Dutch Environmental Permit Application Process: CoSeLoG

bdanalytics

Contents

Date: (Tue) Dec 16, 2014

Data: Originates from the CoSeLoG project executed under NWO project number 638.001.211. Within the CoSeLoG project the (dis)similarities between several processes of different municipalities in the Netherlands has been investigated. This event log contains the records of the execution of the receiving phase of the building permit application process in an anonymous municipality.

Source: http://data.3tu.nl/repository/uuid:a07386a5-7be3-4367-9535-70bc9e77dbe6

Time period: 2010-10-02 to 2012-01-23

0.0.1 Synopsis:

1. Normative Model Enhancements 1.1 Rename transitions / tasks / activities to highlight nature of activity rather than working on a "receipt". 1.2 "silent" transitions required ? 1.3. Inspect positive & negative deviants 1.4. Add guards to decision points

2. Bottleneck improvements

3. Resource alloaction / utilization

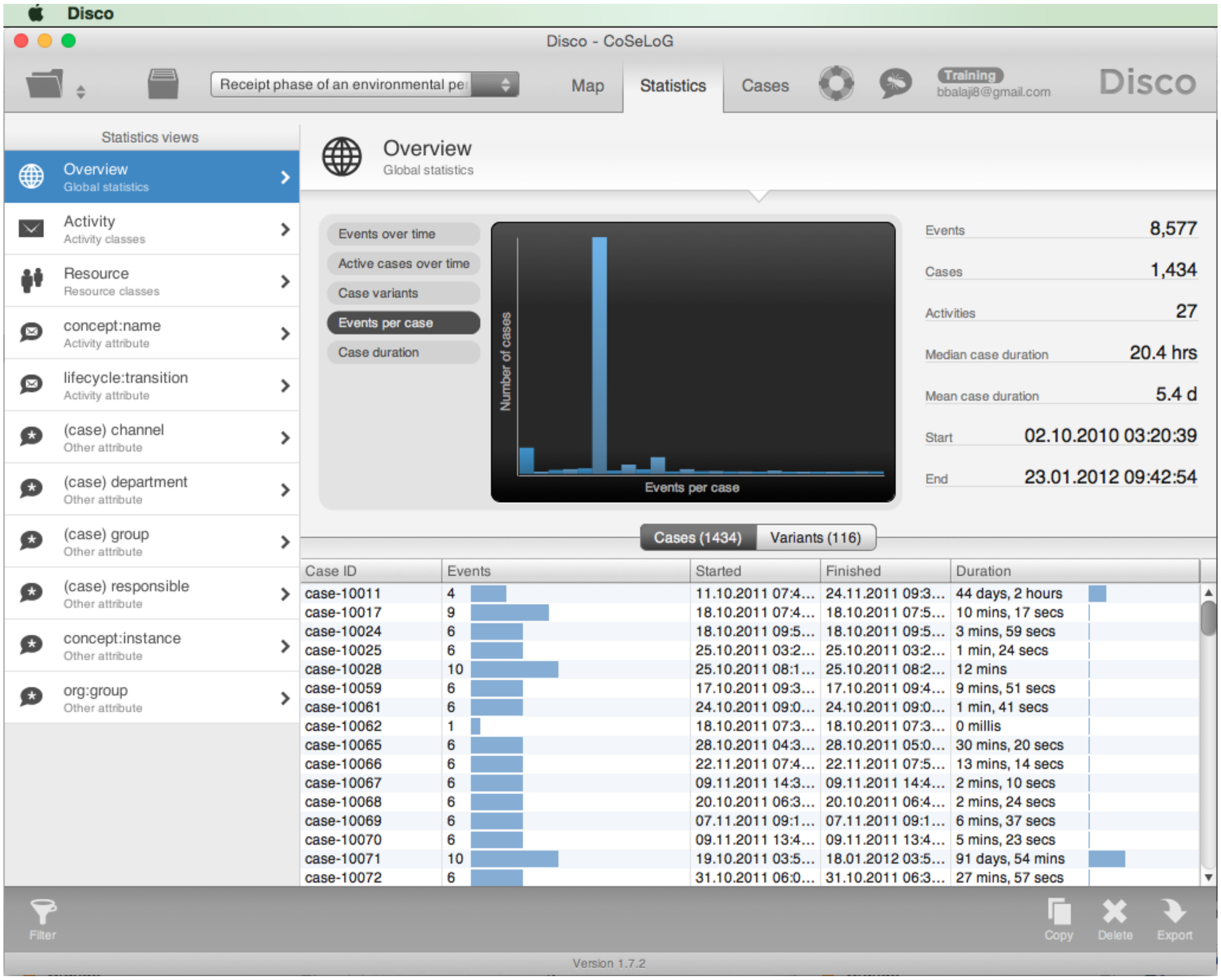
0.0.1.1 Potential next steps include:

1. Step 05: Add conformance fitness (filtered vs. unfiltered log) to Petri net selection criteria
2. Step 05: Add place names to discovered Petri nets.

0.0.2 Step 01: import event log in Disco

Approach I used:
1. Import the event log into Disco.
2. Switch to "Statistics" tab / view
3. Click on "Overview" button in the left pane under "Statistics views"
4. Click on "Events per case" button to the left of the graph

What I saw:



Events 8,577
Cases 1,434
Activities 27
Median case duration 20.4 hrs
Mean case duration 5.4 d
Start 02.10.2010 03:20:39
End 23.01.2012 09:42:54

Case ID	Events	Started	Finished	Duration
case-10011	4	11.10.2011 07:4...	24.11.2011 09:3...	44 days, 2 hours
case-10017	9	18.10.2011 07:4...	18.10.2011 07:5...	10 mins, 17 secs
case-10024	6	18.10.2011 09:5...	18.10.2011 09:5...	3 mins, 59 secs
case-10025	6	25.10.2011 03:2...	25.10.2011 03:2...	1 min, 24 secs
case-10028	10	25.10.2011 08:1...	25.10.2011 08:2...	12 mins
case-10059	6	17.10.2011 09:3...	17.10.2011 09:4...	9 mins, 51 secs
case-10061	6	24.10.2011 09:0...	24.10.2011 09:0...	1 min, 41 secs
case-10062	1	18.10.2011 07:3...	18.10.2011 07:3...	0 millis
case-10065	6	28.10.2011 04:3...	28.10.2011 05:0...	30 mins, 20 secs
case-10066	6	22.11.2011 07:4...	22.11.2011 07:5...	13 mins, 14 secs
case-10067	6	09.11.2011 14:3...	09.11.2011 14:4...	2 mins, 10 secs
case-10068	6	20.10.2011 06:3...	20.10.2011 06:4...	2 mins, 24 secs
case-10069	6	07.11.2011 09:1...	07.11.2011 09:1...	6 mins, 37 secs
case-10070	6	09.11.2011 13:4...	09.11.2011 13:4...	5 mins, 23 secs
case-10071	10	19.10.2011 03:5...	18.01.2012 03:5...	91 days, 54 mins
case-10072	6	31.10.2011 06:0...	31.10.2011 06:3...	27 mins, 57 secs

The graph pane displays a histogram (Number of cases) of Events per case in this event log. The event log contains 8,577 events in 1,434 cases with 27 activities.

My analysis:
There are 6 events on average per case. This information can be gathered by hovering the mouse on the tallest bar.

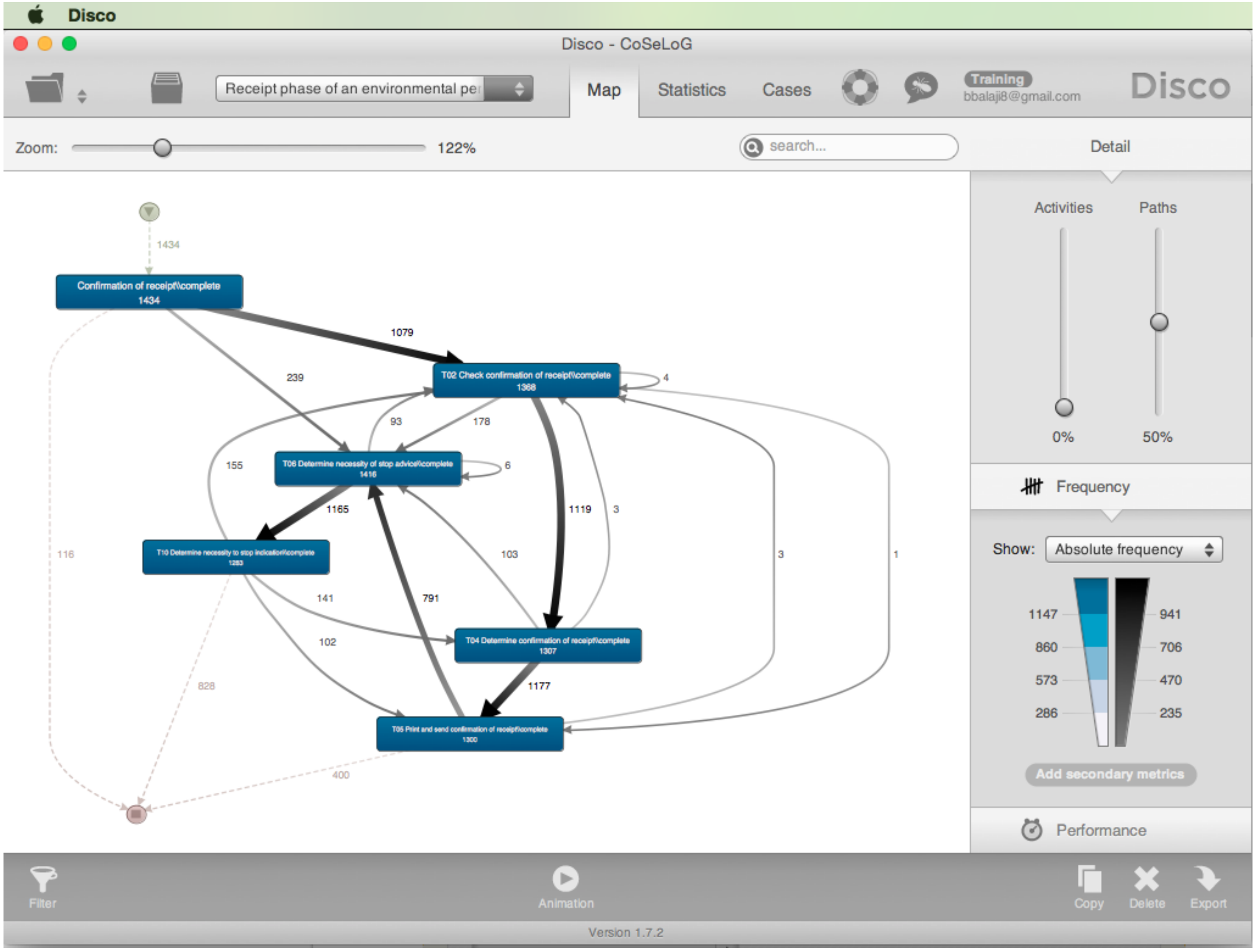
By clicking on "Variants" button on top of the table, we can see that there are only 116 variants amongst the 1,434 cases.

