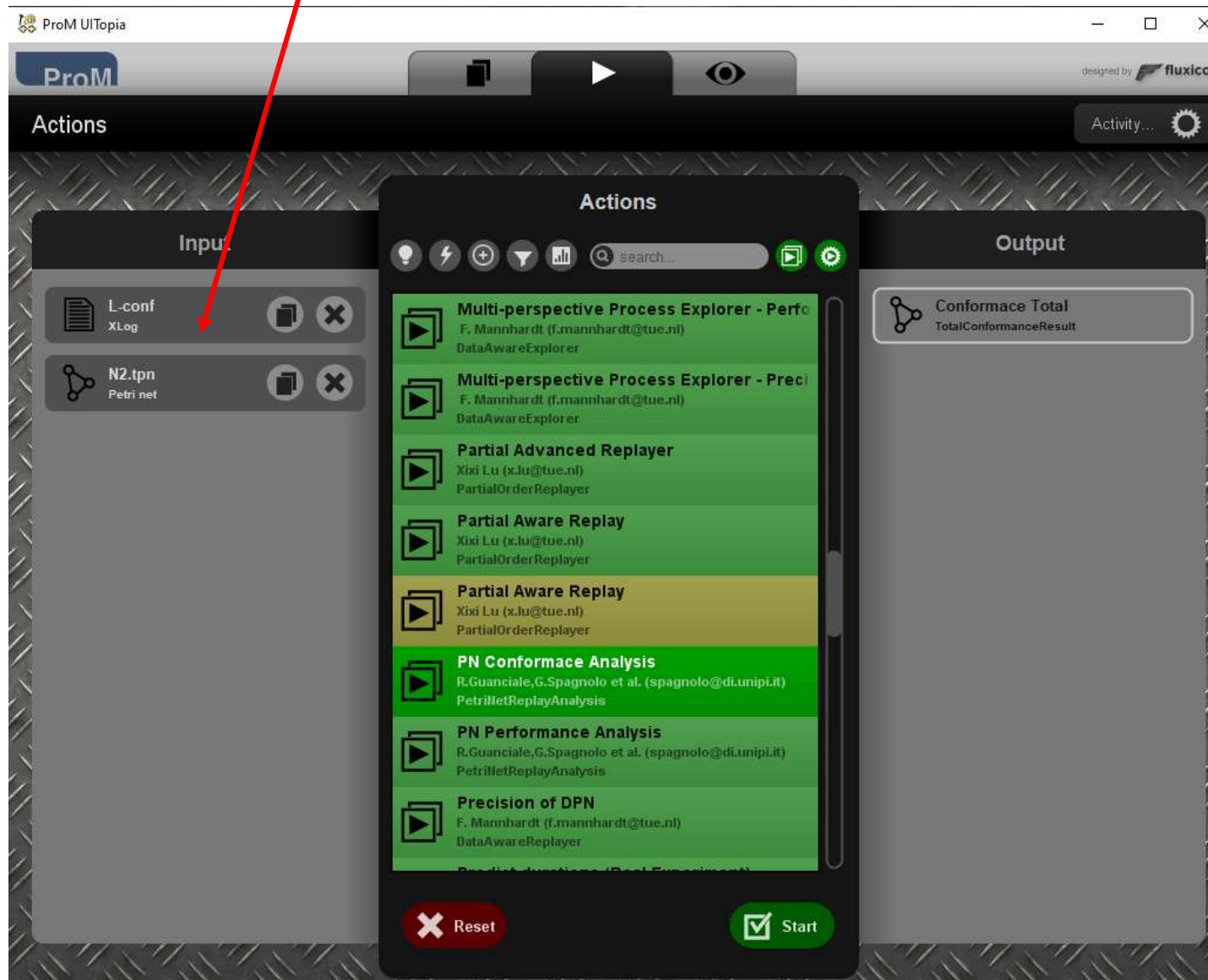
Rename resource

Export to disk

```
place "start" init 1;
place "p1";
place "p2";
place "p3";
place "p4";
place "end";
trans "a"~"a\ncomplete" in "start" out "p1";
trans "b"~"b\ncomplete" in "p1" out "p2" ;
trans "c"~"c\ncomplete" in "p1" out "p2" ;
trans "d"~"d\ncomplete" in "p2" out "p3" ;
trans "e"~"e\ncomplete" in "p3" out "p4" ;
trans "f"~"f\ncomplete" in "p4" out "p1" ;
trans "g"~"g\ncomplete" in "p4" out "end" ;
trans "h"~"h\ncomplete" in "p4" out "end" ;
```

Ez a modell felépítése

Ha mind a két fájl betöltésre került, akkor a **PN Conformance Analysis** plugint használhatjuk



Eredmények:  
f=0,87  
d 443 trace-nél

```
place "start" init 1;  
place "p1";  
place "p2";  
place "p3";  
place "p4";  
place "end";  
trans "a~"a\ncomplete" in "start" out "p1";  
trans "b~"b\ncomplete" in "p1" out "p2" ;  
trans "c~"c\ncomplete" in "p1" out "p2" ;  
trans "d~"d\ncomplete" in "p2" out "p3" ;  
trans "e~"e\ncomplete" in "p3" out "p4" ;  
trans "f~"f\ncomplete" in "p4" out "p1" ;  
trans "g~"g\ncomplete" in "p4" out "end" ;  
trans "h~"h\ncomplete" in "p4" out "end" ;
```