The main observation from the 'Events over time' graph is that the maximum number of events (33) occured on May 2, 2011 across cases.

0.0.3 Step 02: inspect process map in Disco

Approach I used:
1. Click on "Map" tab in the window header.
2. Set "Activities" slider to 0% & "Paths" slider to 50% to make the process map fit on one screen and still be readable.

What I saw:



Receipt phase of an environmental pe

Zoom: 122%

Activities: 0%

Paths: 50%

Show: Absolute frequency

My analysis:

The 6 most frequent activities between the initiation and termination of cases in the process map include:
A. Confirmation of receipt
B. T02 Check confirmation of receipt
C. T04 Determine confirmation of receipt
D. T05 Print and send confirmation of receipt
E. T06 Determine necessity of stop advice
F. T10 Determine necessity to stop indication

The most frequent activity paths traced by the cases include (this is supposed to display as a table, but doesn't work properly) :

`Activity Path | # of Cases`

|

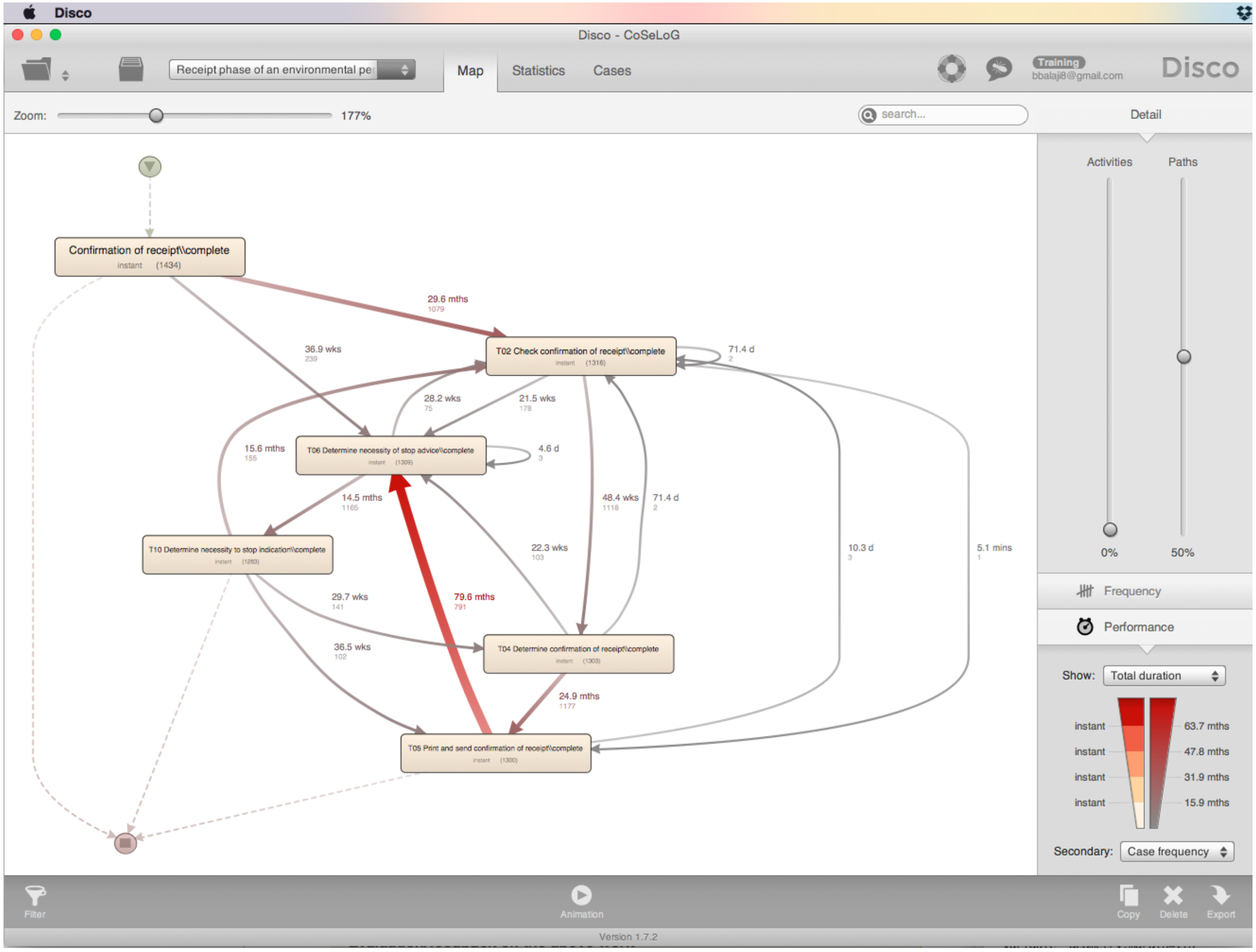
Start -> TA -> End | 116
Start -> TA -> T02 -> T04 -> T05 -> End | 400
Start -> TA -> T02 -> T04 -> T05 -> T06 -> T10 -> End | 828
|
Total cases displayed in this map | 1,344
Total cases | 1,434
% cases displayed in this map | 94%

There are 4 activities (TA, T02, T04 & T05) regarding confirmation of receipts. Maybe these activities are not named appropriately ?

0.0.4 Step 03: inspect process performance in Disco

Approach I used:
1. Click on “Performance” bar / button in the “Detail” pane (right above the “Copy” / “Delete” / “Export” icons).
2. Select “Total Duration” in the “Performance” pane to display.
3. Select “Case frequency” as the secondary metric in the “Performance” pane to ensure that we don’t use outliers (e.g. low case frequency) to make broad conclusions about the process.
4. Cycle through different metrics in the button next to “Show:” in the Performance pane.

What I saw:



Show: Total duration

Secondary: Case frequency

The color & thickness of the arcs are based on the distribution of the selected primary performance metric. Additionally, if an arc is clicked, a statistics window is dsiplayed for that arc.

My analysis:
Total Duration: The arc from T05 to T06 takes 79.6 months for 791 cases (31% of total duration of all cases which is 258.12 months: mean of 5.4 days per case X 1,434 cases / 30 elapsed days per month). The next bottleneck seems to be TA -> T02 which is 29.6 months for 1,079 cases.

Analysis of other metrics (median, mean & max duration) highlighted arcs with very low case frequency.

0.0.5 Step 04: inspect event log in ProM

Approach I used:

1. Click on “import. . . ” icon on the upper right hand side of the “Workspace” pane.

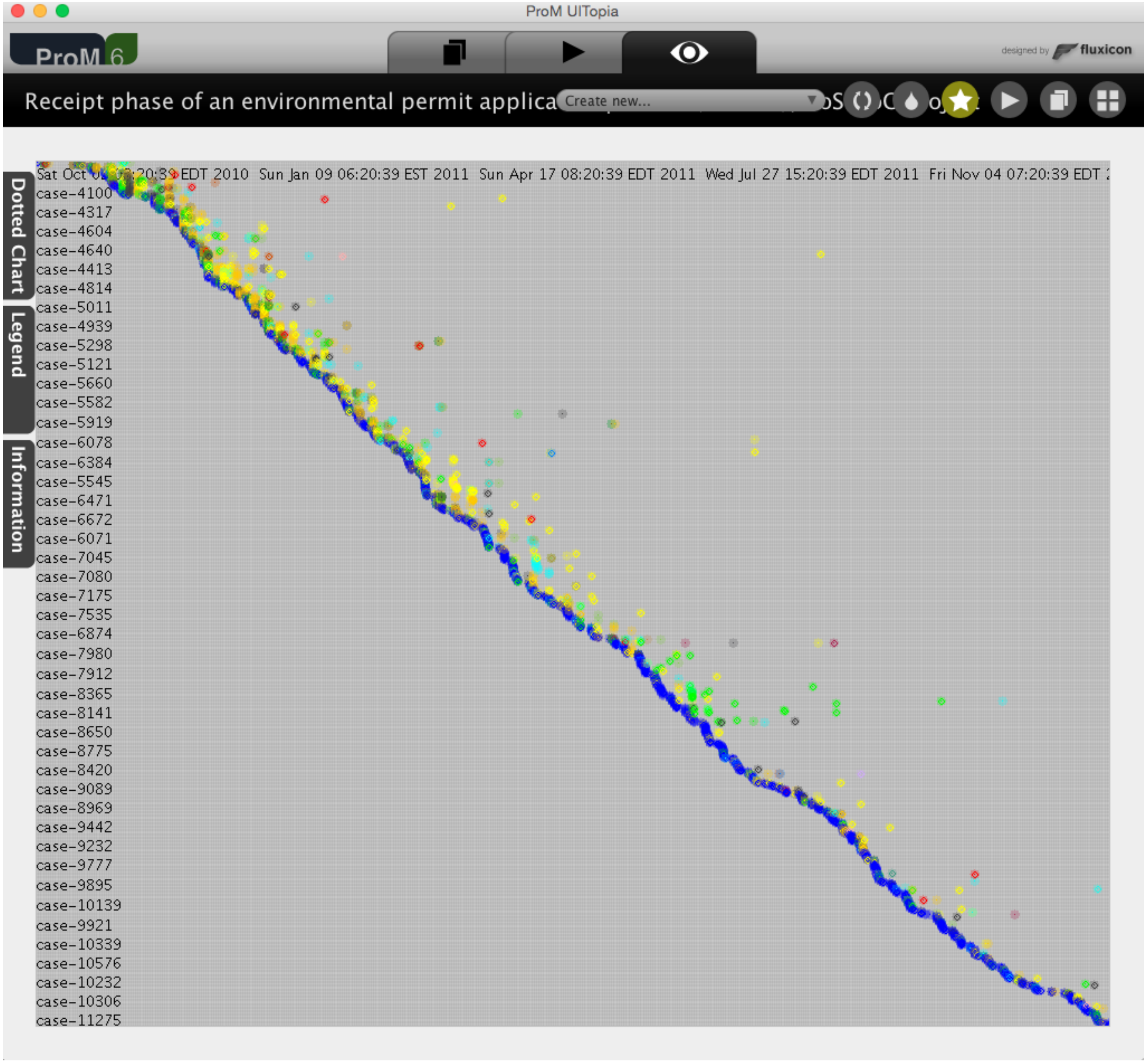
2. Click on eye icon (the one associated with the log in the middle; NOT the top one).

3. Click on “Create new. . . ” droplist in the top center of the window.

4. Select “XDotted Chart” by scrolling down the list.
5. Select “Dotted Chart” tab on the left.
6. Select “Occurence of first event” from the droplist for “Case order:” option.

7. Click on “Apply Settings” button.

What I saw:



Events for each case are plotted across time and color-coded. Did not see the ‘size shows # of events’-option. Zooming in does not make the timeline any more readable / discernible (e.g. do events initiate on weekends ?)

My analysis:
The arrival of the new cases is fairly constant evidenced by the -45 degree slope of the (approx) line of blue dots. There are some minor fluctuations which is difficult to quantify (clicking on the dots does not display any additional information).

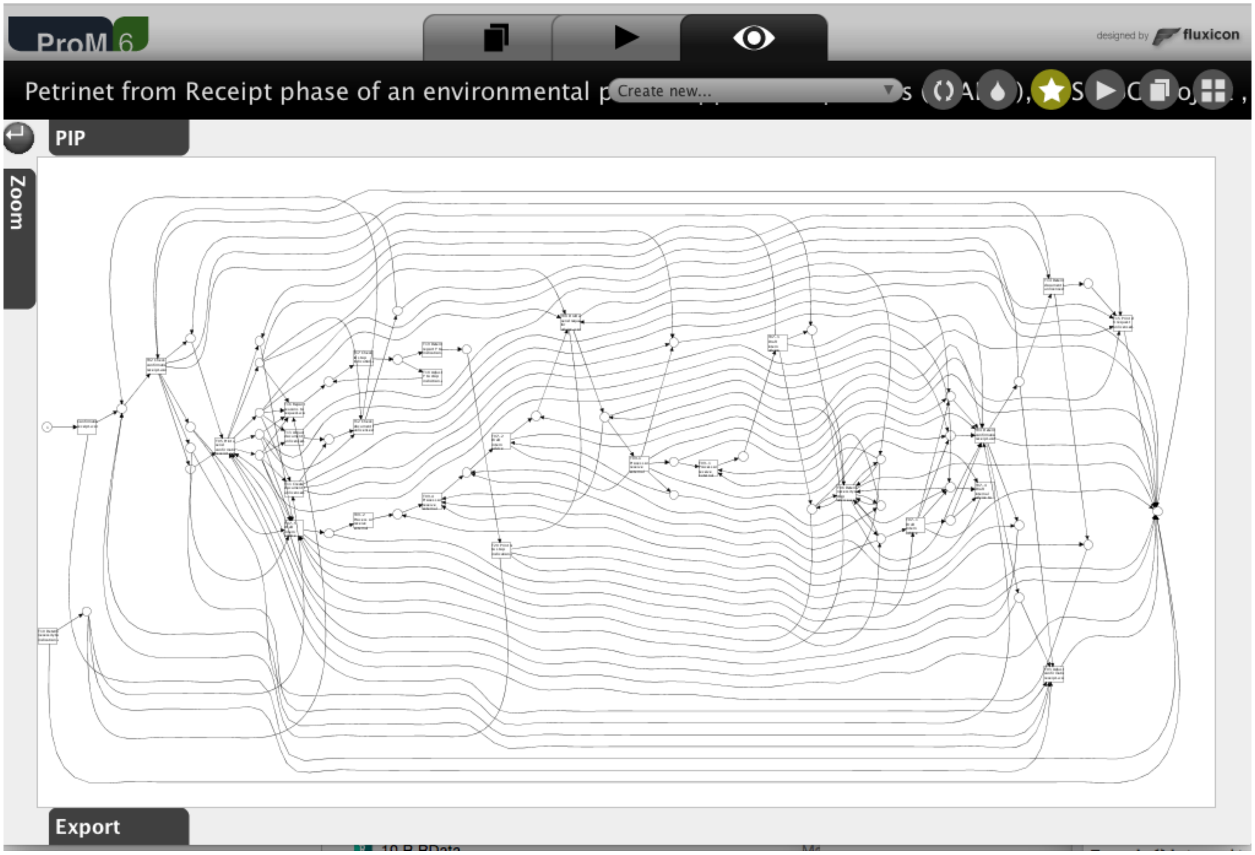
For the more recent cases there are a lot less events / activities occuring close to case initiation compared to the earlier cases.

0.0.6 Step 05: discover Petri net in Disco

Approach I used:

1. Click on "Actions" icon.
2. Add imported event log to "Input".
3. Search for "Alpha" plug-in.
4. Select "Mine for a Petri Net using Alpha-algorithm".
5. Click on "Start" button.

What I saw:



This is clearly difficult to work with. Let's filter the event log to make it more comprehensible.

Approach I used:

6. Click on “Actions” icon.

7. Search for “Filter Log”.

8. Select “Filter Log using Simple Heuristics”.

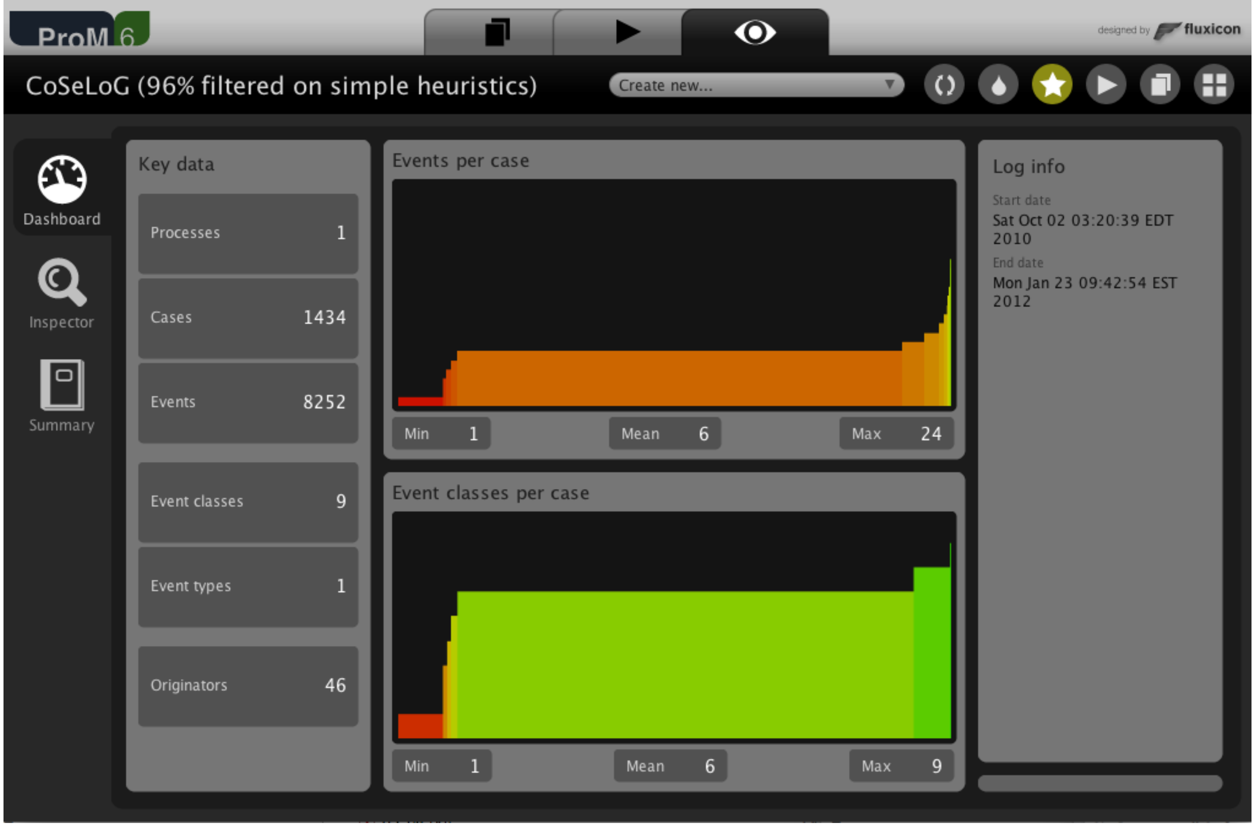
9. Click on “Start” button.
10. Change Log name to “CoSeLoG (filtered on simple heuristics)”.

11. Click on “Next” button.
12. Select “Select top percentage” to 100% because there is only 1 Start event.
13. Click on “Next” button.
14. Select “Select top percentage” to 100% because ideally keeping all End events would be critical in understanding the process.

15. Click on “Next” button.
16. Select “Select top percentage” to 96% because this Event filter criterion discards many events and therefore many arcs in the resulting Petri net.
17. Change Log name to “CoSeLoG (96% filtered on simple heuristics)”.

18. Click on “Finish” button.

What I saw:



CoSeLoG (96% filtered on simple heuristics)

Key data

Processes	1
Cases	1434
Events	8252
Event classes	9
Event types	1
Originators	46

Events per case

Min 1 Mean 6 Max 24

Event classes per case

Min 1 Mean 6 Max 9

Log info

Start date
Sat Oct 02 03:20:39 EDT 2010

End date
Mon Jan 23 09:42:54 EST 2012

The number of Event classes has gone down from 27 to 9. The number of Events has reduced from 8,577 to 8,252 but number of Cases remain the same.

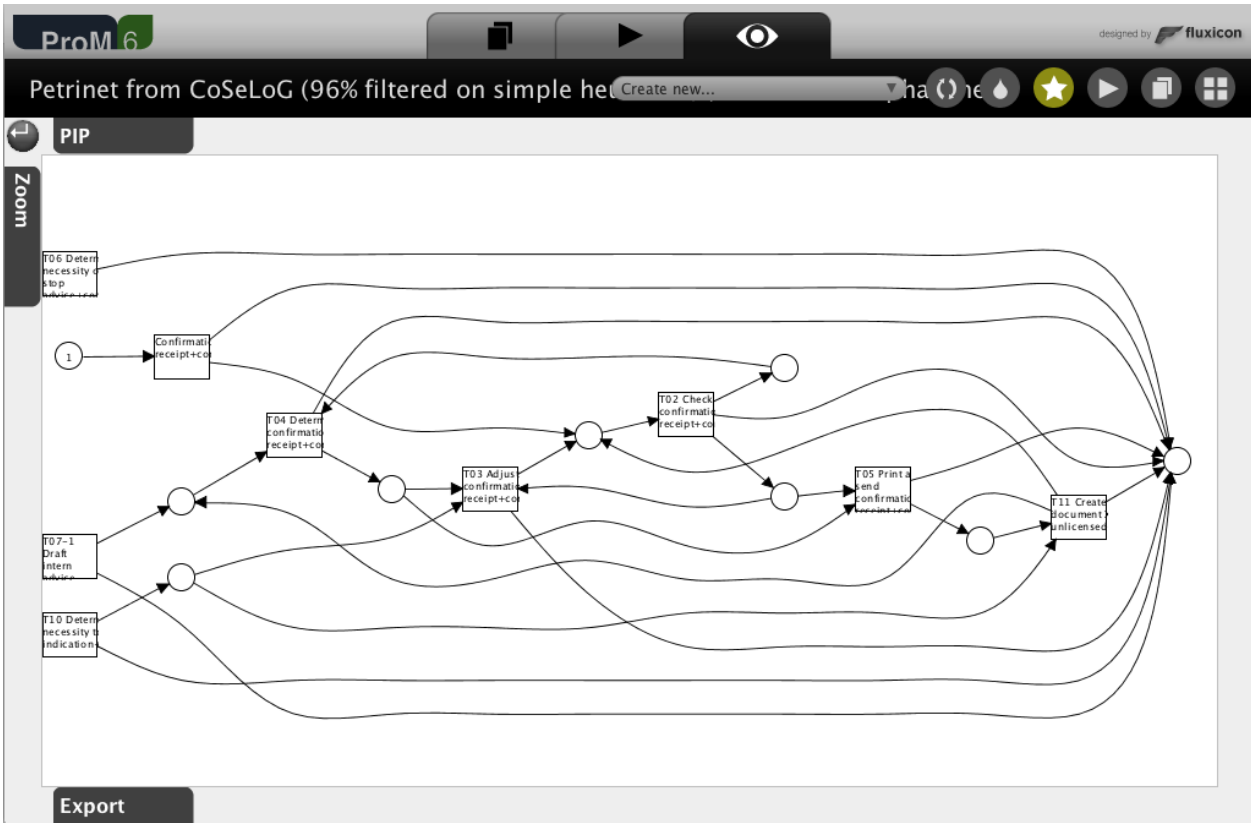
Approach I used:

19. Click on “Workspace” icon.
20. Select “CoSeLoG (filtered. . . ”.

21. Click on “Actions” icon.

22. Repeat tasks numbered 1-5 listed earlier in this Step. For task 2, select “CoSeLoG (96% filtered. . .)” log to “Input”.

What I saw:



Petrinet from CoSeLoG (96% filtered on simple he

ProM 6
designed by fluxicon
Create new...
PIP
Zoom
Export
T06 Determ necessity o stop
1
Confirmati receipt+co
T04 Determ confirmatio receipt+co
T02 Check confirmatio receipt+co
T03 Adjust confirmatio receipt+co
T05 Print a send confirmatio
T11 Create document unlicensed
T07-1 Draft intern
T10 Determ necessity t indication

The Alpha algorithm has discovered 9 transactions & 9 places. However, transactions T06, T07-1 & T10 are not integrated well into the rest of the control-flow.

Approach I used:

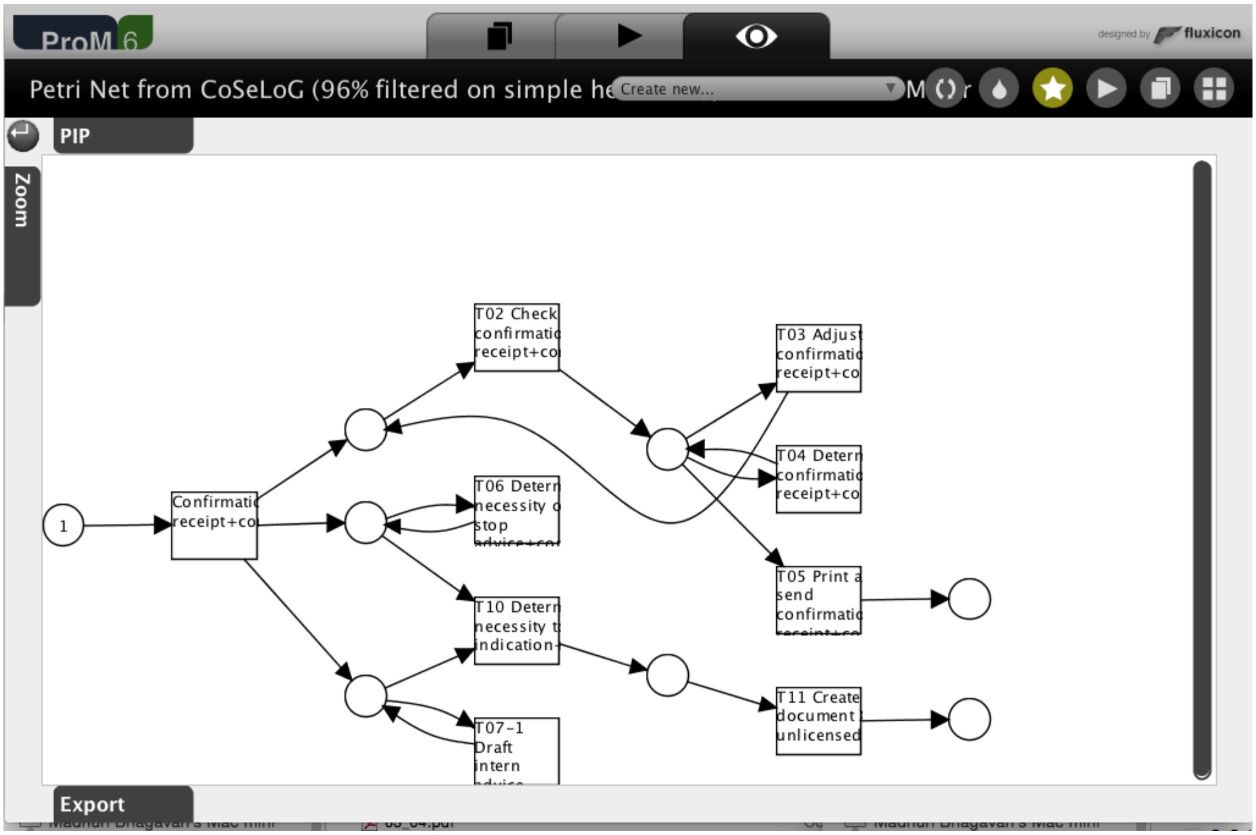
23. Click on “Actions” icon.

24. Add “CoSeLoG (96% filtered. . .)” log to “Input”.

25. Search for “ILP” plug-in.

26. Select “Mine for a Petri Net using ILP”.
27. Click on “Start” button.
28. Select the “Number of places” option to “Before & After Transition” instead of “Per Causal Dependency” to ensure clear “End” states & minimize number of arcs.
29. Click “Finish” button.

What I saw:


ProM 6
designed by fluxicon
Petri Net from CoSeLoG (96% filtered on simple he
Create new...
PIP
Zoom
Export
1
Confirmati receipt+co
T02 Check confirmati receipt+co
T03 Adjust confirmati receipt+co
T04 Detern confirmati receipt+co
T05 Print a send confirmati
T06 Detern necessity o stop
T10 Detern necessity t indication
T11 Create document unlicensed
T07-1 Draft intern

The ILP algorithm has discovered 9 transactions & 8 places. Additionally, the ILP Petri net handles transactions T06, T07-1 & T10 better by not isolating them from the control-flow.

Approach I used:

30. Click on “Actions” icon.

31. Add “CoSeLoG (96% filtered. . .)” log to “Input”.

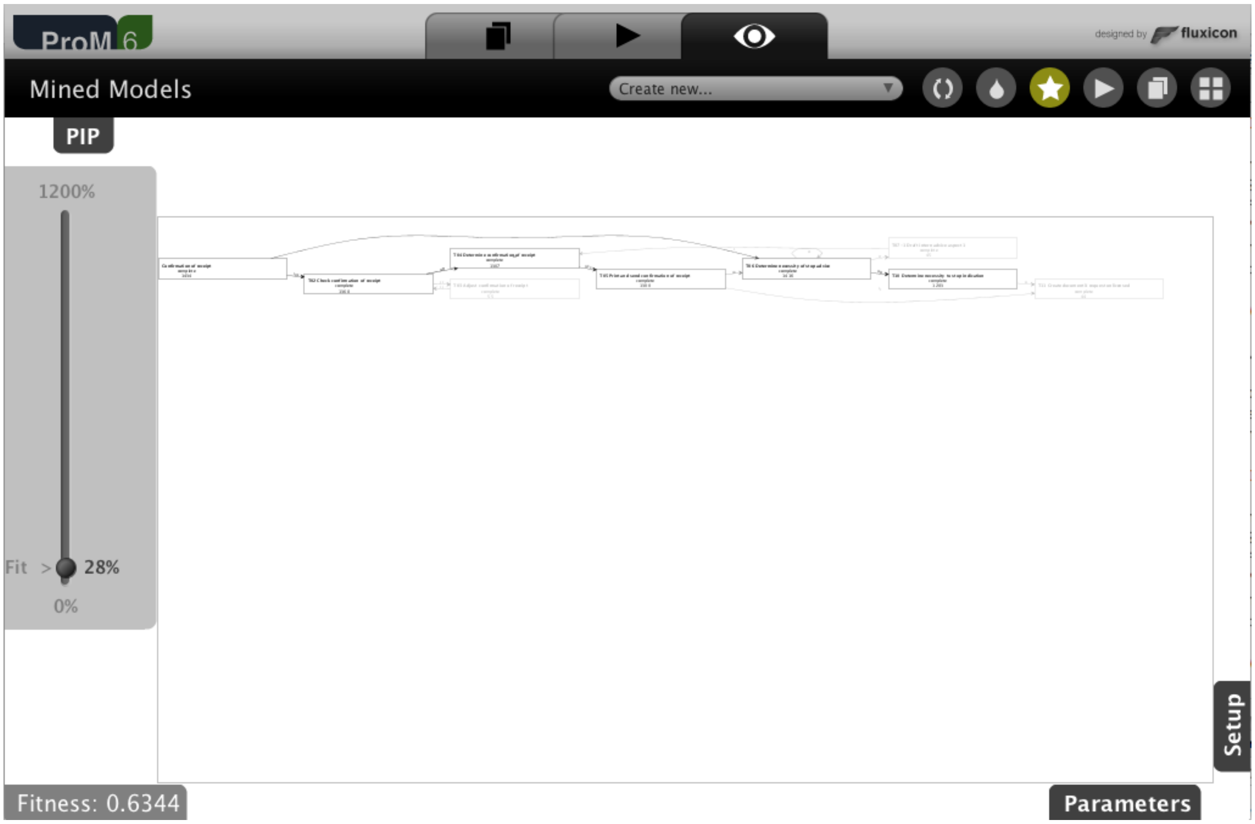
32. Search for “Heuristics” plug-in.

33. Select “Mine for a Heuristics Net using Heuristics Miner”.
34. Click on “Start” button.
35. Select the default options and Click “Continue” button.
36. Click on “Zoom” button to the left of the graphic.

37. Select zoom level next to “Fit >” on the slider to view the net in its entirety.
38. Capture screen image.

39. Select zoom level to 50% to make the net more readable.

What I saw:



9 transactions are discovered with a fitness score of 0.63 but T03, T07-1 & T11 are grayed out due to low case frequency (<= 55).

Approach I used:

40. Click on “Workspace” icon.

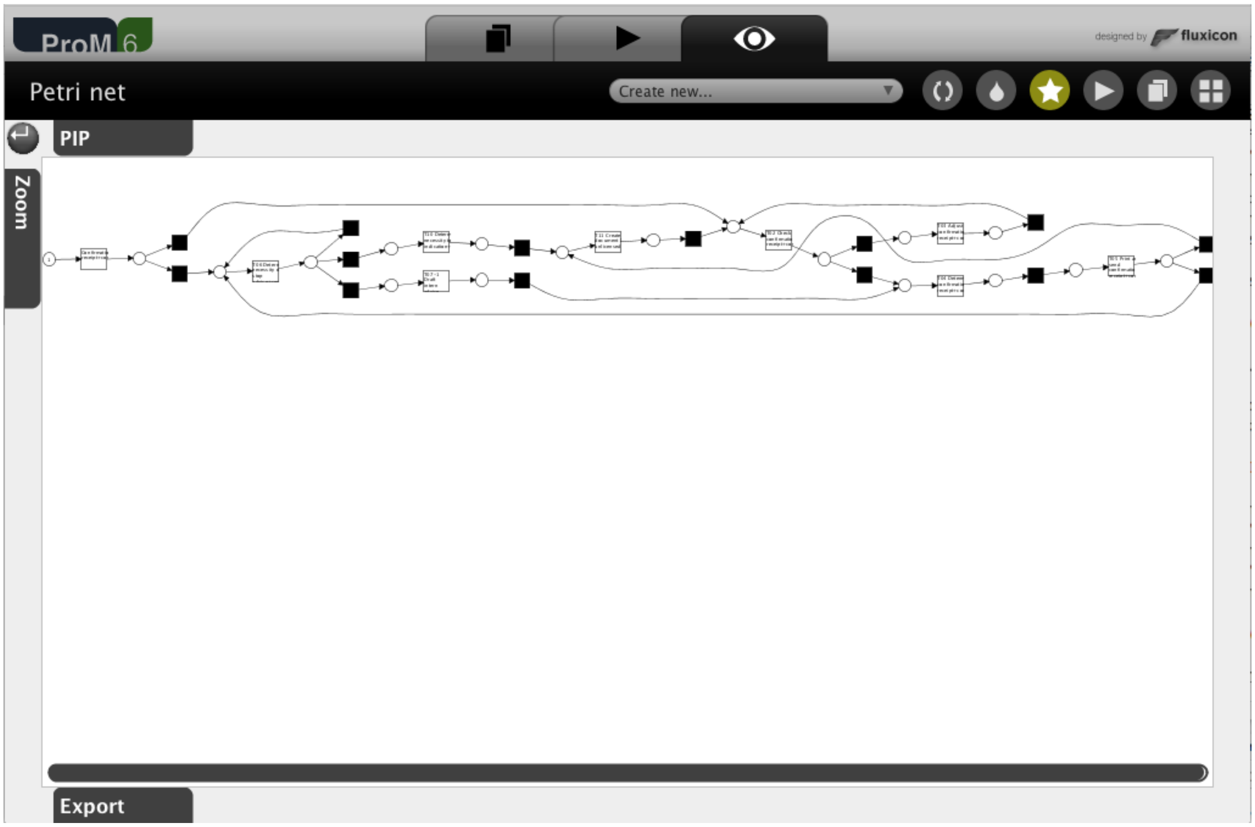
41. Select “Mined Models” of type “HeuristicsNet”.

42. Click on “Actions” icon.

43. Select “Convert Heuristics net into Petri net” plug-in.

44. Click on “Start” button.

What I saw:



This approach has discovered 9 transactions again, 14 “hidden” / “silent” transactions and 18 places. However, there does not seem to be a clear “End” place.

Approach I used:

45. Click on “Workspace” icon.

46. Select “CoSeLoG (96% filtered. . .)” log.

47. Click on “Actions” icon.

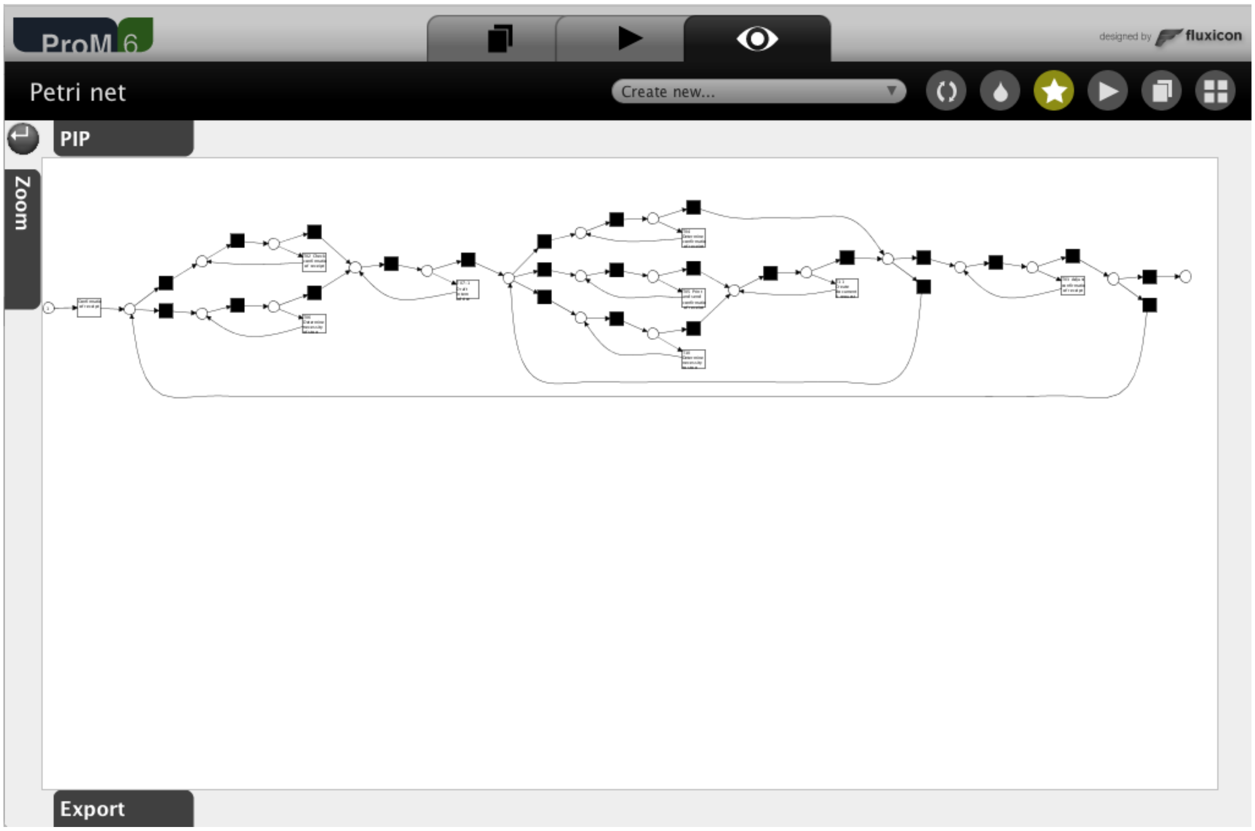
48. Search for “Inductive” plug-in.

49. Select “Mine Petri net with Inductive Miner” plug-in.

50. Click on “Start” button.
51. Change “Variant” option from default of “Inductive Miner - infrequent” to “Inductive Miner” because the default option drops T04 transaction probably due to infrequent cases containing it. We want to keep this transaction so that we can compare the different Petri nets with the same set of transactions.

52. Click “Finish” button.

What I saw:



This approach discovered 9 transactions, 25 “hidden” / “silent” transactions & 21 places.

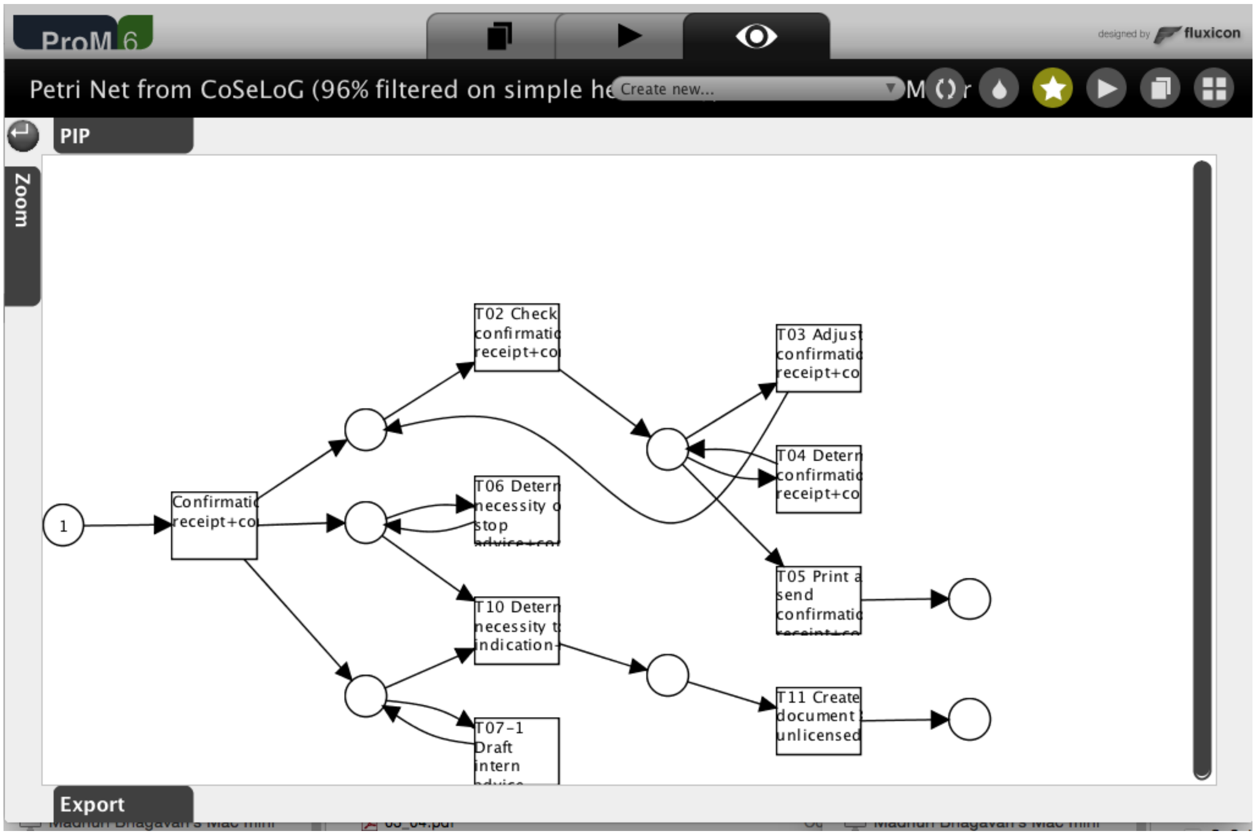
My analysis:

In my opinion, the ILP discovered Petri net is the best based on the following criteria:

‘+’ Clear Start & End states (ILP, Alpha & Inductive; some combination of options in the Heuristics plug-ins might generate a clear End state too which I did not try due to too many steps).
‘+’ Integrate all event log transactions into the control-flow (ILP, Heuristics & Inductive).
‘+’ No silent transactions (ILP & Alpha).
‘+’ Less arcs (ILP & Heuristics).

This should be displayed in a table for better readability ?

Since the analysis objective / goal is not known yet, these criteria might be modified when that becomes clear.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T05 Print a send confirmati
T06 Detern necessity o stop
T10 Detern necessity t indication-
T11 Create document unlicensed
T07-1 Draft intern

The main traces include:
1. Start -> TA -> T02 -> T05 -> End01 with 2 tokens remaining in ILP3 (between TA & T10) and ILP5 (between TA & T07-1)

2. Start -> TA -> T10 -> T11 -> End02 with 1 token remaining in ILP1 (between TA & T02)

The traces with some loops include:
1A. Start -> TA -> T02 -> [T04]* -> T05 -> End01
After T02, there might be any number of T04 firings

1B. Start -> TA -> T02 -> [T03 -> T02]* -> T05 -> End01
After T02, there might be any number of T03 -> T02 loops

1AB. Start -> TA -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01
After T02, there might be any number of T04 firings and/or T03 -> T02 loops

2A. Start -> TA -> [T06]* -> T10 -> T11 -> End02

2B. Start -> TA -> [T07-1]* -> T10 -> T11 -> End02

2AB. Start -> TA -> [T06]* -> [T07-1]* -> T10 -> T11 -> End02

2C1a. Start -> TA -> T10 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01
2C1b. Start -> TA -> T10 -> T11 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01

2AC1a. Start -> TA -> [T06]* -> T10 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01
2AC1b. Start -> TA -> [T06]* -> T10 -> T11 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01

2BC1a. Start -> TA -> [T07-1]* -> T10 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01
2BC1b. Start -> TA -> [T07-1]* -> T10 -> T11 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01

2ABC1a. Start -> TA -> [T06]* -> [T07-1]* -> T10 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01
2ABC1b. Start -> TA -> [T06]* -> [T07-1]* -> T10 -> T11 -> T02 -> [T04]* -> [T03 -> T02]* -> T05 -> End01

All the traces that end in End01 have 2 tokens remaining as described for Trace 1.
All the traces that end in End02 have 1 token remaining as described for Trace 2.

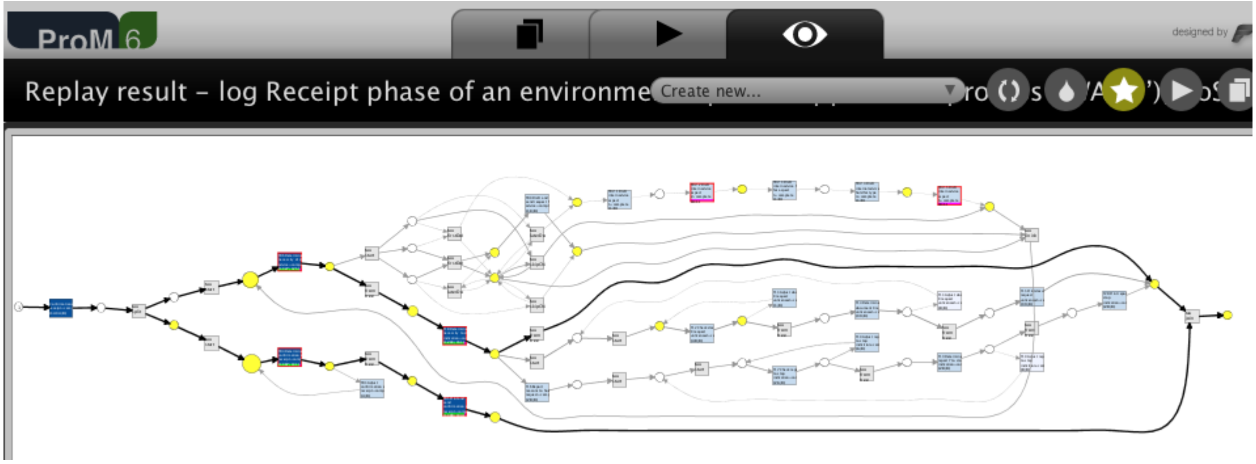
These traces should be in a table for better comprehension ?

0.0.7 Step 06: inspect conformance with normative model in ProM

Approach I used:

1. Click on “Workspace” icon.
2. Click on “import. . . ” button.
3. Select the normative model file.
4. Select the ‘PNML Petri net files’ importer.
5. Click on “Actions” icon.
6. Search for “Replay” plug-in.
7. Select ‘Replay a Log on Petri Net for Conformance Analysis’ (not the variant with performance!) plug-in.
8. Add original event log to “Input”.
9. Click on “Start” button.
10. Click ‘yes’ in the ‘No Final Marking’ pop-up.
11. Select the ‘sink’ place on the left (note: do not select ‘0-sink’ etc.) and click the button ‘Add Place >>’ to add the place ‘sink’ to the candidate final marking list.
12. Click ‘Finish’ in the mapping wizard.
13. Click ‘Finish’ .
14. Click ‘No, I’ve mapped all necessary event classes’ to indicate that some events are not present in the normative model.
15. Click ‘Next’.
16. Click ‘Finish’.

What I saw:



Transitions: Most of the traces pass through very few “labeled” (tau are “silent”) transitions: TA -> T06 -> T10 & TA -> T04 -> T05. The color darkness or “fill” of the transition boxes is based on the number of traces in the event log that fire them. The numbers underneath the label in the transition boxes refer to the number of synchronous moves vs. “move on model”. T13 & T18 are never fired in this event log.

Places: Place size displays “move on log” frequency. Places where move log occured are colored yellow. However, size of “source” & “sink” are not adjusted. Clicking on the place displays the underlying label. Size of places going to silent transitions are not adjusted with frequency but are colored yellow when there are move(s) on log.

Arcs: The thickness of the arcs seems proportional to the frequency of event log traces.

My analysis:

The replay fitness (the ‘trace fitness’ statistic) of the event log on the normative process model is 0.8425. T10 has the maximum deviations (151). T06 has the minimum (125).

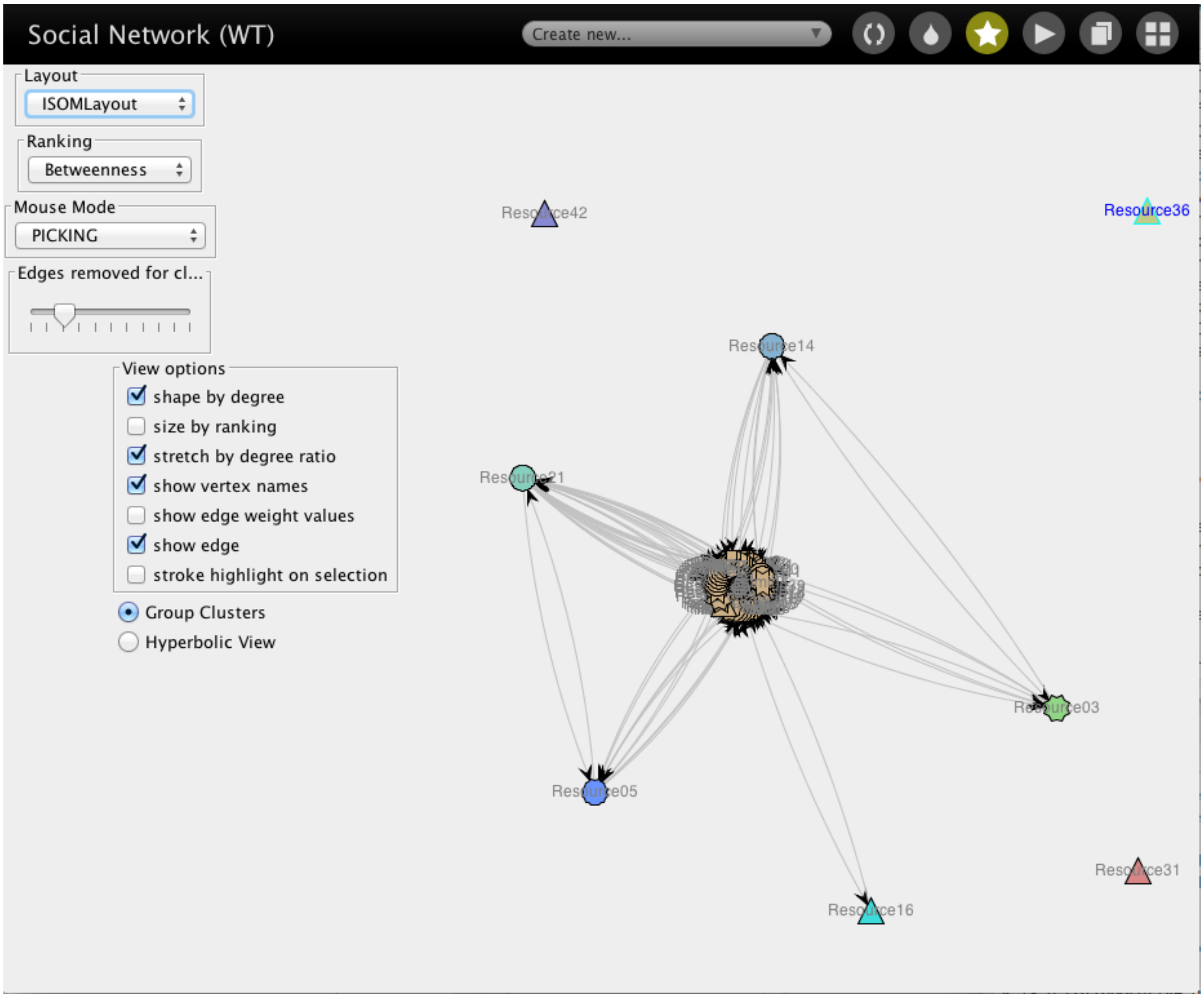
The transition ‘T06 Determine necessity of stop advice+complete’ (on the top left of the model) was tested with 1,434 traces in the event log. Out of those 1,309 (91%) were synchronous moves in both the model & log. Amongst those 1,309 traces, T06 was fired synchronously for 1,327 times (i.e. some traces fired T06 fired multiple times). For 125 traces, T06 was fired in the model only.

0.0.8 Step 07: inspect resource utilization in ProM

Approach I used:
1. Click on “Workspace” icon.
2. Select event log resource.
3. Click on “Actions” icon for this resource.
4. Search for “Mine for a Subcontracting Social Network” & select it.
5. Keep selected default options & click on “Continue” button.
6. Click “Start” button.
7. Select the following in the Social Network view options:
Layout: ISOMLayout
Ranking: Betweenness
Mouse Mode: Picking
Edges removed for cl. . . : 3rd tick from left
View options:
shape by degree
show vertex names
show edge

Group Clusters
8. Select a resource and move it to get more clarity in the visual.

What I saw:



Layout: ISOMLayout
Ranking: Betweenness
Mouse Mode: PICKING
Edges removed for cl...

View options
☑ shape by degree
☐ size by ranking
☑ stretch by degree ratio
☑ show vertex names
☐ show edge weight values
☑ show edge
☐ stroke highlight on selection

● Group Clusters
○ Hyperbolic View

Resources grouped by cluster, shaped by connectivity degree and edges depicting the connectivity density.

My analysis:

The resources may be grouped into the following categories:
I. *Singletons*: Resources {31, 36 & 42} don't and {16} rarely subcontract work.
II. *Couples*: {05, 21} and {03, 14} are targets of subcontracting and amongst each other within the group.
III. *General Pool*: All the other resources subcontract work significantly amongst themselves.

Let's see if we can get any more granularity regarding the sub-groups in "General Pool" by inspecting the cases & tasks executed by these resources. Couldn't find an appropriate filter plug-in to do this in ProM. Therefore, I switched to Disco and figured out that I need to filter the event log to delete cases that the "Singletons" worked on & utilize the remaining cases to re-do this analysis.

Approach I used:

11. Click on "Import" icon in Disco.

12. Select the event log.

13. Click on “Filter” icon in the bottom left.

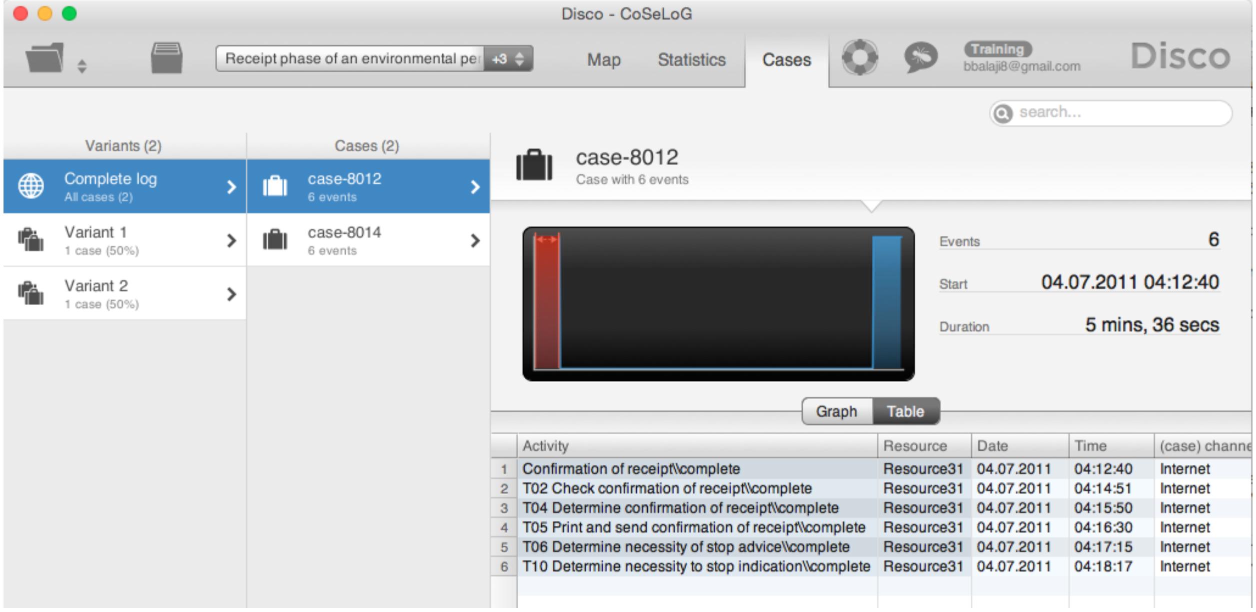
14. Click in the left pane to add filter.

15. Select “Attribute - Removes events by attribute”.

16. Select “Resource” in the “Filter by:” option.

17. Select “Mandatory” in the “Filtering mode:” option.
18. Select “Resource31” only in “Event values:” pane.
19. Click on “Apply filter” button.

What I saw:



case-8012
Case with 6 events

Events 6
Start 04.07.2011 04:12:40
Duration 5 mins, 36 secs

	Activity	Resource	Date	Time	(case) channe
1	Confirmation of receipt\\complete	Resource31	04.07.2011	04:12:40	Internet
2	T02 Check confirmation of receipt\\complete	Resource31	04.07.2011	04:14:51	Internet
3	T04 Determine confirmation of receipt\\complete	Resource31	04.07.2011	04:15:50	Internet
4	T05 Print and send confirmation of receipt\\complete	Resource31	04.07.2011	04:16:30	Internet
5	T06 Determine necessity of stop advice\\complete	Resource31	04.07.2011	04:17:15	Internet
6	T10 Determine necessity to stop indication\\complete	Resource31	04.07.2011	04:18:17	Internet

2 cases in which all tasks were executed by Resource31.

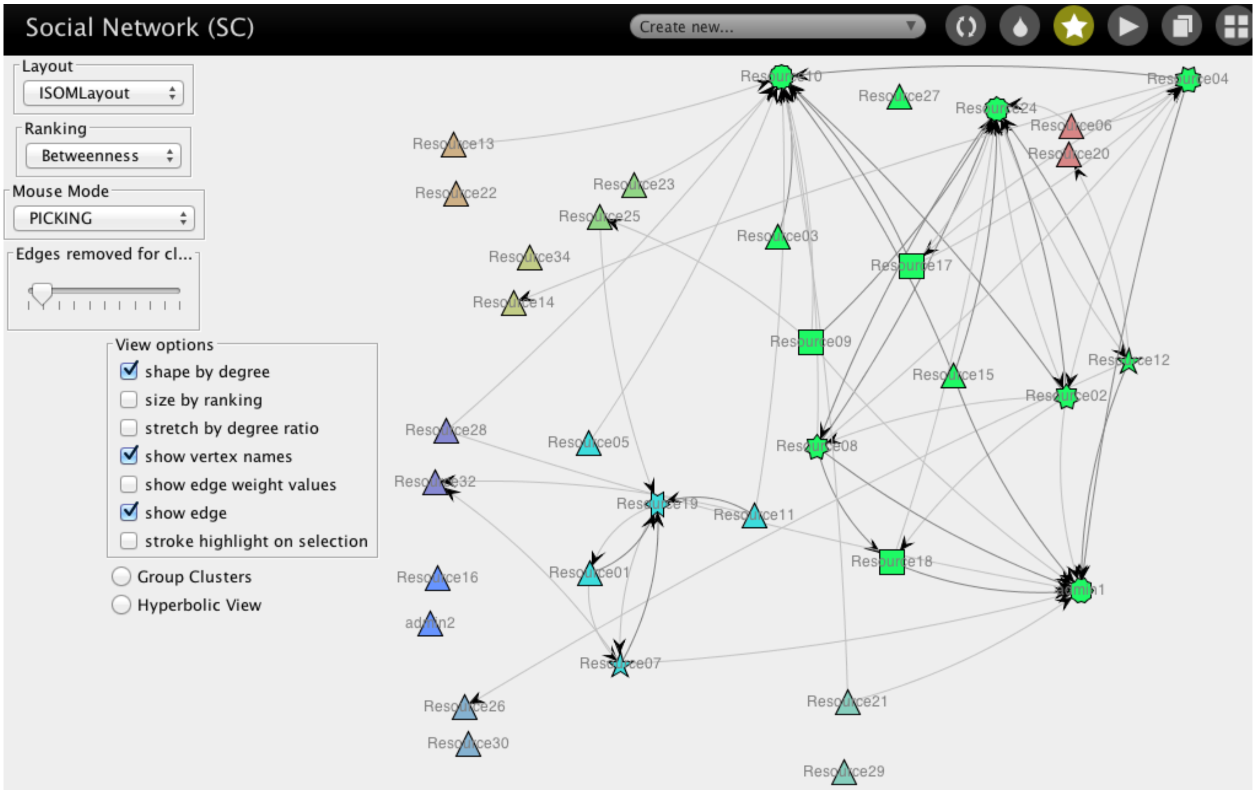
My analysis:

The “Singletons” worked on 4 cases (10918 for Resource 42; 4328 for Resource 36 & [8012, 8014] for Resource 31) only. Moreover, in each of these cases, all the tasks were conducted by one resource. Similarly, I also found resources {“test” & “TEST”} who each had one case 8061 & 8047. I excluded these cases by applying a filter & exported the filtered event log.

Re-did tasks 1-8 as listed above for “Step 07: inspect resource utilization in ProM”. The clustering in ProM suggested expanding & splitting the “Singletons” group into “Exclusive One-timers” and “Occasional Helpers:” as listed further below.

After filtering the event log to delete cases that utilize these resources, I re-did the social networking analysis in ProM.

What I saw:



Layout: ISOMLayout

Ranking: Betweenness

Mouse Mode: PICKING

Edges removed for cl...

View options
- ☑ shape by degree
- ☐ size by ranking
- ☐ stretch by degree ratio
- ☑ show vertex names
- ☐ show edge weight values
- ☑ show edge
- ☐ stroke highlight on selection

○ Group Clusters

○ Hyperbolic View

My analysis:

The resources may be grouped into the following categories:
1. *Exclusive One-timers*: Resources {31, 36, 42, test, TEST} have worked on their cases exclusively (Total 6 cases).

2. *Occasional Helpers*: Resources {33, 35, 37, 38, 39, 40, 41, 43, admin3}
   2.1 Resources {40, 41, 43} have helped with one activity on one case each.
   2.2 Resource37 has helped with 5 activities on one case.
   2.3 Resource39 has helped with one activity (T02) on 2 cases.
   2.4 Resource38 has helped with activities on 2 cases.
   2.5 Resource admin3 has helped with one activity on 3 cases.
   2.6 Resource33 has helped with T07-* activities on 3 cases.
   2.7 Resource35 has helped with multiple activities on 3 cases.

   Total 17 cases.

3. *Isolated Couples*: Resources {[13, 22], [23, 25], [14, 34], [28, 32], [16, admin2], [26, 30], [21, 29], [06, 20]} occasionally are outsourced / assign work. The cluster sub-groups are probably based on the tasks similarity.

4. *Workgroup A*: Resources {01, 05, 07, 11, 19}

5. *Workgroup B*: Resources {[10, admin1], [04, 24], [02, 03, 08, 09, 12, 15, 17, 18, 27]}
   5.1 Resources 10 & admin1 are out-scourced work by many resources but do not assign any work to others.
   5.2 Resources 04 & 24 are out-sourced work by many resources and occassionally assign work to others.

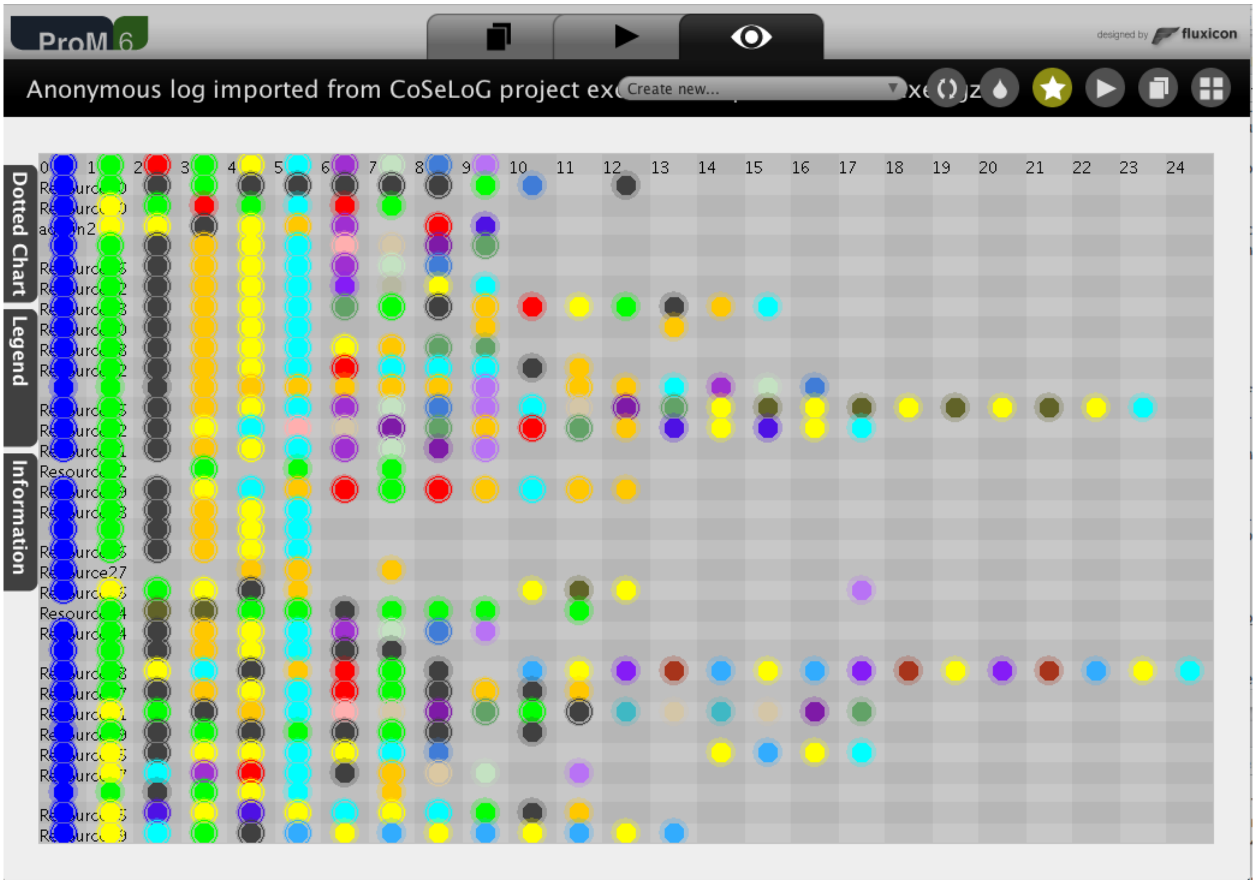
For, are all users executing activities from the start of the event log, or are some users joining later? & are users mainly executing particular activities or are most users executing most of the activities?

Approach I used:

21. Click on “Workspace” icon.
22. Select event log excluding cases that involve *Exclusive One-timers* or *Occasional Helpers*.
23. Click on “Visualize” icon for the selected resource.
24. Select “XDottedChart” by clicking on “Create new. . . ” drop-box.
25. Select “Dotted Chart” tab.
26. Select the following options:

Component: ‘org:resource’ Time: Logical Case order: Occurence of first event 27. Click on “Apply settings” button.

What I saw:



The resources are displayed as rows and the transitions are organized into columns based on when the transition was executed by that resource for a certain case. The transitions are color coded.

My analysis:

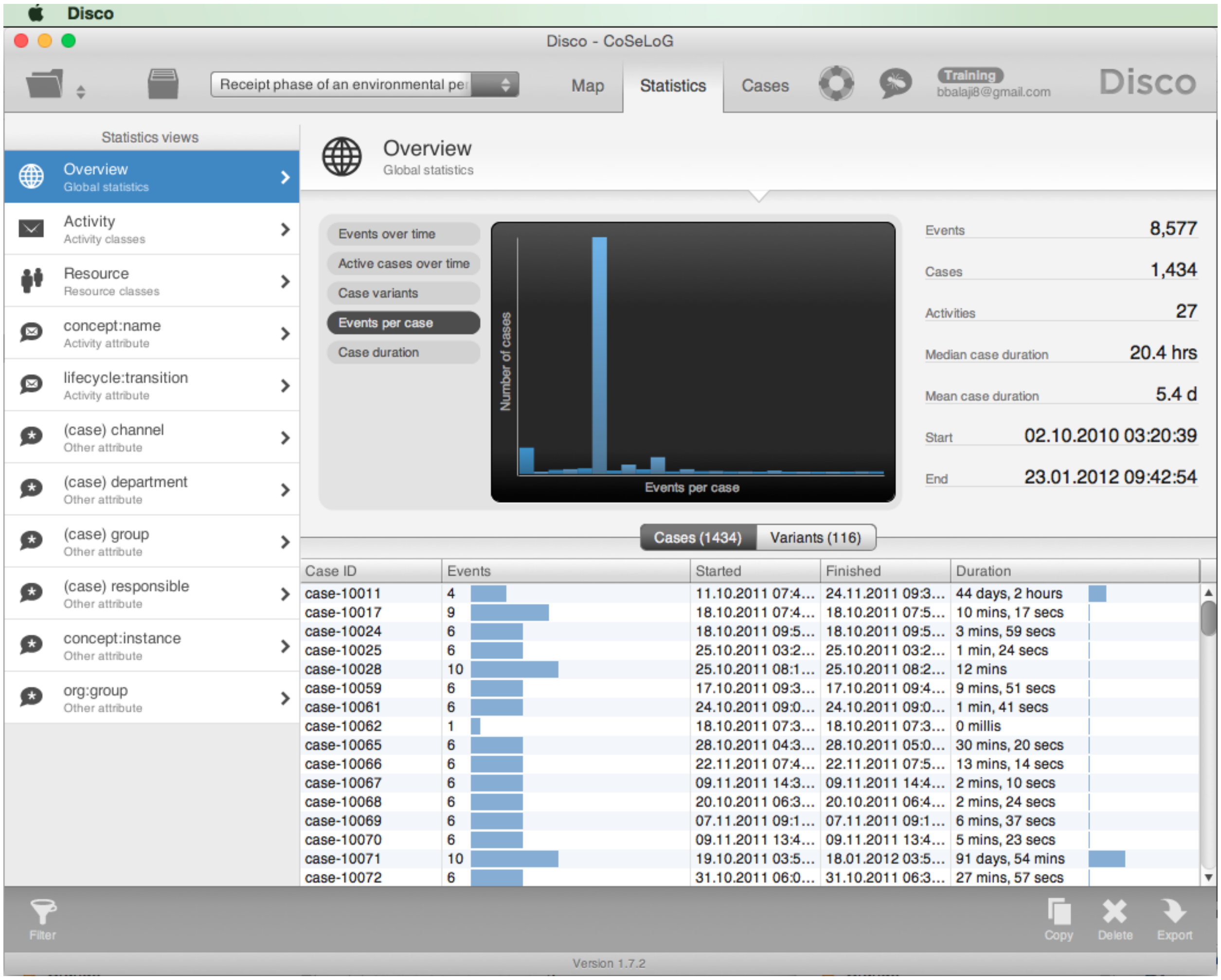
Most of the resources are executing activities from the start of the event log. It’s hard to identify the exceptions. I wish the chart could be interactive (e.g. click on a dot and obtain more information).

Most resources are executing the first few activities {TA, T02, T06}. The black color is assigned to multiple activities, so it’s hard to tell whether many resources are executing these activities or only a few. Other activities appear to be executed by only a few.

0.0.9 Step nn: step title

Approach I used:

What I saw:



Events	8,577
Cases	1,434
Activities	27
Median case duration	20.4 hrs
Mean case duration	5.4 d
Start	02.10.2010 03:20:39
End	23.01.2012 09:42:54

Case ID	Events	Started	Finished	Duration
case-10011	4	11.10.2011 07:4...	24.11.2011 09:3...	44 days, 2 hours
case-10017	9	18.10.2011 07:4...	18.10.2011 07:5...	10 mins, 17 secs
case-10024	6	18.10.2011 09:5...	18.10.2011 09:5...	3 mins, 59 secs
case-10025	6	25.10.2011 03:2...	25.10.2011 03:2...	1 min, 24 secs
case-10028	10	25.10.2011 08:1...	25.10.2011 08:2...	12 mins
case-10059	6	17.10.2011 09:3...	17.10.2011 09:4...	9 mins, 51 secs
case-10061	6	24.10.2011 09:0...	24.10.2011 09:0...	1 min, 41 secs
case-10062	1	18.10.2011 07:3...	18.10.2011 07:3...	0 millis
case-10065	6	28.10.2011 04:3...	28.10.2011 05:0...	30 mins, 20 secs
case-10066	6	22.11.2011 07:4...	22.11.2011 07:5...	13 mins, 14 secs
case-10067	6	09.11.2011 14:3...	09.11.2011 14:4...	2 mins, 10 secs
case-10068	6	20.10.2011 06:3...	20.10.2011 06:4...	2 mins, 24 secs
case-10069	6	07.11.2011 09:1...	07.11.2011 09:1...	6 mins, 37 secs
case-10070	6	09.11.2011 13:4...	09.11.2011 13:4...	5 mins, 23 secs
case-10071	10	19.10.2011 03:5...	18.01.2012 03:5...	91 days, 54 mins
case-10072	6	31.10.2011 06:0...	31.10.2011 06:3...	27 mins, 57 secs

My analysis: