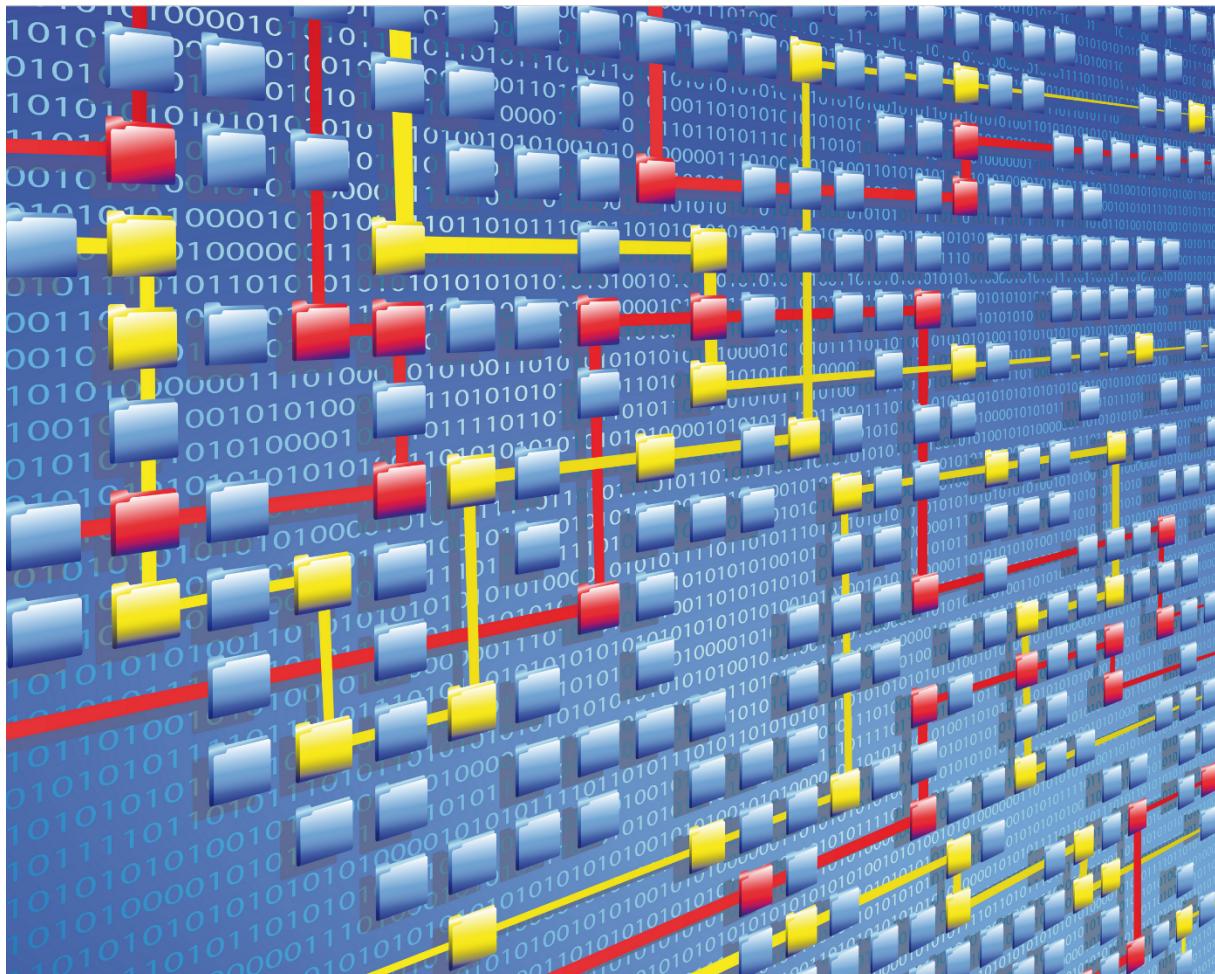


# IEEE Task Force on



## Process Mining

XES CERTIFICATION FOR  
DISCO 2.9

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# TOOL

## Tool

### NAME

Disco

### VENDOR

Fluxicon

### VERSION

2.9 (using an Academic license)

### REQUESTED CERTIFICATION LEVELS

#### Import

A-D, X



# META

## Meta

### AUTHORS

Eric Verbeek, Anne Rozinat

### LAST DATE

26/11/2020

### HISTORY

#### CHANGES

| AUTHOR(S)           | DATE       | DESCRIPTION                                                                                                     |
|---------------------|------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Eric Verbeek</b> | 07/09/2017 | Made walk-throughs more explicit by (1) adding arrows where to act and (2) adding some text telling what to do. |
| <b>Eric Verbeek</b> | 06/09/2017 | Added walk-throughs that support the claim for A1-D1 for both import and export.                                |
| <b>Anne Rozinat</b> | 26/11/2020 | Added walk-throughs and screenshots for the remaining import and export levels.                                 |

# IMPORT

## Import

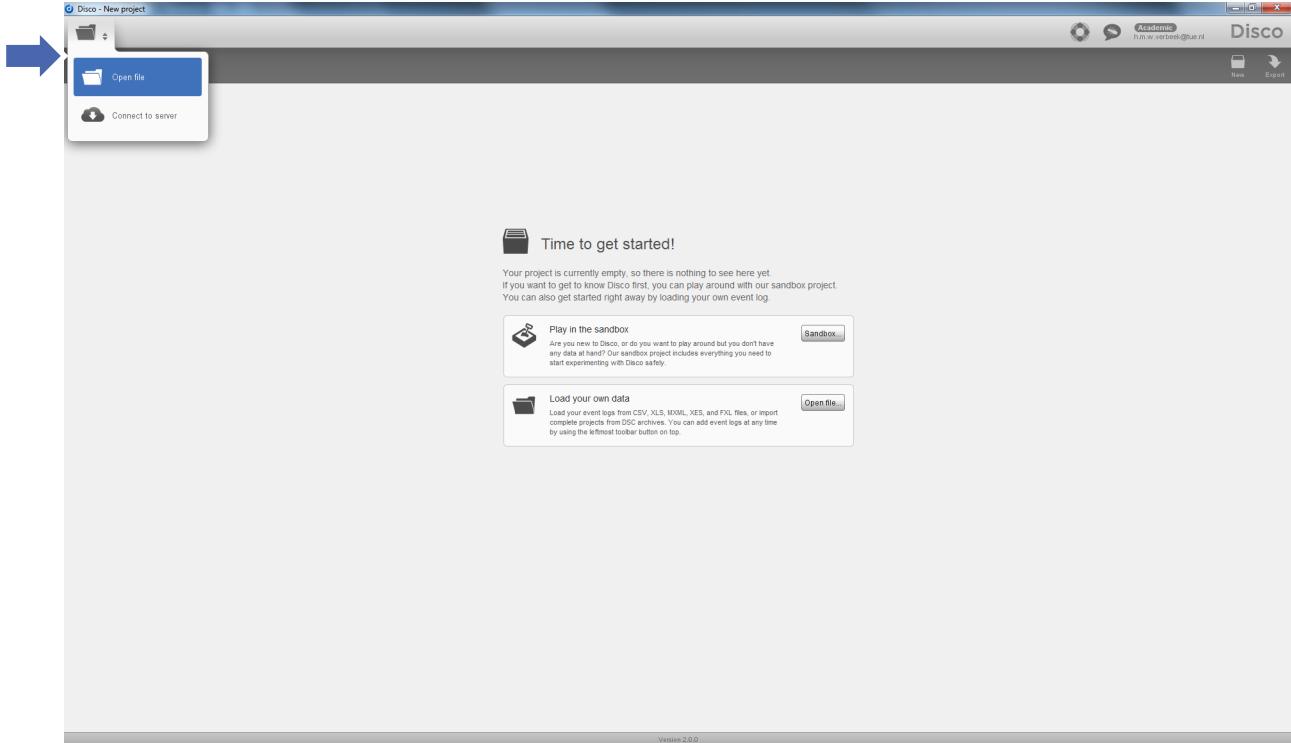
### REAL-LIFE LOGS

#### SANITIZED BPIC LOGS

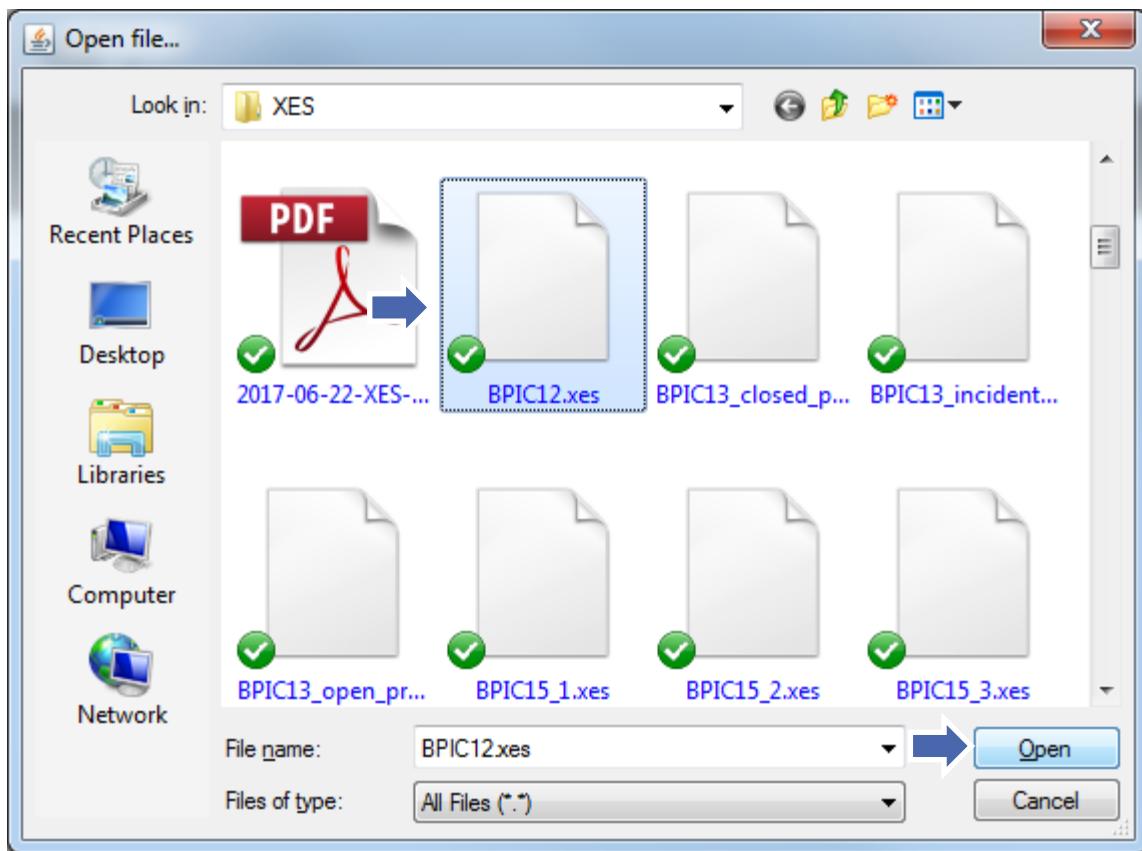
| NAME                   | TRACES | EVENTS    | SIZE IN KB |
|------------------------|--------|-----------|------------|
| BPIC12                 | 13,087 | 262,200   | 72,363     |
| BPIC13_closed_problems | 1,487  | 6,660     | 4,090      |
| BPIC13_incidents       | 7,554  | 65,533    | 38,627     |
| BPIC13_open_problems   | 819    | 2,351     | 1,370      |
| BPIC15_1               | 1,199  | 52,217    | 40,261     |
| BPIC15_2               | 832    | 44,354    | 33,616     |
| BPIC15_3               | 1,409  | 59,681    | 45,673     |
| BPIC15_4               | 1,053  | 47,293    | 36,131     |
| BPIC15_5               | 1,156  | 59,083    | 44,961     |
| BPIC17 - Offer log     | 42,995 | 193,849   | 107,557    |
| BPIC17                 | 31,509 | 1,202,267 | 565,373    |

# IMPORT

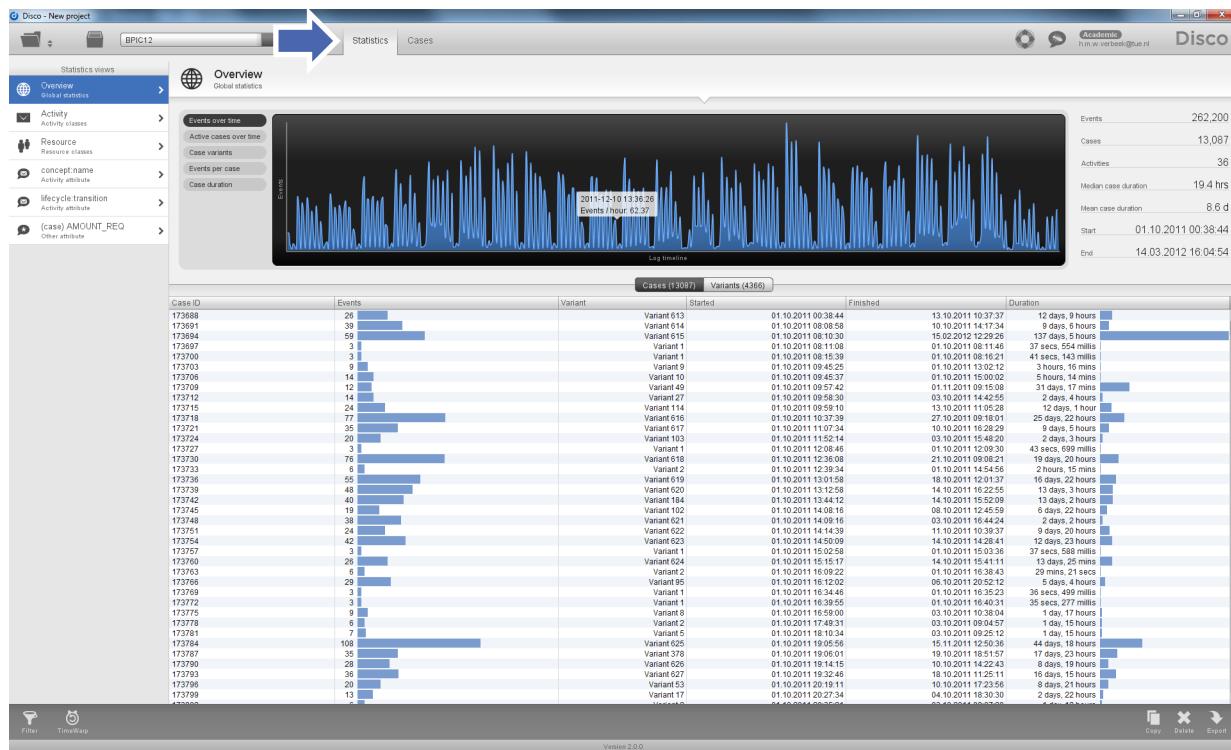
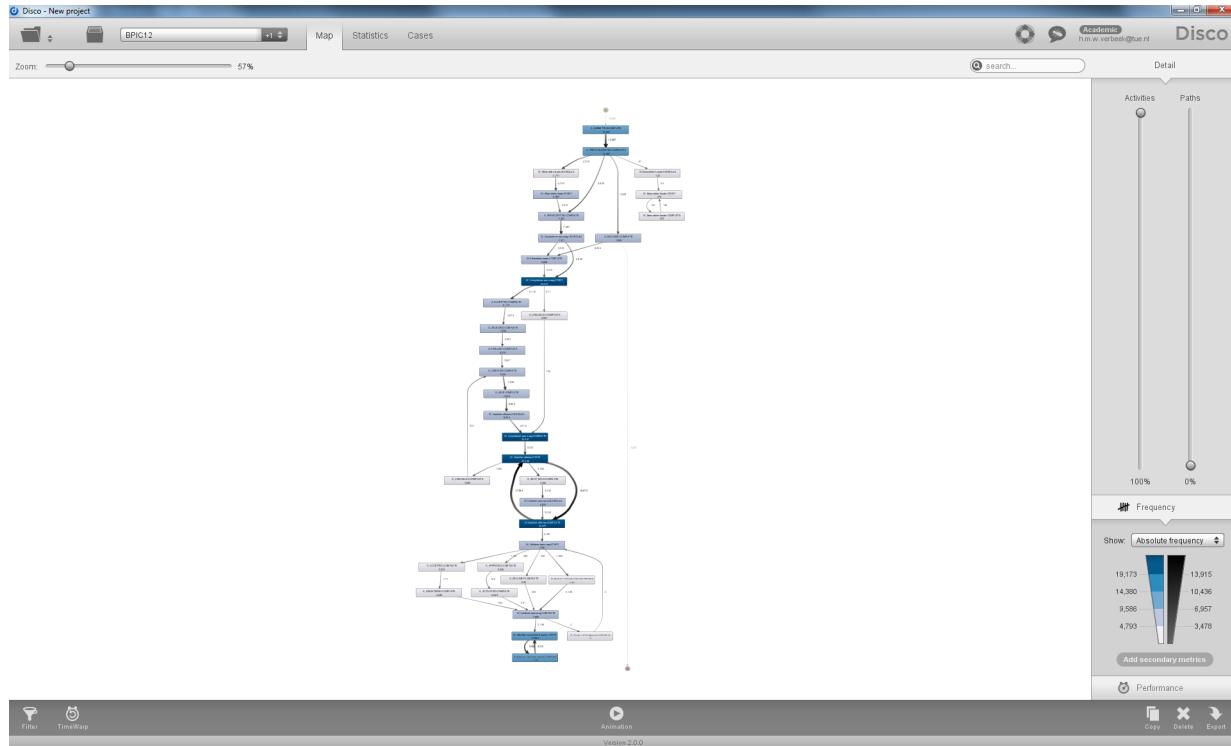
BPIC12



# IMPORT

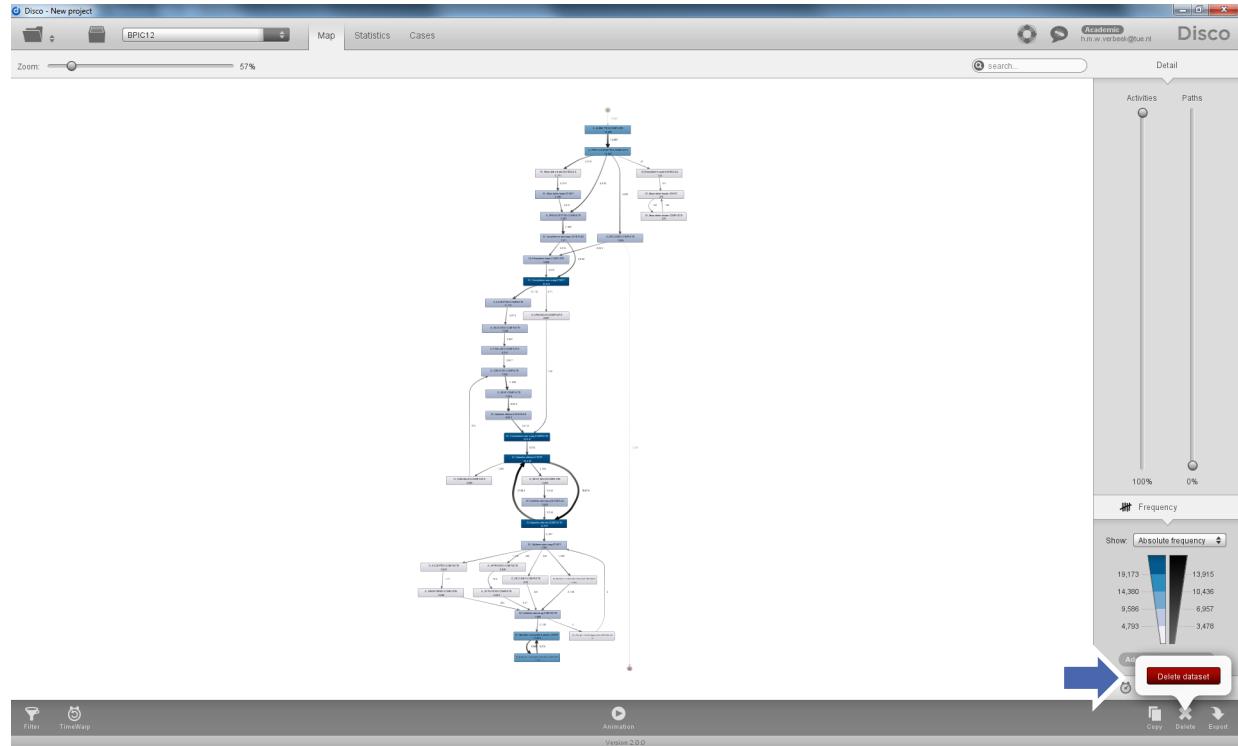


# IMPORT



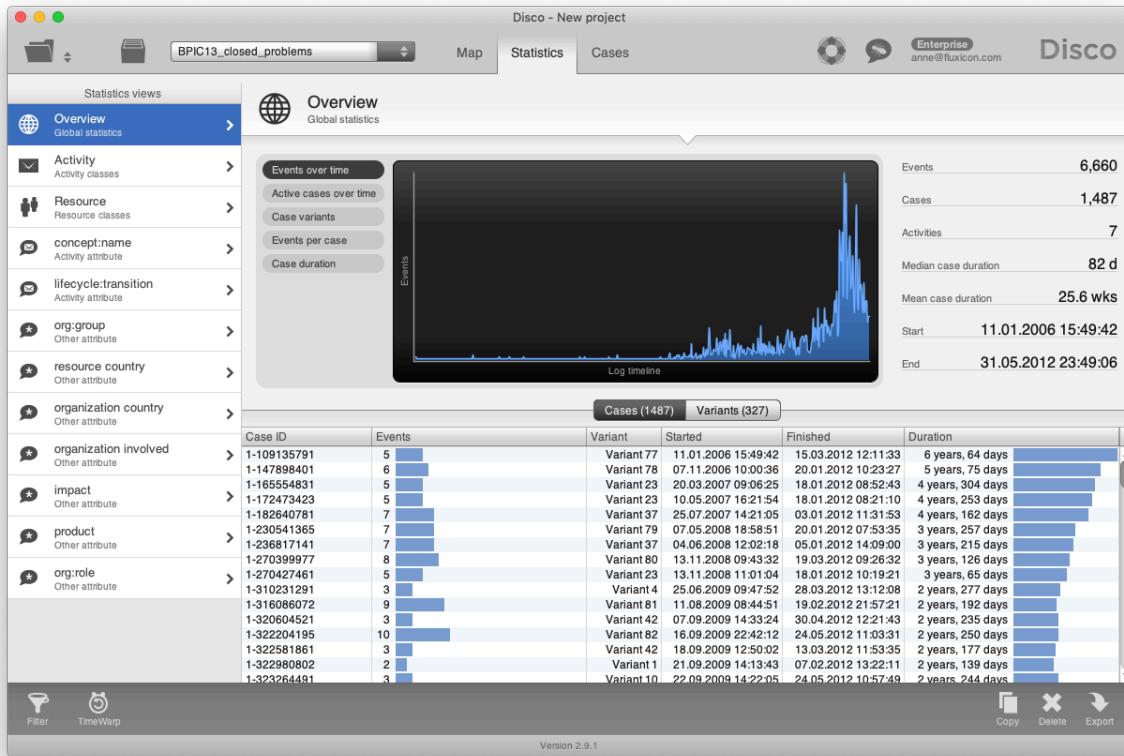
# IMPORT

For sake of completeness, we mention that before a new log is imported, any current one is deleted first:



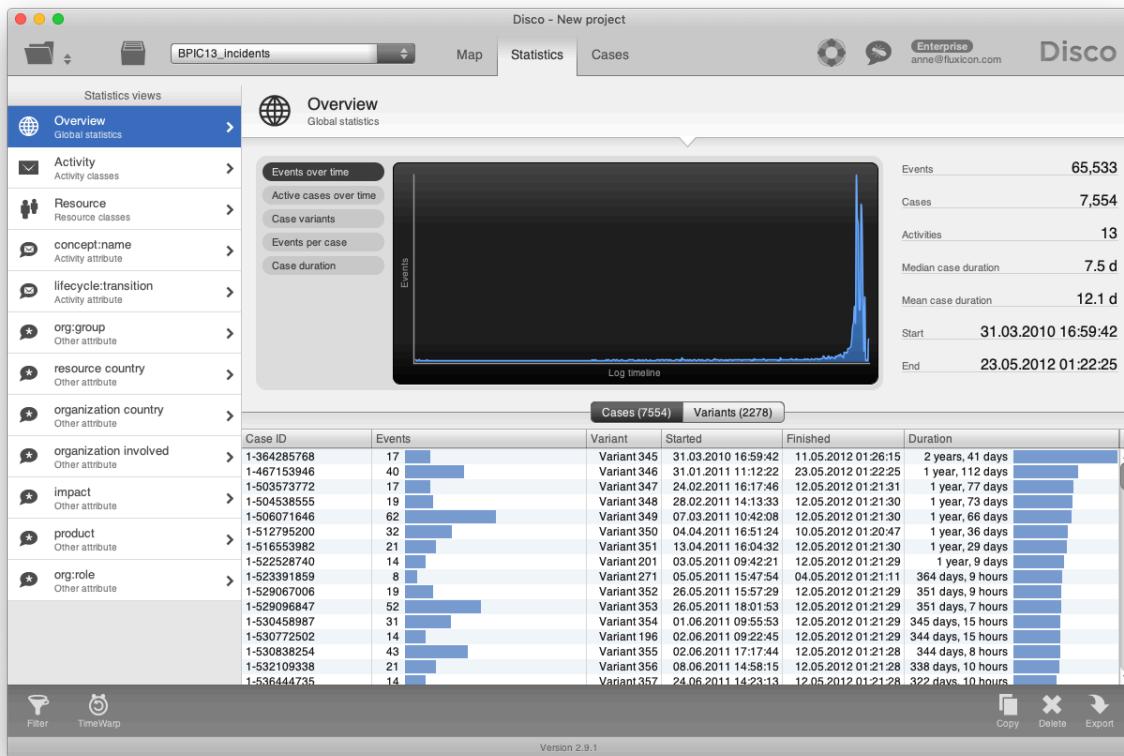
# IMPORT

## BPIC13\_closed\_problems



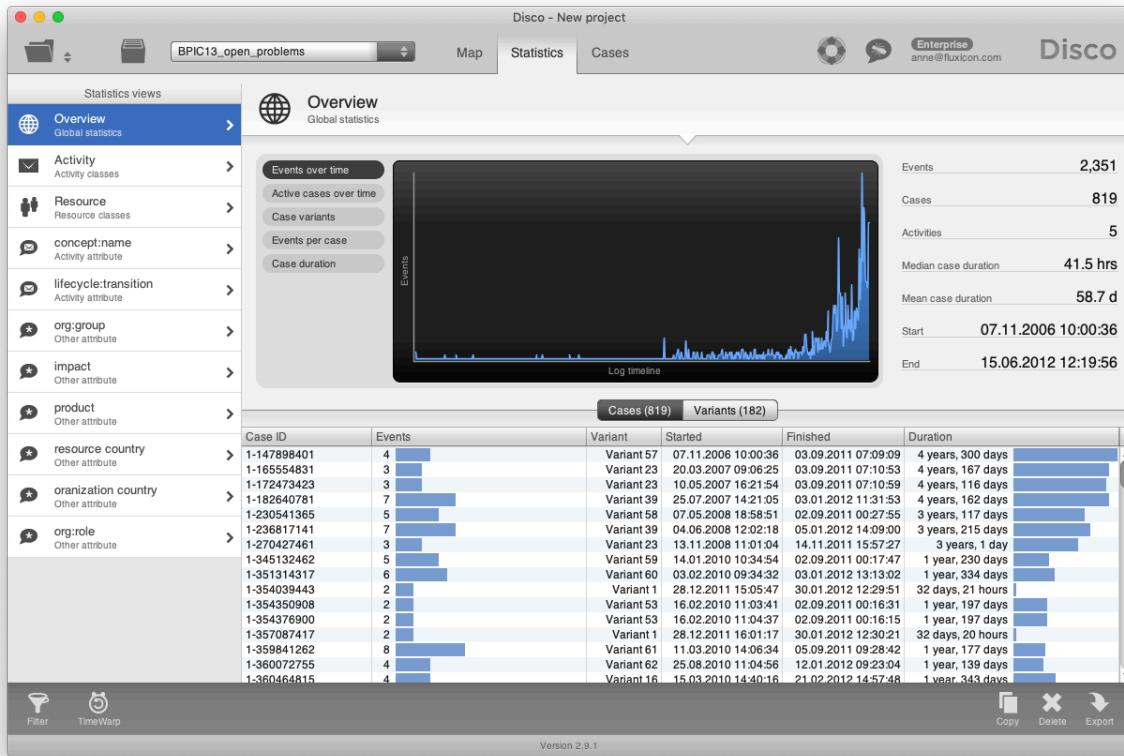
# IMPORT

## BPIC13\_incidents



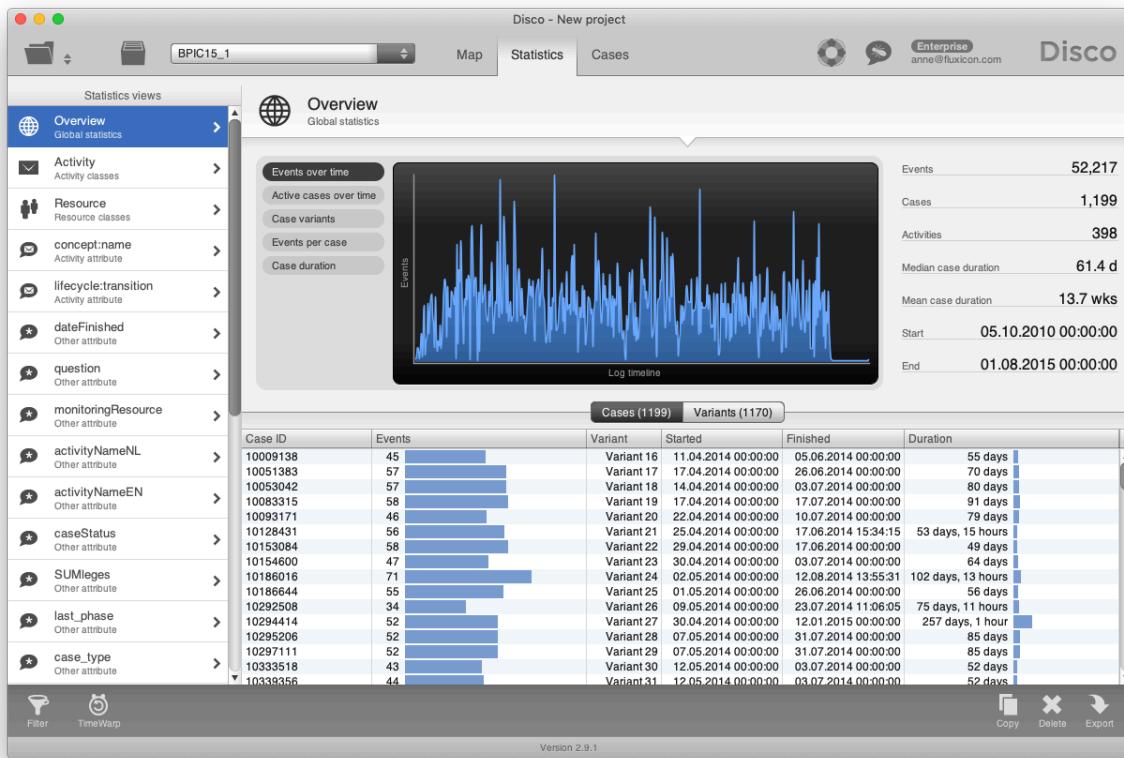
# IMPORT

## BPIC13\_open\_problems



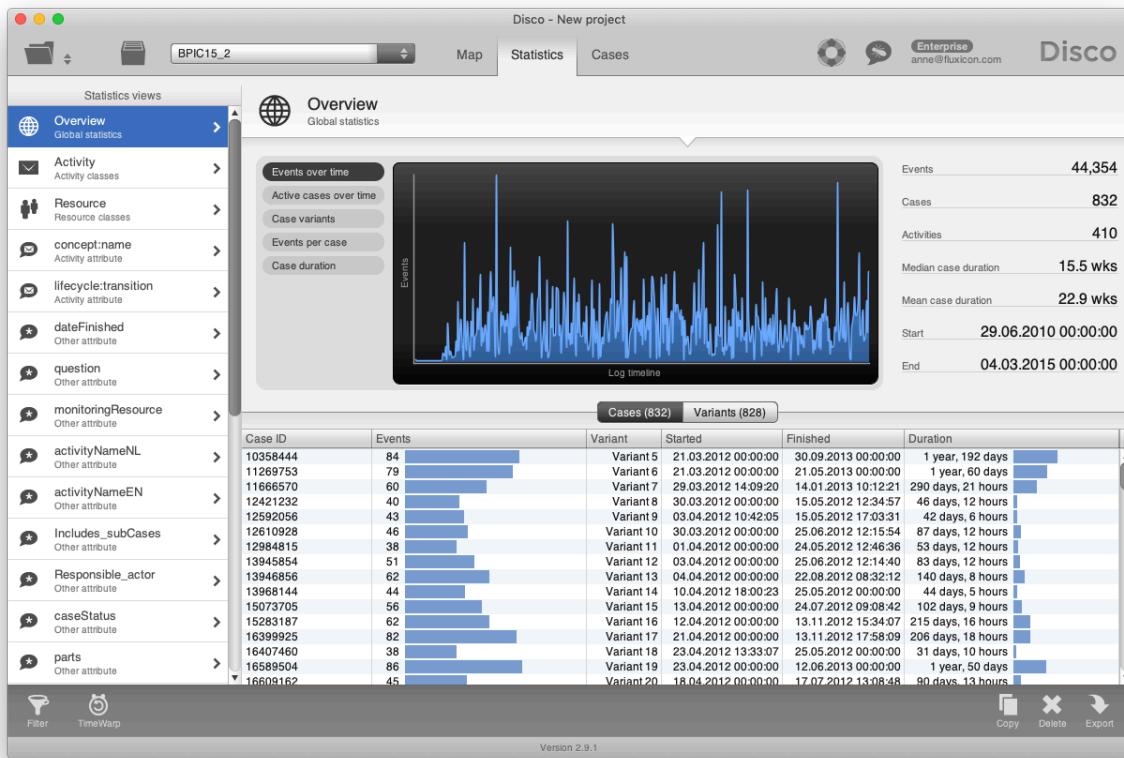
# IMPORT

## BPIC15\_1



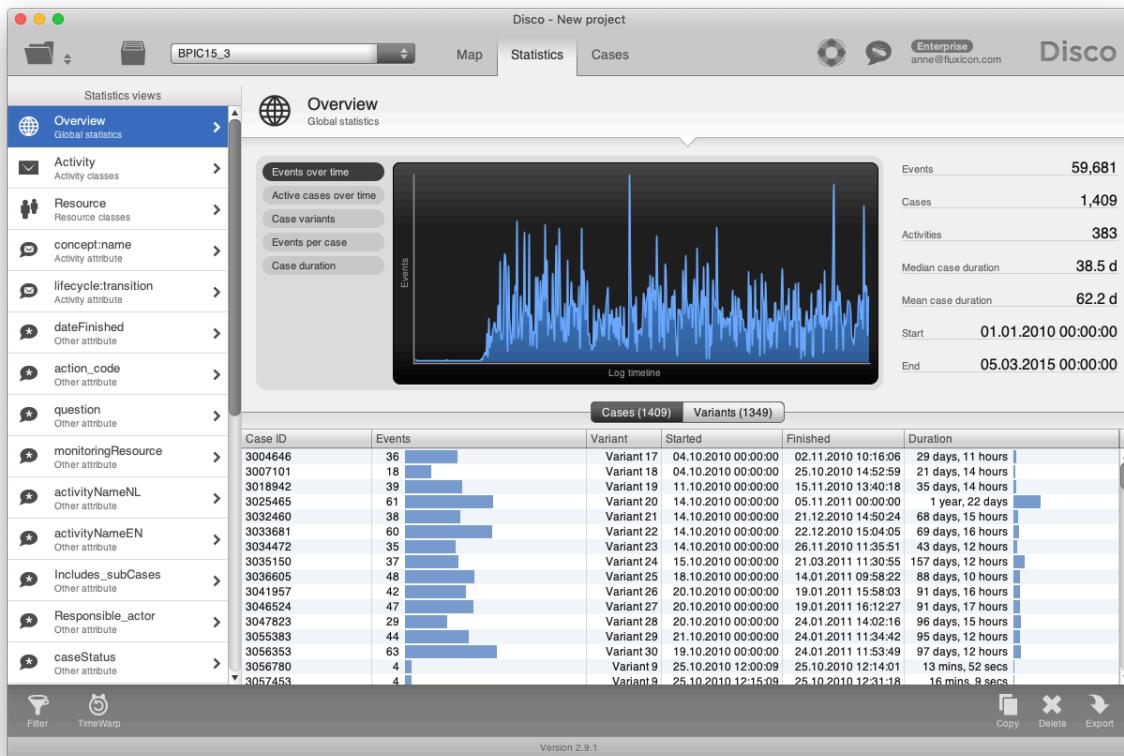
# IMPORT

## BPIC15\_2



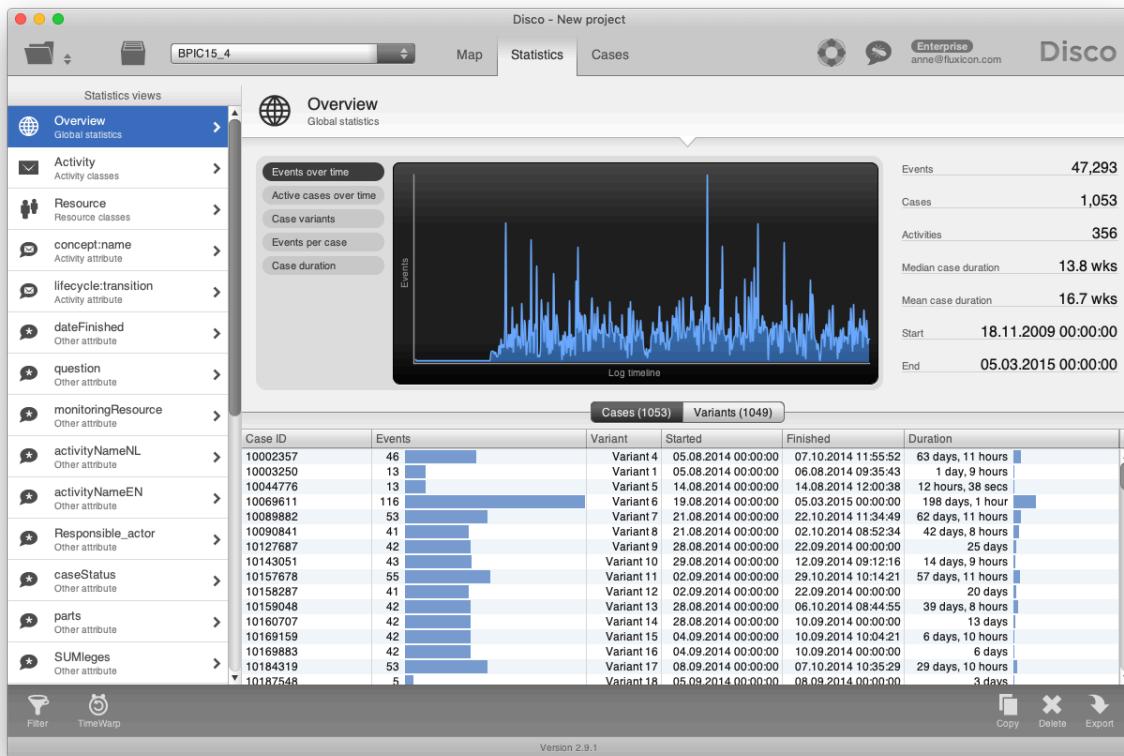
# IMPORT

## BPIC15\_3



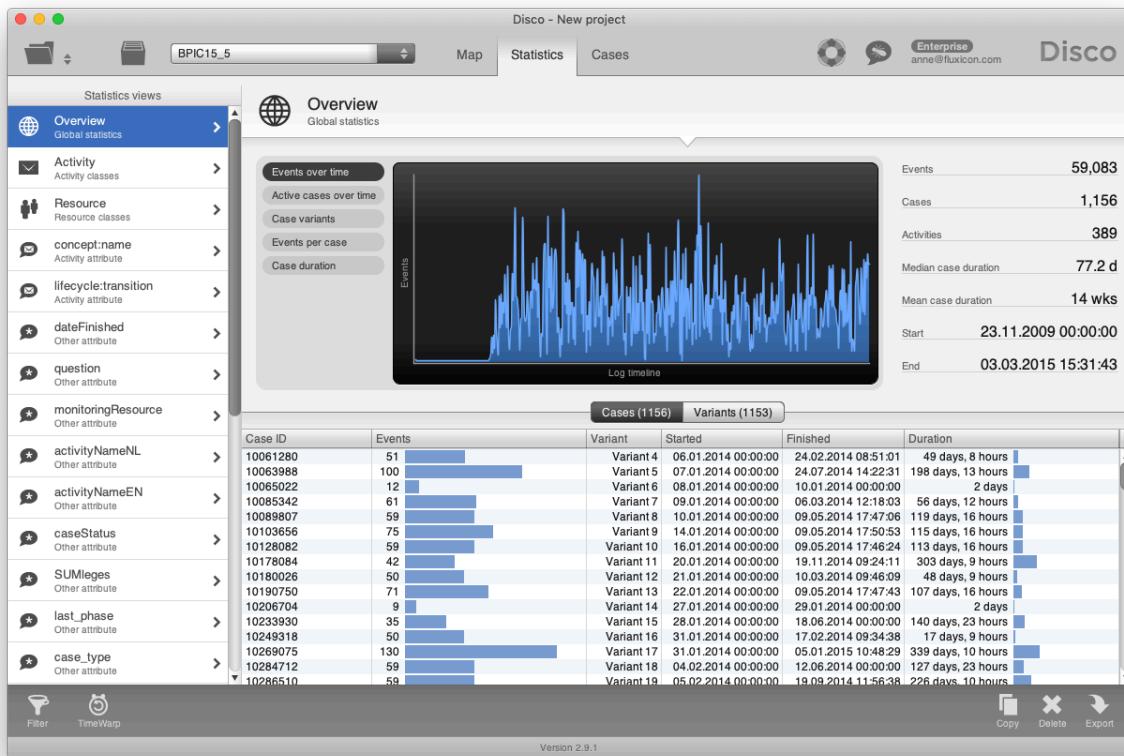
# IMPORT

## BPIC15\_4



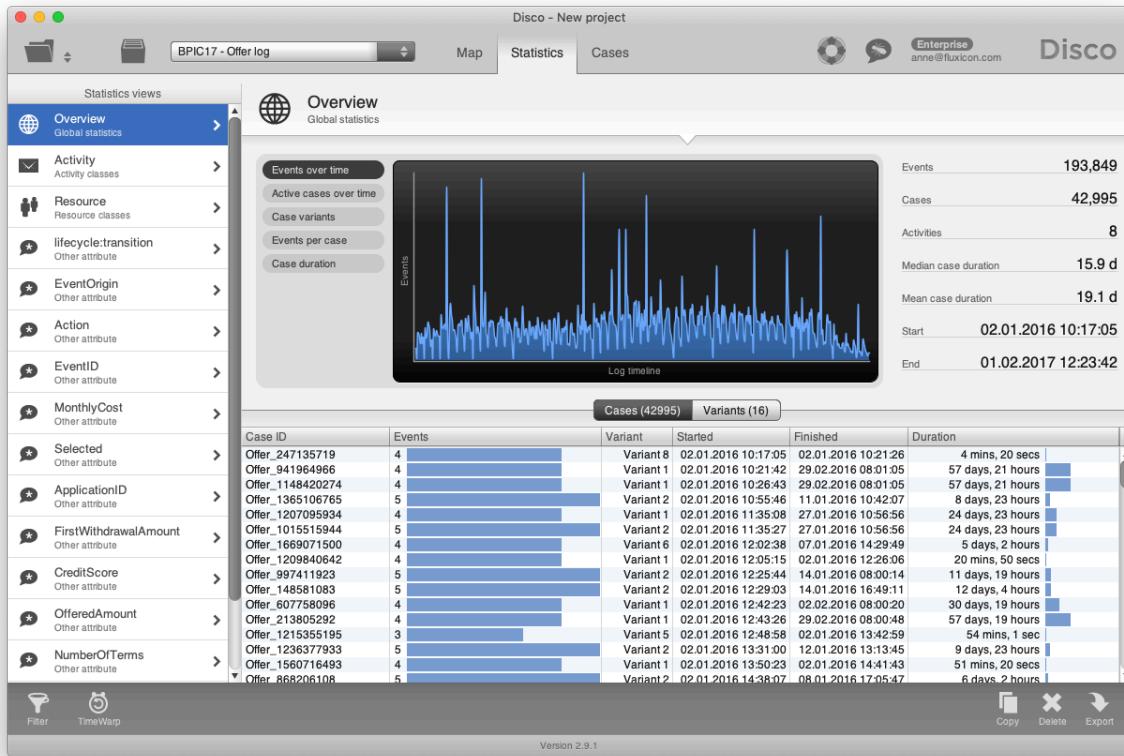
# IMPORT

## BPIC15\_5



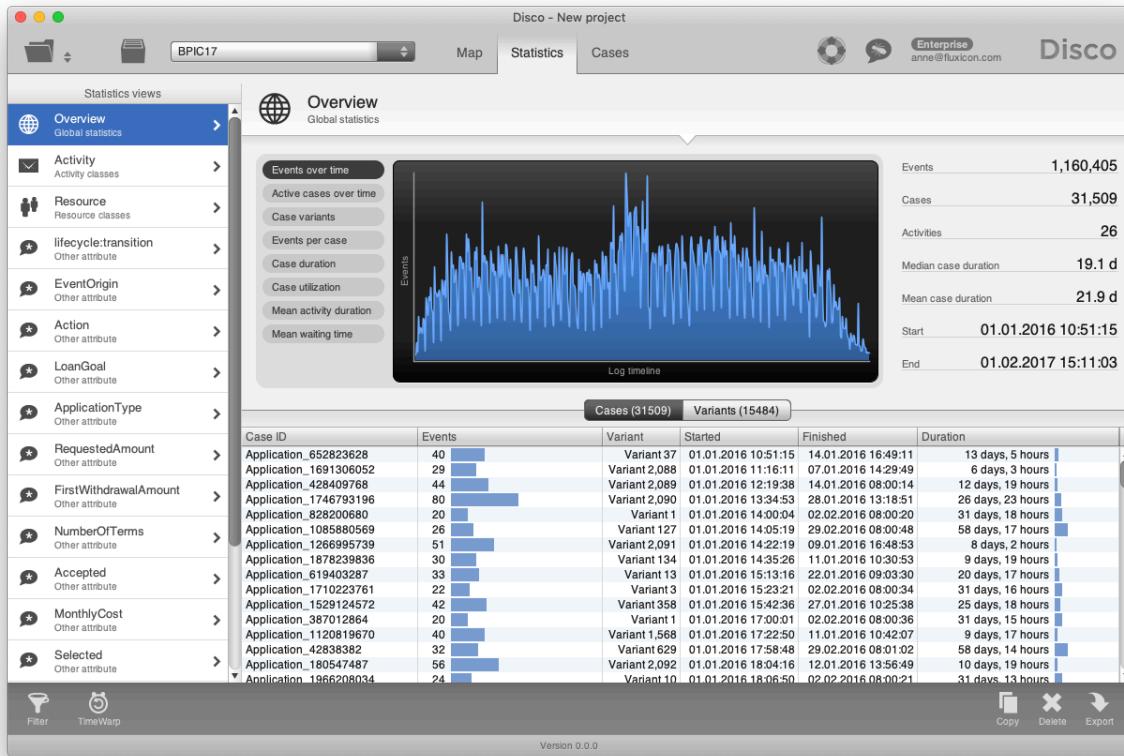
# IMPORT

## BPIC17 – Offer log



# IMPORT

BPIC17



The reason that only 1,160,405 out of the 1,202,267 events appear to be imported is that matching 'start' and 'complete' events are combined into one activity with a duration.

Consider, for example, Application\_493034835 (see XES snippet below). The case contains 27 events, where the 'start' and 'complete' events of 'W\_Complete application' (see light grey highlight) and the 'start' and 'complete' events of 'W\_Validate application' (see dark grey highlight) are matched by Disco.

```

<string key="concept:name" value="Application_493034835"/>
  <float key="RequestedAmount" value="9000.0"/>
<event>
  <string key="Action" value="Created"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="A_Create Application"/>
  <string key="EventOrigin" value="Application"/>
  <string key="EventID" value="Application_493034835"/>
  <string key="lifecycle:transition" value="complete"/>
  <date key="time:timestamp" value="2016-01-02T12:24:39.241Z"/>
</event>
<event>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_3"/>

```

# IMPORT

```
<string key="concept:name" value="A_Concept"/>
<string key="EventOrigin" value="Application"/>
<string key="EventID" value="ApplState_1913249392"/>
<string key="lifecycle:transition" value="complete"/>
<date key="time:timestamp" value="2016-01-02T12:24:39.245Z"/>
</event>
<event>
  <string key="Action" value="Created"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="W_Complete application"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_819502667"/>
  <string key="lifecycle:transition" value="schedule"/>
  <date key="time:timestamp" value="2016-01-02T12:24:39.250Z"/>
</event>
<event>
  <string key="Action" value="Obtained"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="W_Complete application"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_807173433"/>
  <string key="lifecycle:transition" value="start"/>
  <date key="time:timestamp" value="2016-01-02T12:24:39.253Z"/>
</event>
<event>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="A_Accepted"/>
  <string key="EventOrigin" value="Application"/>
  <string key="EventID" value="ApplState_1597124964"/>
  <string key="lifecycle:transition" value="complete"/>
  <date key="time:timestamp" value="2016-01-02T12:29:45.915Z"/>
</event>
<event>
  <string key="Action" value="Created"/>
  <float key="FirstWithdrawalAmount" value="1500.0"/>
  <int key="NumberOfTerms" value="72"/>
  <boolean key="Accepted" value="false"/>
  <date key="time:timestamp" value="2016-01-02T12:31:00.150Z"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="O_Create Offer"/>
  <float key="MonthlyCost" value="150.0"/>
  <string key="EventOrigin" value="Offer"/>
  <string key="EventID" value="Offer_1236377933"/>
  <boolean key="Selected" value="true"/>
  <int key="CreditScore" value="0"/>
  <string key="lifecycle:transition" value="complete"/>
  <float key="OfferedAmount" value="9000.0"/>
</event>
<event>
  <string key="OfferID" value="Offer_1236377933"/>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_3"/>
  <string key="concept:name" value="O_Created"/>
  <string key="EventOrigin" value="Offer"/>
  <string key="EventID" value="OfferState_1545161685"/>
  <string key="lifecycle:transition" value="complete"/>
  <date key="time:timestamp" value="2016-01-02T12:31:01.388Z"/>
</event>
<event>
  <string key="OfferID" value="Offer_1236377933"/>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_3"/>
```

# IMPORT

```
<string key="concept:name" value="O_Sent (mail and online)"/>
<string key="EventOrigin" value="Offer"/>
<string key="EventID" value="OfferState_1890889062"/>
<string key="lifecycle:transition" value="complete"/>
<date key="time:timestamp" value="2016-01-02T12:31:11.640Z"/>
</event>
<event>
    <string key="Action" value="Deleted"/>
    <string key="org:resource" value="User_3"/>
    <string key="concept:name" value="W_Complete application"/>
    <string key="EventOrigin" value="Workflow"/>
    <string key="EventID" value="Workitem_1190436104"/>
    <string key="lifecycle:transition" value="complete"/>
    <date key="time:timestamp" value="2016-01-02T12:31:11.655Z"/>
</event>
<event>
    <string key="Action" value="Created"/>
    <string key="org:resource" value="User_3"/>
    <string key="concept:name" value="W_Call after offers"/>
    <string key="EventOrigin" value="Workflow"/>
    <string key="EventID" value="Workitem_1521625809"/>
    <string key="lifecycle:transition" value="schedule"/>
    <date key="time:timestamp" value="2016-01-02T12:31:11.662Z"/>
</event>
<event>
    <string key="Action" value="Obtained"/>
    <string key="org:resource" value="User_3"/>
    <string key="concept:name" value="W_Call after offers"/>
    <string key="EventOrigin" value="Workflow"/>
    <string key="EventID" value="Workitem_1770591784"/>
    <string key="lifecycle:transition" value="start"/>
    <date key="time:timestamp" value="2016-01-02T12:31:11.665Z"/>
</event>
<event>
    <string key="Action" value="statechange"/>
    <string key="org:resource" value="User_3"/>
    <string key="concept:name" value="A_Complete"/>
    <string key="EventOrigin" value="Application"/>
    <string key="EventID" value="ApplState_1633807146"/>
    <string key="lifecycle:transition" value="complete"/>
    <date key="time:timestamp" value="2016-01-02T12:31:11.667Z"/>
</event>
<event>
    <string key="Action" value="Released"/>
    <string key="org:resource" value="User_3"/>
    <string key="concept:name" value="W_Call after offers"/>
    <string key="EventOrigin" value="Workflow"/>
    <string key="EventID" value="Workitem_2022922365"/>
    <string key="lifecycle:transition" value="suspend"/>
    <date key="time:timestamp" value="2016-01-02T12:32:38.936Z"/>
</event>
<event>
    <string key="Action" value="Obtained"/>
    <string key="org:resource" value="User_11"/>
    <string key="concept:name" value="W_Call after offers"/>
    <string key="EventOrigin" value="Workflow"/>
    <string key="EventID" value="Workitem_1927775329"/>
    <string key="lifecycle:transition" value="resume"/>
    <date key="time:timestamp" value="2016-01-06T09:28:26.298Z"/>
</event>
<event>
    <string key="Action" value="Released"/>
    <string key="org:resource" value="User_11"/>
```

# IMPORT

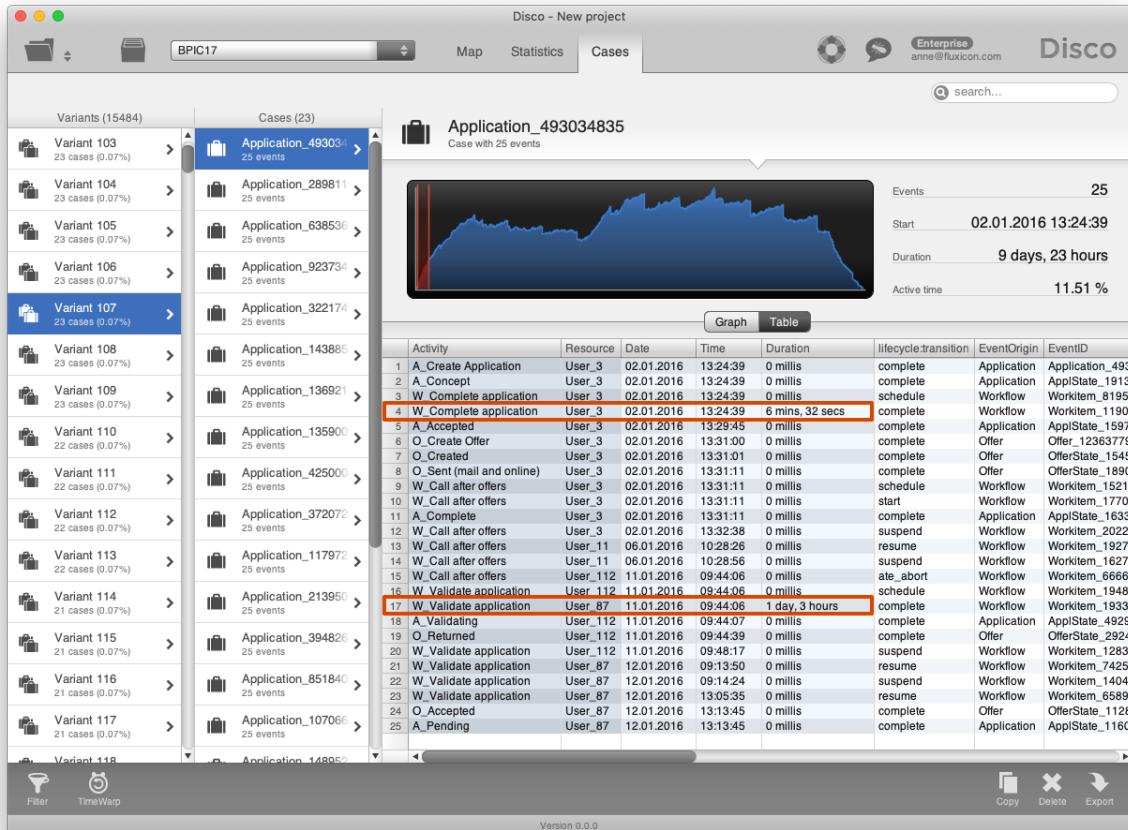
```
<string key="concept:name" value="W_Call after offers"/>
<string key="EventOrigin" value="Workflow"/>
<string key="EventID" value="Workitem_1627231525"/>
<string key="lifecycle:transition" value="suspend"/>
<date key="time:timestamp" value="2016-01-06T09:28:56.754Z"/>
</event>
<event>
  <string key="Action" value="Deleted"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="W_Call after offers"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_666607882"/>
  <string key="lifecycle:transition" value="ate_abort"/>
  <date key="time:timestamp" value="2016-01-11T08:44:06.364Z"/>
</event>
<event>
  <string key="Action" value="Created"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="W_Validate application"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_1948002622"/>
  <string key="lifecycle:transition" value="schedule"/>
  <date key="time:timestamp" value="2016-01-11T08:44:06.374Z"/>
</event>
<event>
  <string key="Action" value="Obtained"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="W_Validate application"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_1972055666"/>
  <string key="lifecycle:transition" value="start"/>
  <date key="time:timestamp" value="2016-01-11T08:44:06.379Z"/>
</event>
<event>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="A_Validating"/>
  <string key="EventOrigin" value="Application"/>
  <string key="EventID" value="ApplState_492986510"/>
  <string key="lifecycle:transition" value="complete"/>
  <date key="time:timestamp" value="2016-01-11T08:44:07.206Z"/>
</event>
<event>
  <string key="OfferID" value="Offer_1236377933"/>
  <string key="Action" value="statechange"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="O_Returned"/>
  <string key="EventOrigin" value="Offer"/>
  <string key="EventID" value="OfferState_292441853"/>
  <string key="lifecycle:transition" value="complete"/>
  <date key="time:timestamp" value="2016-01-11T08:44:39.240Z"/>
</event>
<event>
  <string key="Action" value="Released"/>
  <string key="org:resource" value="User_112"/>
  <string key="concept:name" value="W_Validate application"/>
  <string key="EventOrigin" value="Workflow"/>
  <string key="EventID" value="Workitem_1283781048"/>
  <string key="lifecycle:transition" value="suspend"/>
  <date key="time:timestamp" value="2016-01-11T08:48:17.482Z"/>
</event>
<event>
  <string key="Action" value="Obtained"/>
```

# IMPORT

```
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="W_Validate application"/>
<string key="EventOrigin" value="Workflow"/>
<string key="EventID" value="Workitem_742511566"/>
<string key="lifecycle:transition" value="resume"/>
<date key="time:timestamp" value="2016-01-12T08:13:50.864Z"/>
</event>
<event>
<string key="Action" value="Released"/>
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="W_Validate application"/>
<string key="EventOrigin" value="Workflow"/>
<string key="EventID" value="Workitem_1404052780"/>
<string key="lifecycle:transition" value="suspend"/>
<date key="time:timestamp" value="2016-01-12T08:14:24.136Z"/>
</event>
<event>
<string key="Action" value="Obtained"/>
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="W_Validate application"/>
<string key="EventOrigin" value="Workflow"/>
<string key="EventID" value="Workitem_658937168"/>
<string key="lifecycle:transition" value="resume"/>
<date key="time:timestamp" value="2016-01-12T12:05:35.482Z"/>
</event>
<event>
<string key="OfferID" value="Offer_1236377933"/>
<string key="Action" value="statechange"/>
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="O_Accepted"/>
<string key="EventOrigin" value="Offer"/>
<string key="EventID" value="OfferState_1128437541"/>
<string key="lifecycle:transition" value="complete"/>
<date key="time:timestamp" value="2016-01-12T12:13:45.145Z"/>
</event>
<event>
<string key="Action" value="statechange"/>
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="A_Pending"/>
<string key="EventOrigin" value="Application"/>
<string key="EventID" value="ApplState_1160305551"/>
<string key="lifecycle:transition" value="complete"/>
<date key="time:timestamp" value="2016-01-12T12:13:45.148Z"/>
</event>
<event>
<string key="Action" value="Deleted"/>
<string key="org:resource" value="User_87"/>
<string key="concept:name" value="W_Validate application"/>
<string key="EventOrigin" value="Workflow"/>
<string key="EventID" value="Workitem_1933451474"/>
<string key="lifecycle:transition" value="complete"/>
<date key="time:timestamp" value="2016-01-12T12:13:45.151Z"/>
</event>
</trace>
```

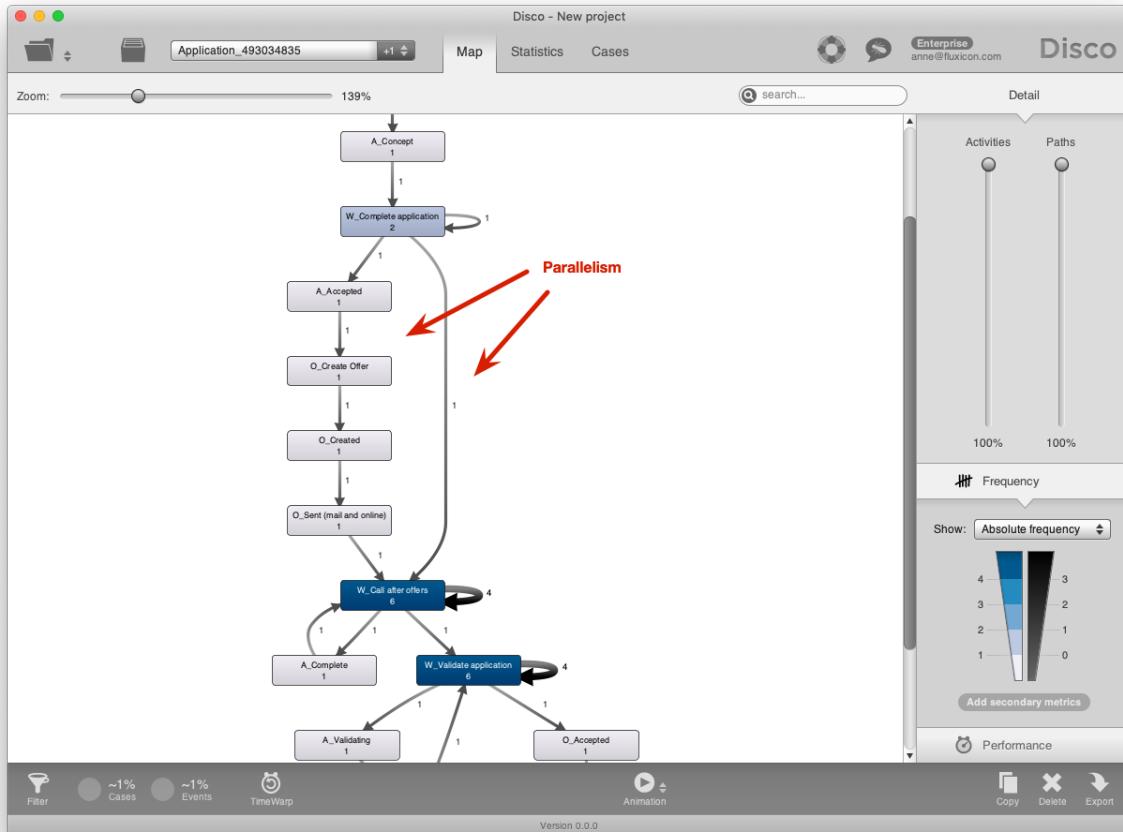
# IMPORT

As a result, the case has 25 events in Disco, whereas both the 'W\_Complete application' and the 'W\_Validate application' activities have a duration (see highlighted events in the screenshot below).



# IMPORT

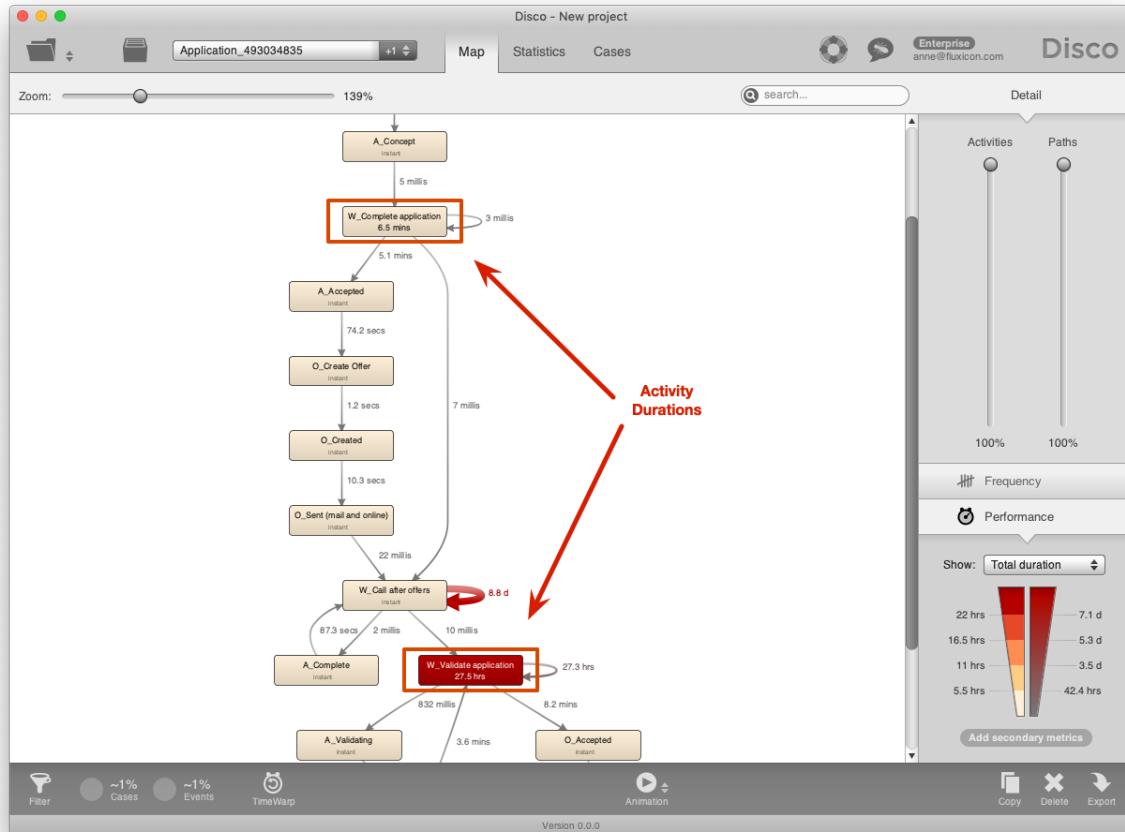
Note that detected activity durations are used in the inference of the process model (see the inferred parallel path for the case Application\_493034835 in the screenshot below).<sup>1</sup>



<sup>1</sup> Note that parallelism is discovered by Disco via overlapping activity durations within the same case, see <https://fluxicon.com/blog/2017/09/dealing-with-parallelism-in-your-process-maps/> for further information.

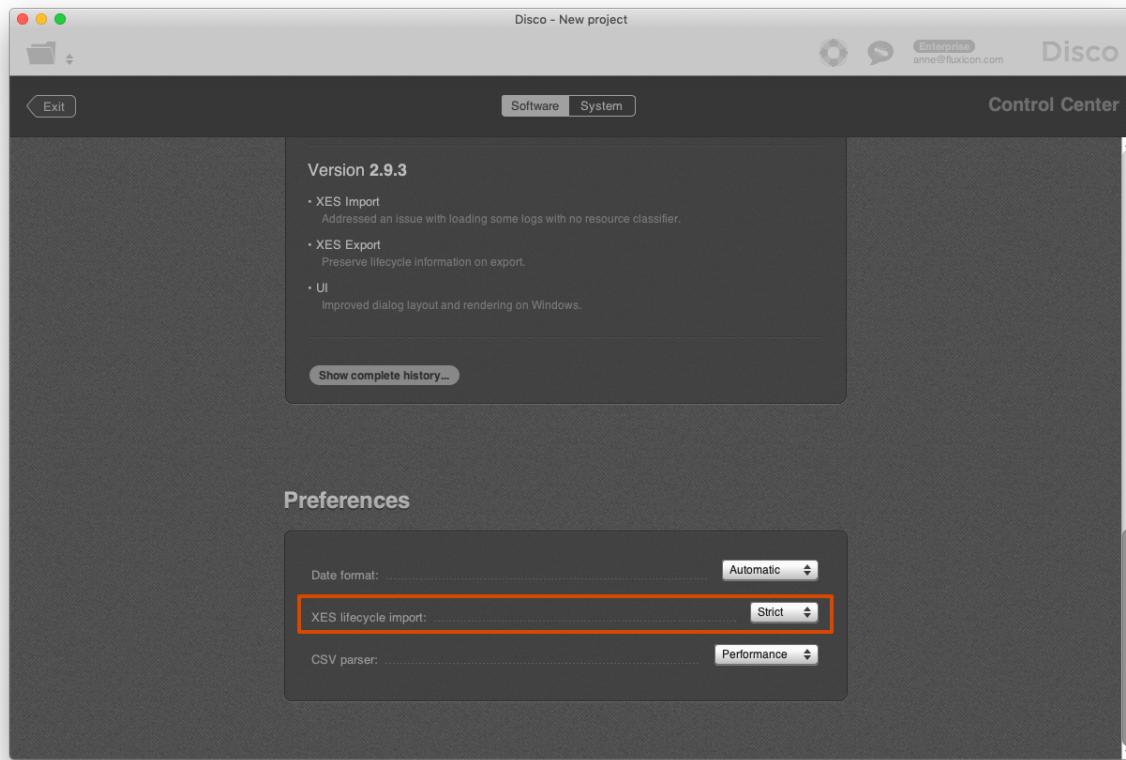
# IMPORT

Furthermore, the activity durations are displayed in the statistics as well as in the process map (see the screenshot below as an example).



# IMPORT

For situations, where matching 'start' and 'complete' events should **not** be combined into activities with a duration, the user can change the XES lifecycle import setting from 'smart' to 'strict' in the Control Center preferences of Disco (see screenshot below).



In 'strict' mode, all events remain atomic and, as a result, the case Application\_493034835 has now 27 events and no durations (see upper screenshot on next page). Furthermore, the imported data set has now 1,202,267 events (see lower screenshot on next page).

# IMPORT

Disco - New project

Map Statistics Cases

Case with 27 events

Application\_493034835

Events 27

Start 02.01.2016 13:24:39

Duration 9 days, 23 hours

| Activity                     | Resource | Date       | Time     | lifecycle.transition | EventOrigin | EventID                     | Action      |
|------------------------------|----------|------------|----------|----------------------|-------------|-----------------------------|-------------|
| 1. Create Application        | User_3   | 02.01.2016 | 13:24:39 | complete             | Application | 493034835                   | Created     |
| 2. V. Complete application   | User_3   | 02.01.2016 | 13:24:39 | complete             | Application | 493034835                   | statechange |
| 3. V. Complete application   | User_3   | 02.01.2016 | 13:24:39 | schedule             | Workflow    | WorkflowItem_807173433      | Obtained    |
| 4. V. Complete application   | User_3   | 02.01.2016 | 13:24:39 | start                | Workflow    | WorkflowItem_807173433      | Workflow    |
| 5. Accepted                  | User_3   | 02.01.2016 | 13:29:45 | complete             | Application | AppInstanceState_1597124964 | statechange |
| 6. D. Create Offer           | User_3   | 02.01.2016 | 13:31:00 | complete             | Offer       | OfferState_154516168        | Created     |
| 7. D. Created                | User_3   | 02.01.2016 | 13:31:01 | complete             | Offer       | OfferState_154516168        | Created     |
| 8. D. Sent (mail and online) | User_3   | 02.01.2016 | 13:31:11 | complete             | Offer       | OfferState_1890889062       | statechange |
| 9. V. Complete application   | User_3   | 02.01.2016 | 13:31:11 | complete             | Workflow    | WorkflowItem_119043610      | Deleted     |
| 10. V. Call after offers     | User_3   | 02.01.2016 | 13:31:11 | schedule             | Workflow    | WorkflowItem_152162580      | Created     |
| 11. V. Call after offers     | User_3   | 02.01.2016 | 13:31:11 | start                | Workflow    | WorkflowItem_152162580      | Workflow    |
| 12. V. Complete offers       | User_3   | 02.01.2016 | 13:31:11 | complete             | Application | AppInstanceState_1633807146 | statechange |
| 13. V. Call after offers     | User_3   | 02.01.2016 | 13:32:38 | suspend              | Workflow    | WorkflowItem_2022922385     | Released    |
| 14. V. Call after offers     | User_11  | 06.01.2016 | 10:28:26 | resume               | Workflow    | WorkflowItem_1927775329     | Obtained    |
| 15. V. Call after offers     | User_11  | 06.01.2016 | 10:28:56 | suspend              | Workflow    | WorkflowItem_1627231525     | Released    |
| 16. V. Call after offers     | User_112 | 11.01.2016 | 09:44:06 | ate_abort            | Workflow    | WorkflowItem_666607882      | Deleted     |
| 17. V. Validate application  | User_112 | 11.01.2016 | 09:44:06 | schedule             | Workflow    | WorkflowItem_1948002622     | Created     |
| 18. V. Validate application  | User_112 | 11.01.2016 | 09:44:06 | start                | Workflow    | WorkflowItem_197205566      | Obtained    |
| 19. V. Validating            | User_112 | 11.01.2016 | 09:44:06 | complete             | Application | AppInstanceState_49289810   | statechange |
| 20. V. Validate              | User_112 | 11.01.2016 | 09:44:06 | complete             | Offer       | OfferState_149289810        | statechange |
| 21. V. Validate application  | User_112 | 11.01.2016 | 09:48:17 | suspend              | Workflow    | WorkflowItem_1283781048     | Released    |
| 22. V. Validate application  | User_87  | 12.01.2016 | 09:13:50 | resume               | Workflow    | WorkflowItem_74251156       | Obtained    |
| 23. V. Validate application  | User_87  | 12.01.2016 | 09:14:24 | suspend              | Workflow    | WorkflowItem_1404052780     | Released    |
| 24. V. Validate application  | User_87  | 12.01.2016 | 13:05:35 | resume               | Workflow    | WorkflowItem_658937168      | Obtained    |
| 25. D. Accepted              | User_87  | 12.01.2016 | 13:13:45 | complete             | Offer       | OfferState_1128437541       | statechange |
| 26. V. Pending               | User_87  | 12.01.2016 | 13:13:45 | complete             | Application | AppInstanceState_1160305551 | statechange |
| 27. V. Validate application  | User_87  | 12.01.2016 | 13:13:45 | complete             | Workflow    | WorkflowItem_1933451474     | Deleted     |

Copy Delete Export

Version 2.9.7

Disco - New project

Map Statistics Cases

Overview Global statistics

Events over time

Active cases over time Case variants Events per case Case duration

Events 1,202,267

Cases 31,509

Activities 26

Median case duration 19.1 d

Mean case duration 21.9 d

Start 01.01.2016 10:51:15

End 01.02.2017 15:11:03

| Case ID               | Events | Variant        | Started             | Finished            | Duration          |
|-----------------------|--------|----------------|---------------------|---------------------|-------------------|
| Application_49289886  | 31     | Variant 5,734  | 20.04.2016 19:10:53 | 29.04.2016 15:14:46 | 8 days, 20 hours  |
| Application_493034835 | 27     | Variant 88     | 02.01.2016 13:24:39 | 12.01.2016 13:13:45 | 9 days, 23 hours  |
| Application_493034840 | 33     | Variant 58     | 30.01.2016 11:24:53 | 07.02.2016 10:43:18 | 7 days, 3 hours   |
| Application_493034847 | 24     | Variant 12     | 01.01.2016 11:59:19 | 01.01.2016 12:00:19 | 7 days, 0 hours   |
| Application_493293481 | 37     | Variant 328    | 04.04.2016 13:47:22 | 13.04.2016 16:55:39 | 8 days, 3 hours   |
| Application_493378651 | 25     | Variant 14,275 | 24.08.2016 11:45:34 | 25.08.2016 09:00:07 | 31 days, 20 hours |
| Application_493345403 | 42     | Variant 110    | 24.02.2016 11:19:51 | 05.03.2016 16:53:57 | 13 days, 5 hours  |
| Application_493571606 | 73     | Variant 36     | 25.02.2016 05:01:31 | 03.03.2016 11:12:06 | 44 days, 6 hours  |
| Application_493690701 | 32     | Variant 62     | 25.02.2016 05:01:31 | 03.03.2016 11:12:06 | 44 days, 6 hours  |
| Application_493778424 | 62     | Variant 13,802 | 03.11.2016 17:38:01 | 16.12.2016 16:48:20 | 42 days, 23 hours |
| Application_493812371 | 33     | Variant 7,452  | 08.06.2016 12:56:07 | 12.07.2016 08:00:19 | 33 days, 19 hours |
| Application_493845140 | 47     | Variant 1,127  | 06.03.2016 19:40:57 | 29.03.2016 14:20:27 | 14 days, 9 hours  |
| Application_493845140 | 30     | Variant 58     | 03.03.2016 14:20:57 | 24.03.2016 13:17:45 | 13 days, 9 hours  |
| Application_493845714 | 26     | Variant 20     | 05.08.2016 07:47:29 | 26.08.2016 16:54:31 | 21 days, 9 hours  |
| Selected              | 23     | Variant 4      | 07.08.2016 03:15:08 | 09.08.2016 08:00:40 | 30 days, 4 hours  |
| Application_493971498 | 36     | Variant 4,315  | 07.03.2016 12:17:19 | 21.03.2016 12:56:30 | 14 days, 39 mins. |

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Version 2.9.7

# IMPORT

## ARTIFICIAL LOGS

### FILTERED REPAIREXAMPLE LOGS

| NAME    | LEVEL | EVENT ATTRIBUTE KEYS (IF BOLD THEN GLOBAL)                                                                                                                                                                  |
|---------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LevelA1 | A1    | <b>concept:name</b>                                                                                                                                                                                         |
| LevelA2 | A2    | Classifier ( <b>concept:name</b> AND <b>lifecycle:transition</b> )                                                                                                                                          |
| LevelB1 | B1    | <b>concept:name</b> ,<br><b>lifecycle:transition</b> ,<br><b>time:timestamp</b>                                                                                                                             |
| LevelB2 | B2    | Classifier ( <b>concept:name</b> AND <b>lifecycle:transition</b> ),<br><b>time:timestamp</b>                                                                                                                |
| LevelC1 | C1    | <b>concept:name</b> ,<br><b>org:resource</b>                                                                                                                                                                |
| LevelC2 | C2    | Classifier ( <b>concept:name</b> AND <b>lifecycle:transition</b> ),<br><b>org:resource</b>                                                                                                                  |
| LevelD1 | D1    | <b>concept:name</b> ,<br><b>concept:instance</b> ,<br><b>lifecycle:transition</b> ,<br><b>org:resource</b> ,<br><b>org:group</b> ,<br><b>org:role</b> ,<br><b>time:timestamp</b>                            |
| LevelD2 | D2    | Classifier ( <b>concept:name</b> AND <b>lifecycle:transition</b> ),<br><b>concept:instance</b> ,<br><b>org:resource</b> ,<br><b>org:group</b> ,<br><b>org:role</b> ,<br><b>time:timestamp</b>               |
| FlagX1  | X1    | defectFixed,<br>defectType,<br><b>Key 1</b> ,<br>Key 2,<br><b>Key 3</b> ,<br><b>Key 4</b> ,<br><b>Key 6</b> ,<br>phoneType,<br>numberRepairs,<br><b>{0,1,2} 2Sa!! +1 &lt;x&gt;</b> ,<br>ITEMS:41, #1, o.1.1 |
| FlagX2  | X2    | defectFixed,<br>defectType,<br>Classifier ( <b>Key 1</b> AND <b>Key 6</b> ),<br>Key 2,<br><b>Key 3</b> ,<br><b>Key 4</b> ,                                                                                  |

# IMPORT

phoneType,  
numberRepairs,  
**{0,1,2} 2Sa!! +1 <x>**,  
ITEMS:41, #1, o.1.1

## ATTRIBUTE TYPES AND VALUES

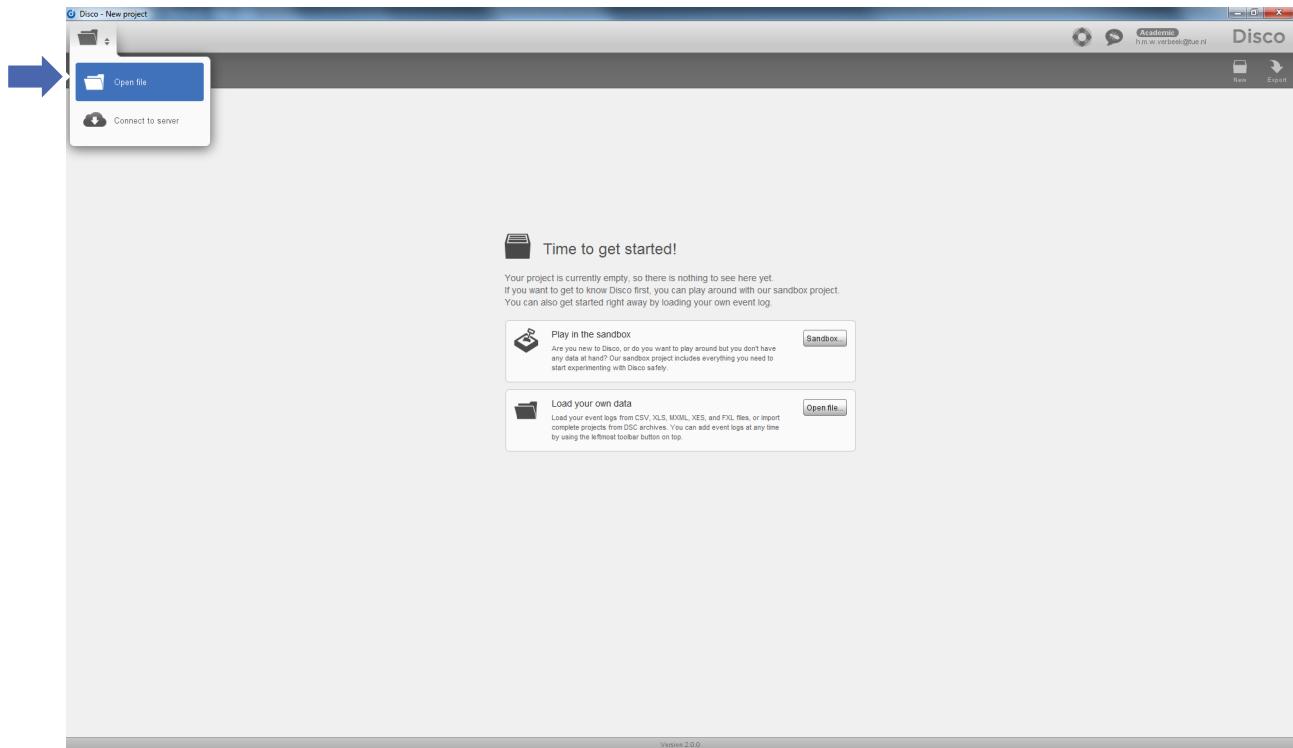
| KEYS                                                  | TYPE   | VALUES                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>concept:instance</b><br>Key 2                      | string | instance 1<br>instance 2<br>instance 3<br>instance 4                                                                                                                                                                                                                                                        |
| <b>concept:name (A1 and C1 logs)</b>                  | string | Analyze Defect+complete<br>Analyze Defect+start<br>Archive Repair+complete<br>Inform User+complete<br>Register+complete<br>Repair (Complex)+complete<br>Repair (Complex)+start<br>Repair (Simple)+complete<br>Repair (Simple)+start<br>Restart Repair+complete<br>Test Repair+complete<br>Test Repair+start |
| <b>concept:name (other logs)</b><br>Key 1             | string | Analyze Defect<br>Archive Repair<br>Inform User<br>Register<br>Repair (Simple)<br>Repair (Complex)<br>Restart Repair<br>Test Repair                                                                                                                                                                         |
| <b>lifecycle:transition</b><br>Key 6                  | string | start<br>complete                                                                                                                                                                                                                                                                                           |
| <b>org:group</b><br><b>{0,1,2} 2Sa!! +1 &lt;x&gt;</b> | string | Group -<br>Group 1, 3, and 5<br>Group 2 and 4                                                                                                                                                                                                                                                               |
| <b>org:resource</b><br>Key 3                          | string | SolverC1<br>SolverC2<br>SolverC3<br>SolverS1<br>SolverS2<br>SolverS3<br>System<br>Tester1<br>Tester2                                                                                                                                                                                                        |

# IMPORT

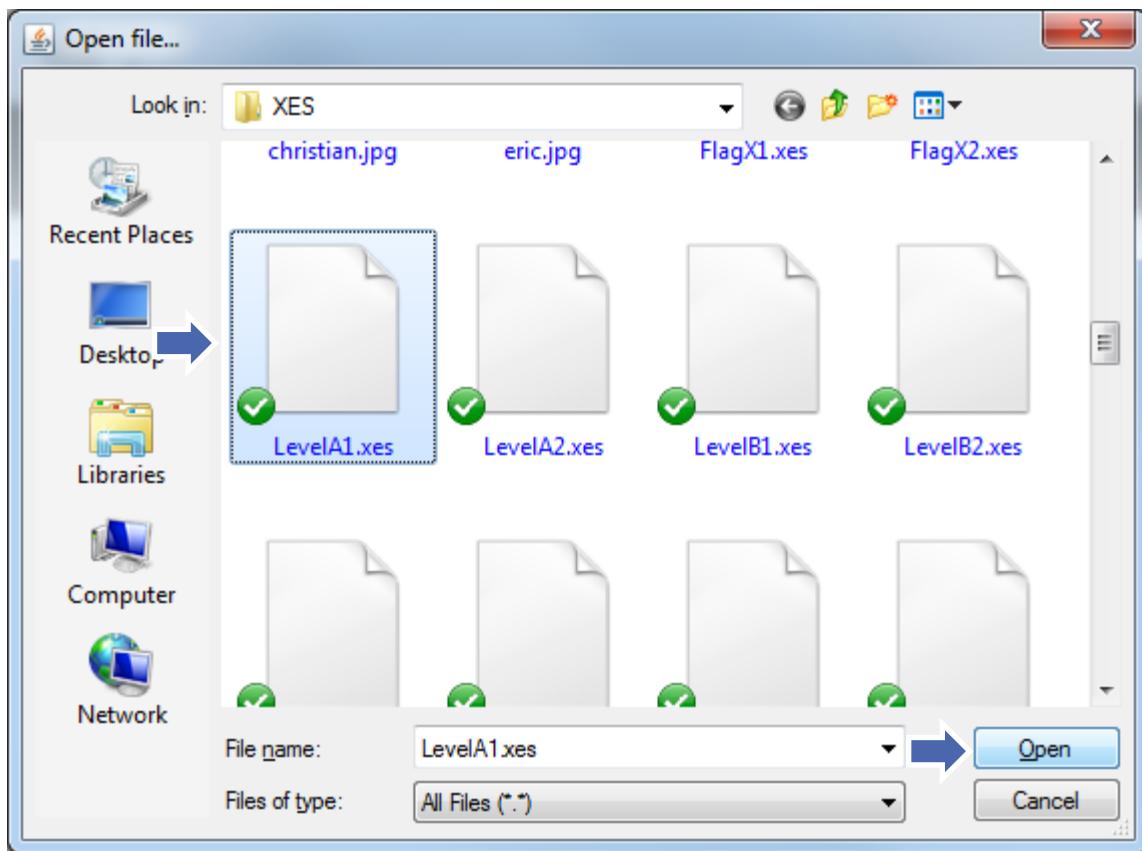
|                                               |         |                                                 |
|-----------------------------------------------|---------|-------------------------------------------------|
|                                               |         | Tester3<br>Tester4<br>Tester5<br>Tester6        |
| <b>org:role</b><br><b>ITEMS:41, #1, o.1.1</b> | string  | Role 1, 2, and 3<br>Role 10<br>Role 9           |
| <b>time:timestamp</b><br><b>Key 4</b>         | date    | Like 1970-01-02T12:23:56.720+01:00              |
| <b>defectFixed</b>                            | boolean | true<br>false                                   |
|                                               |         | 1<br>10<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9 |
| <b>defectType</b>                             | int     | 0<br>1<br>2<br>3                                |
| <b>numberRepairs</b>                          | int     | 0<br>1<br>2<br>3                                |
| <b>phoneType</b>                              | String  | T1<br>T2<br>T3                                  |

# IMPORT

## Level A1

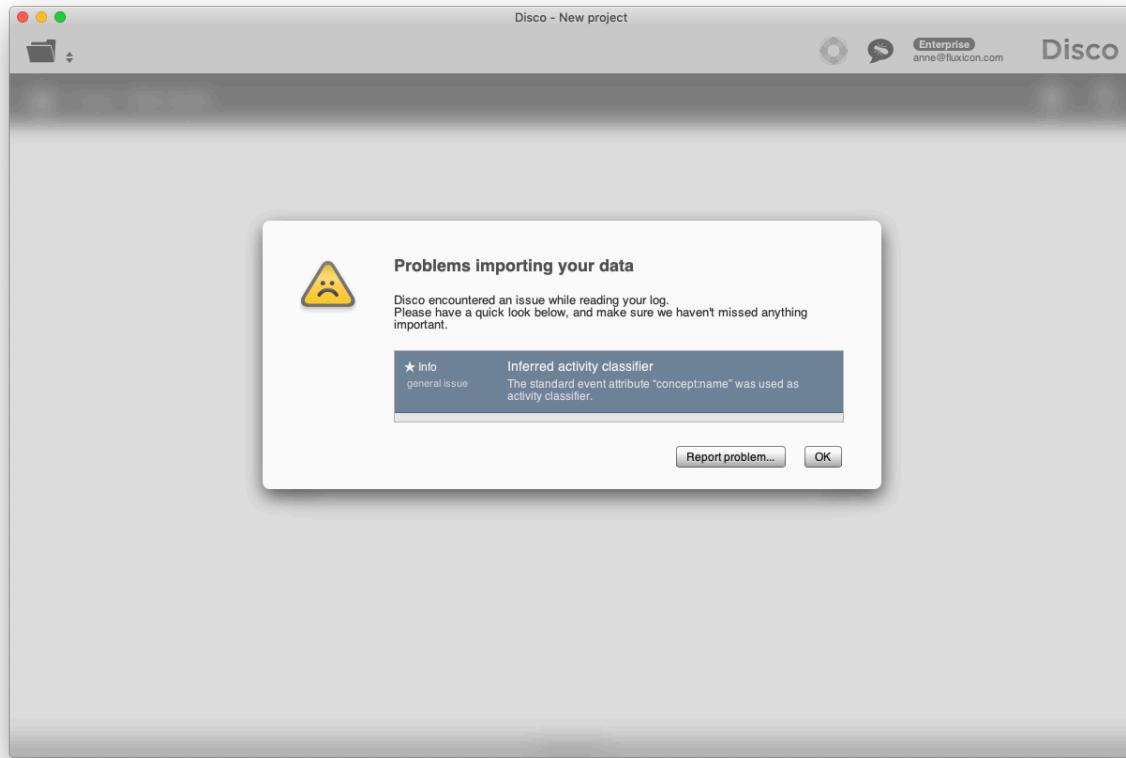


# IMPORT



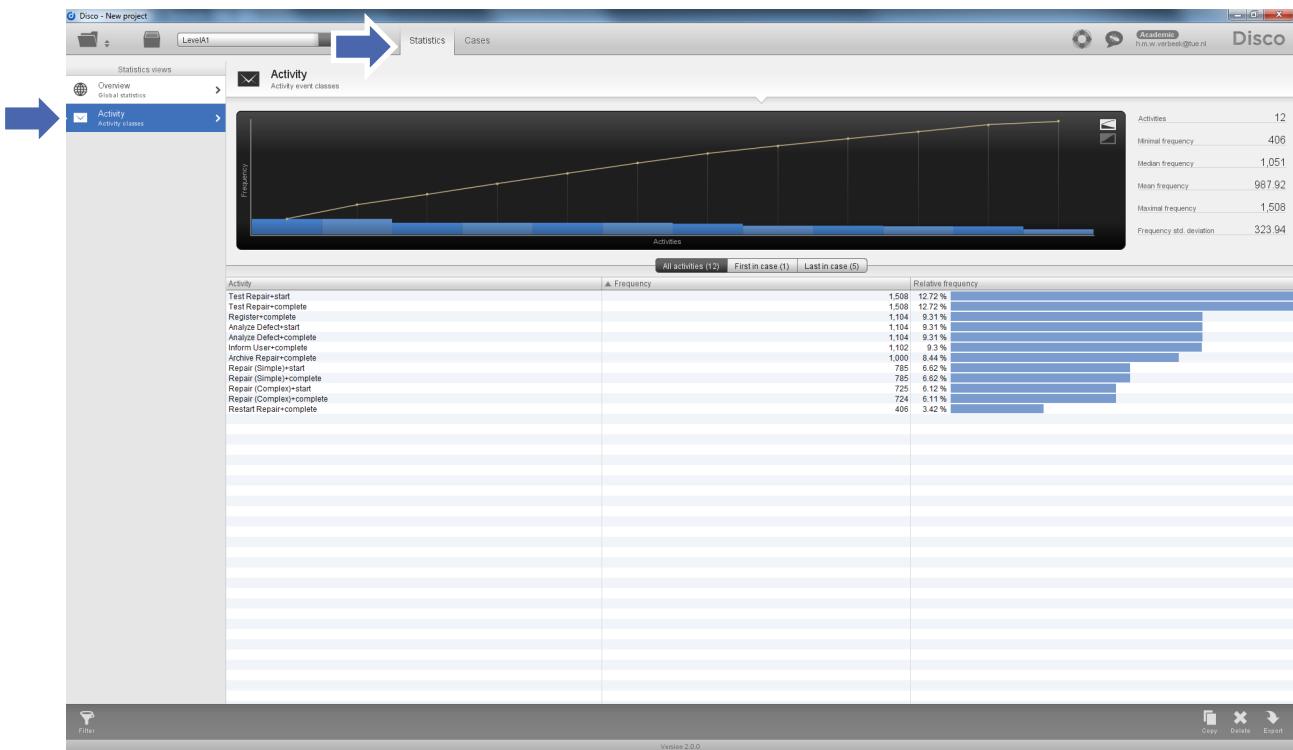
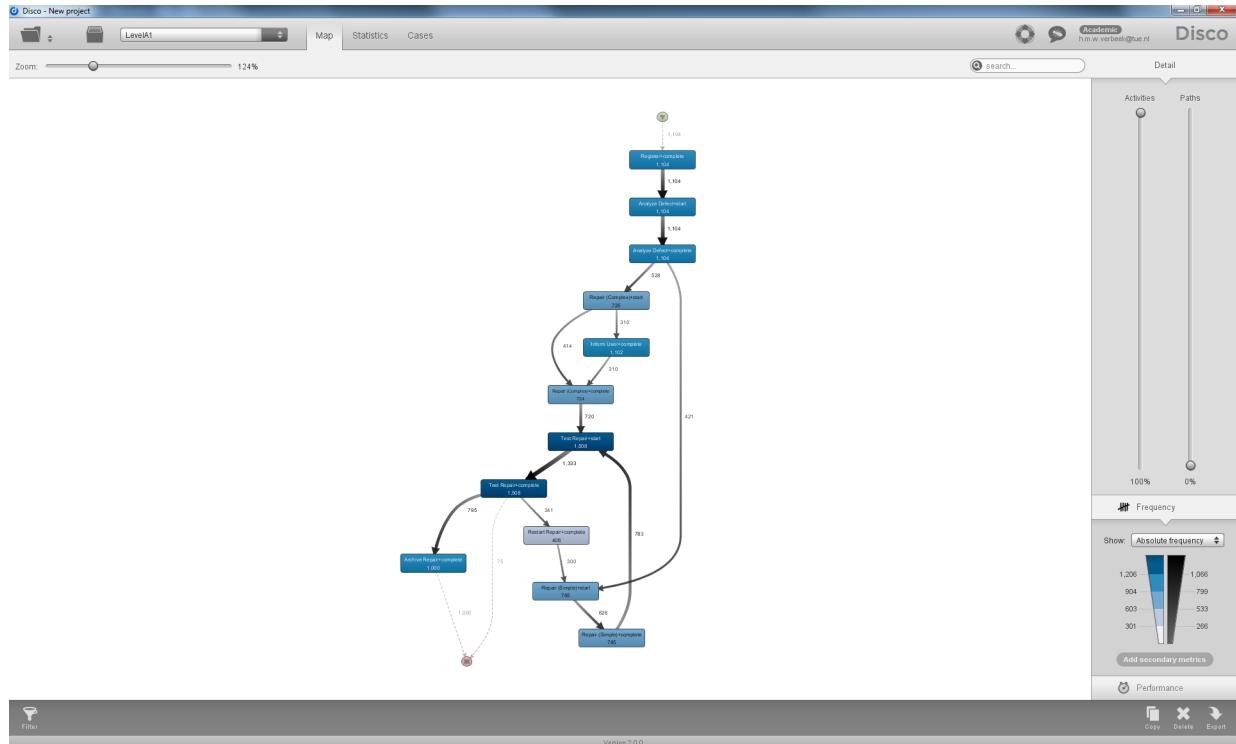
# IMPORT

Since classifiers are a mandatory feature of the XES standard, Disco informs the user that no classifier has been found in the imported file and that the standard event attribute concept:name was used instead (see screenshot below).



After pressing OK, the file is imported with this inferred event classifier being used as the activity name in Disco (see screenshots on the next page).

# IMPORT

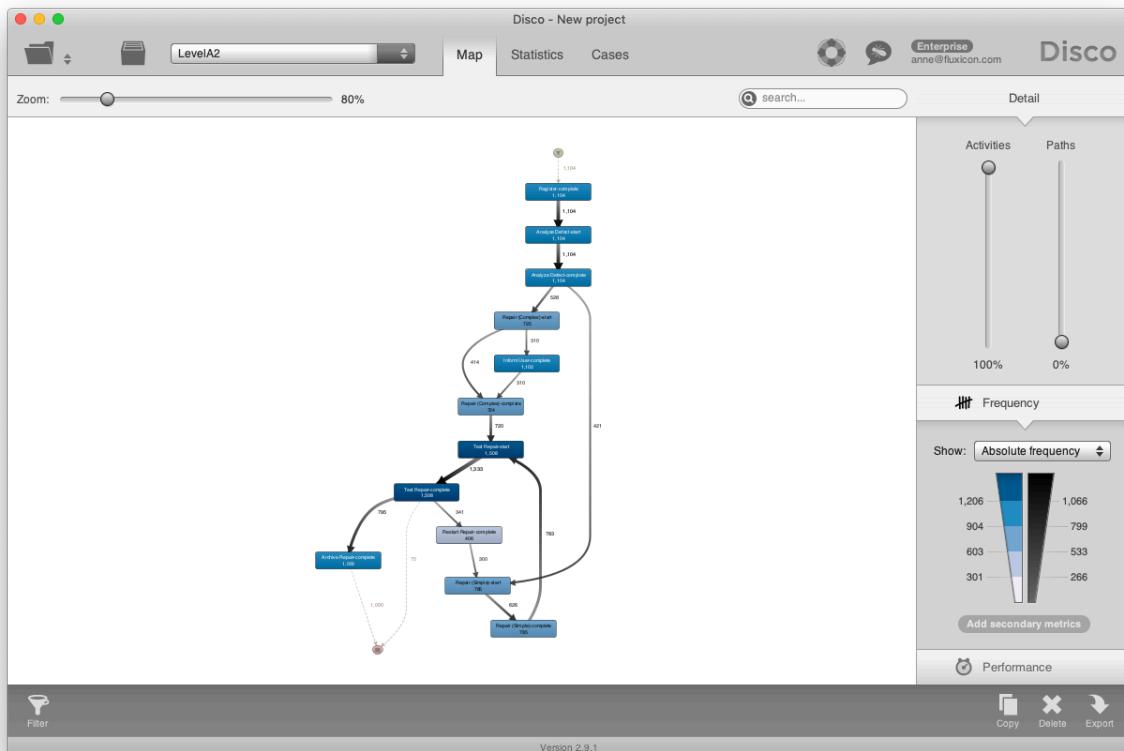


## IMPORT

This shows that the concept:name attributes contained in the log were used.

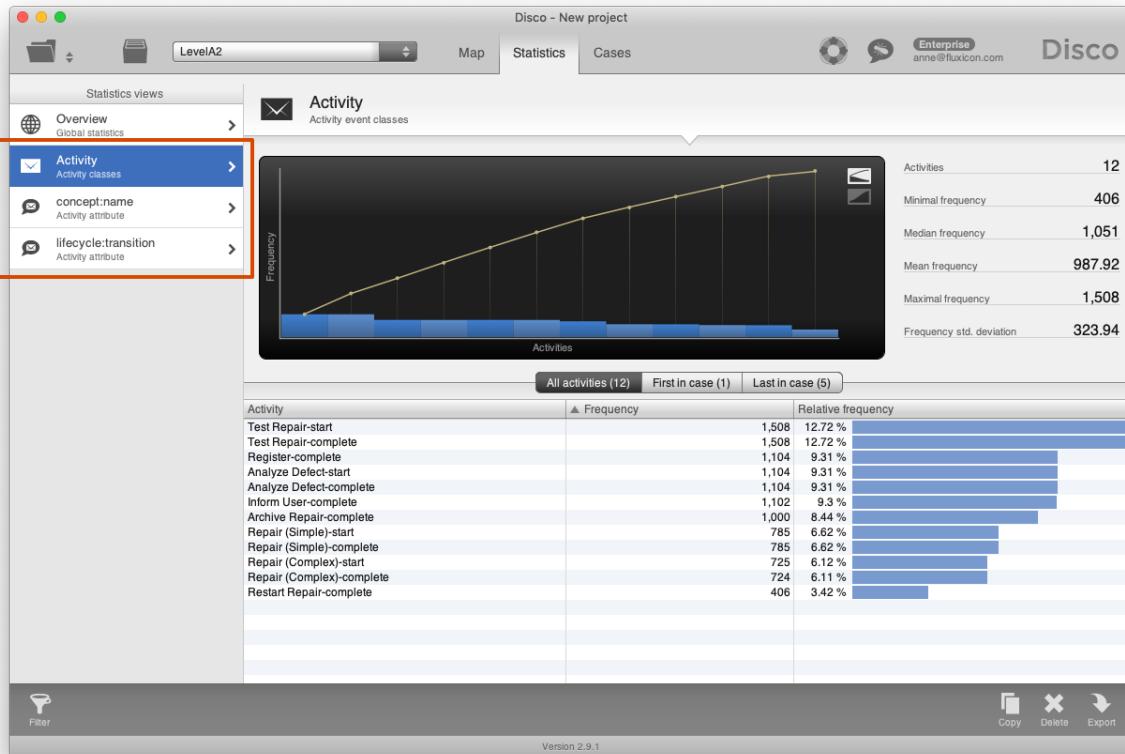
## Level A2

The classifier is used as the activity name (see screenshot of discovered process map below).



# IMPORT

Furthermore, both of the attributes that in their combination form the activity classifier are also preserved as separate attributes independently (for statistics and filtering purposes) as shown in the screenshot below.

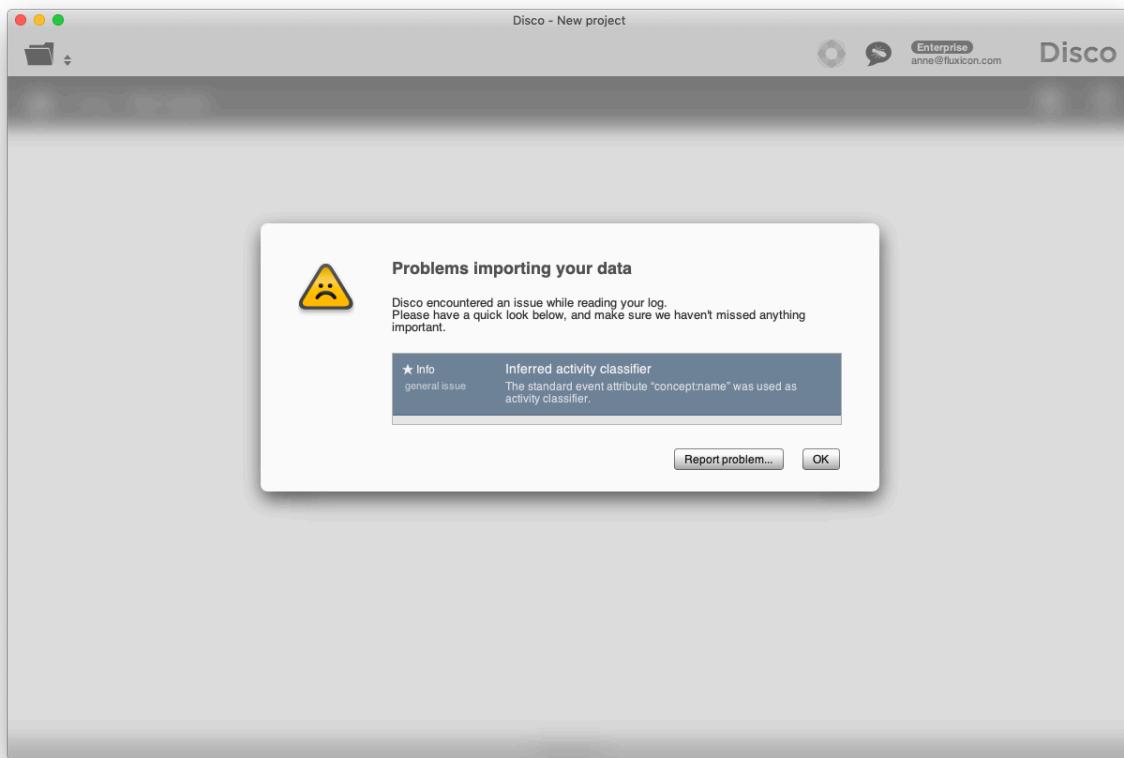


This shows that the classifier contained in the log was used.

# IMPORT

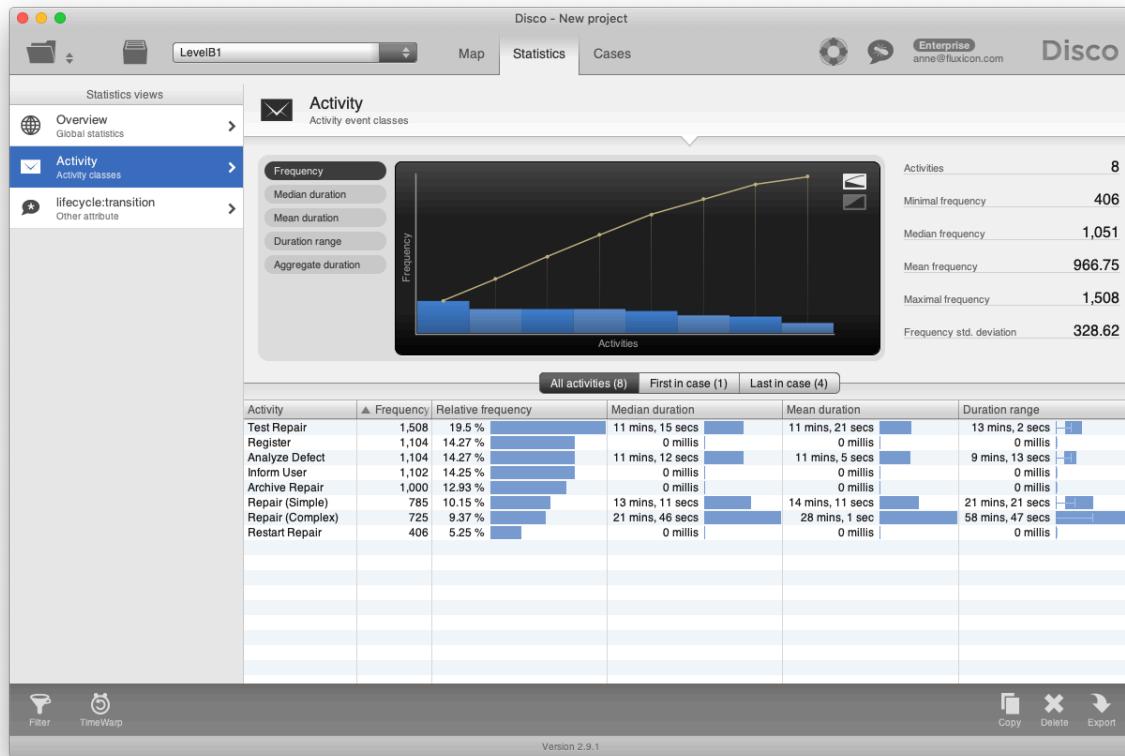
## Level B1

The same informational message as for A1 is shown to the user, because the data set does not contain a classifier.



# IMPORT

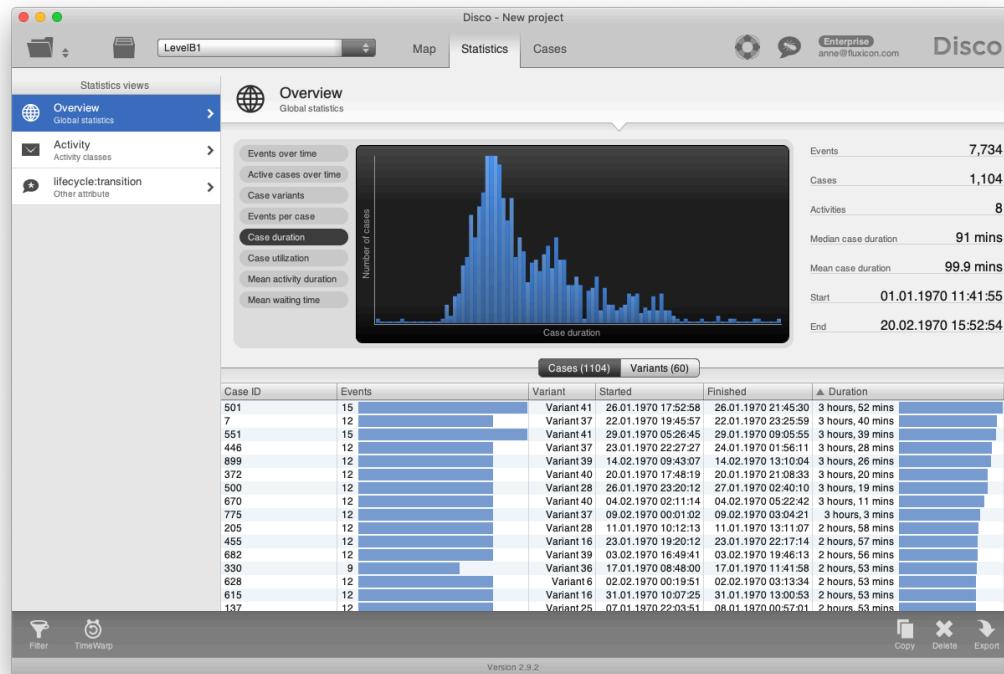
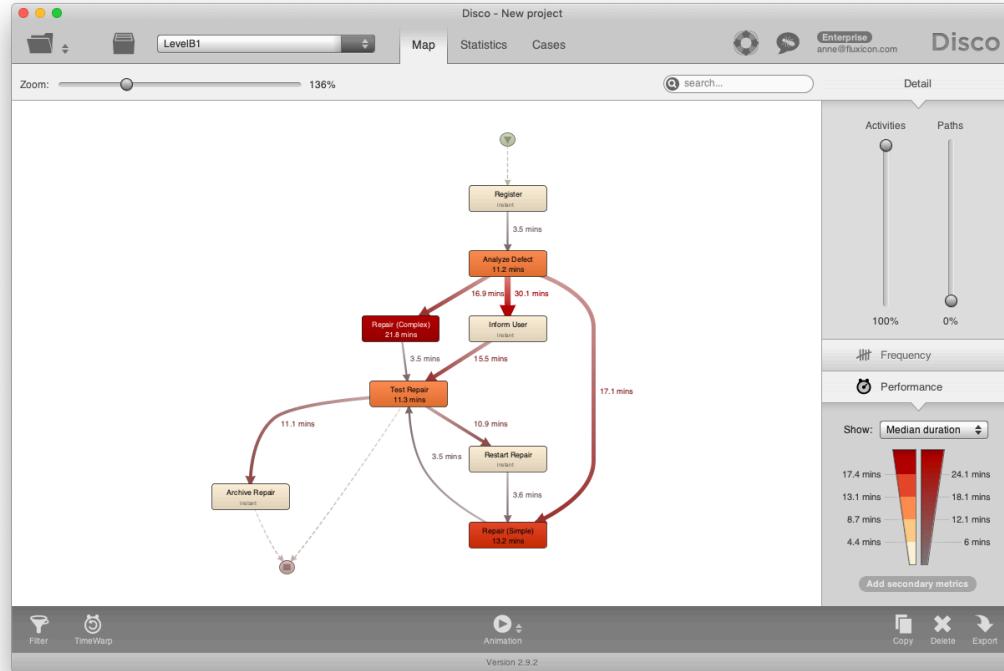
Instead, the standard event attribute `concept:name` is used as the activity name (see screenshot below).



Furthermore, the timestamps are used for performance measurements in various places (see the process map with median durations and the case duration statistics overview on the next page as an example). Note that the activity durations are derived from interpreting the "start" and "complete" timestamps of the `lifecycle:transition` attribute.

This shows that the `concept:name`, `lifecycle:transition`, and `time:timestamp` attributes contained in the log were used.

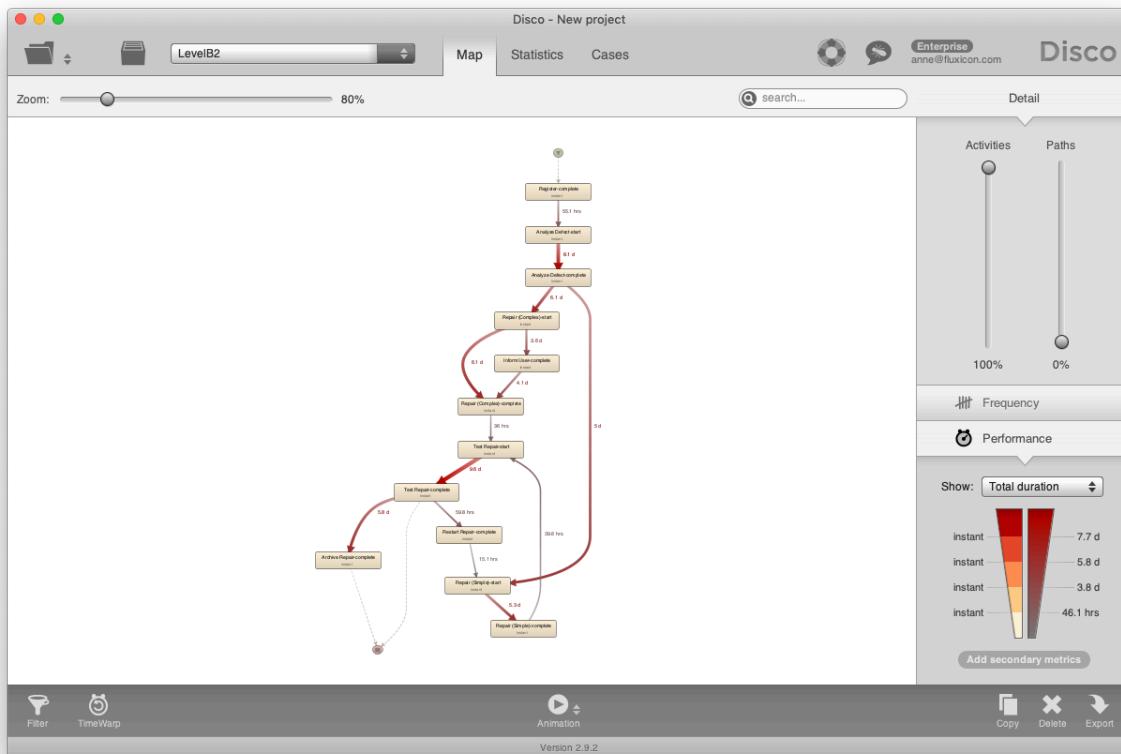
# IMPORT



# IMPORT

## Level B2

Because the classifier combines the standard event attribute concept:name and lifecycle:transition, the activities are atomic and have no durations anymore. However, the timestamps are still used to calculate the case durations. Furthermore, the process map shows the waiting times between activities (see screenshot below).

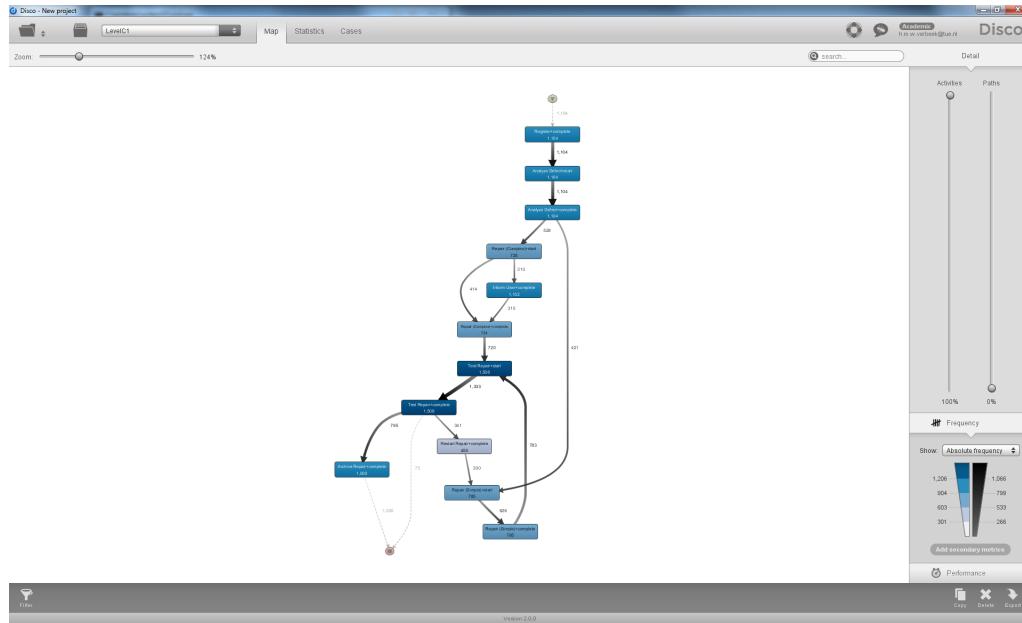
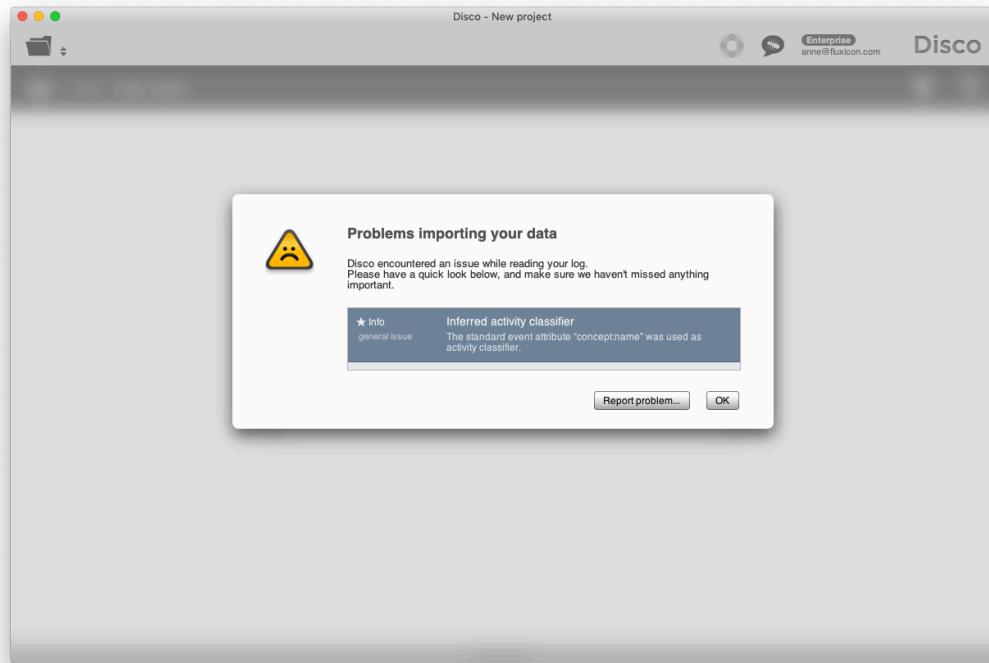


This shows that the classifier and the time:timestamp attributes contained in the log were used.

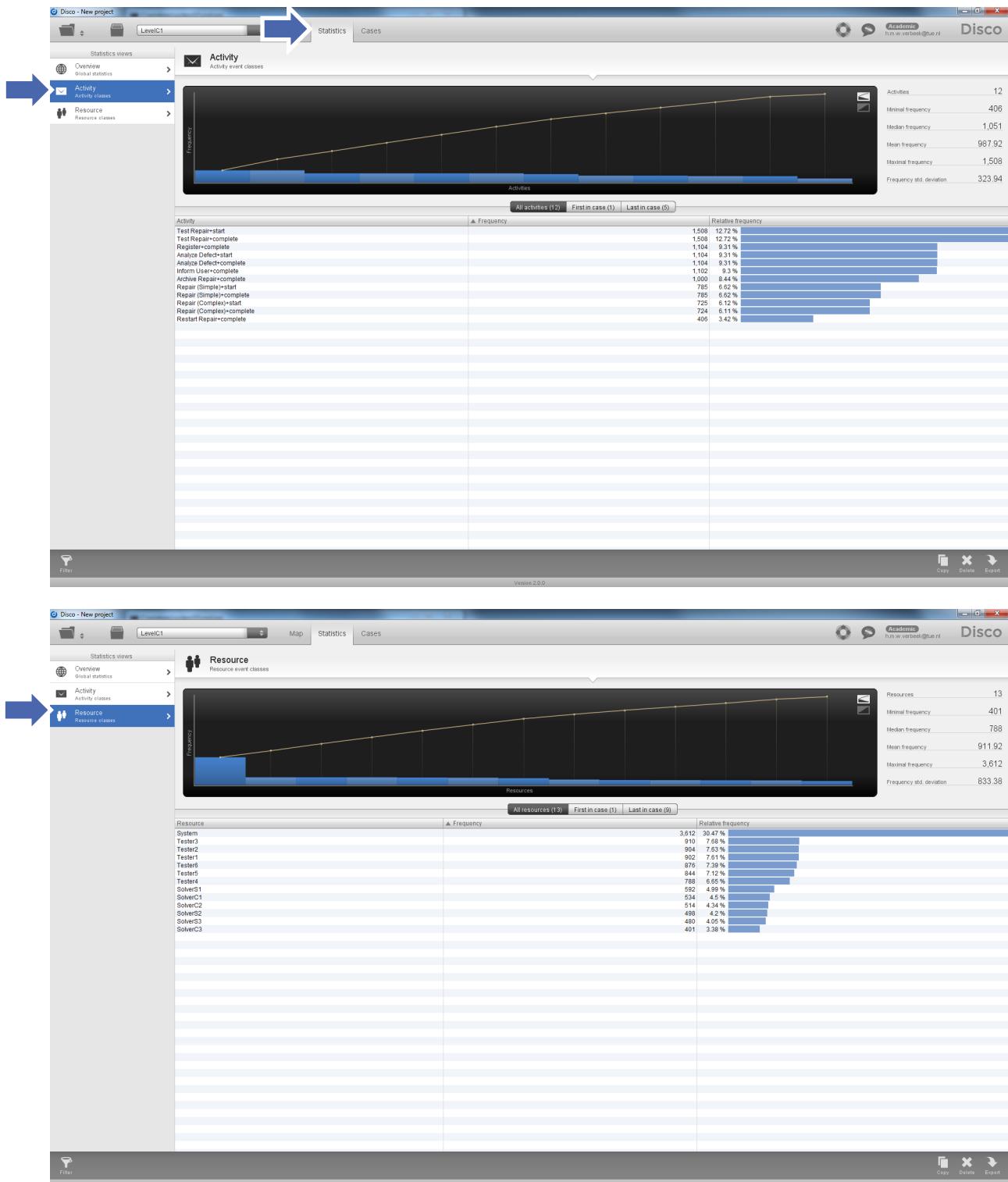
## IMPORT

## Level C1

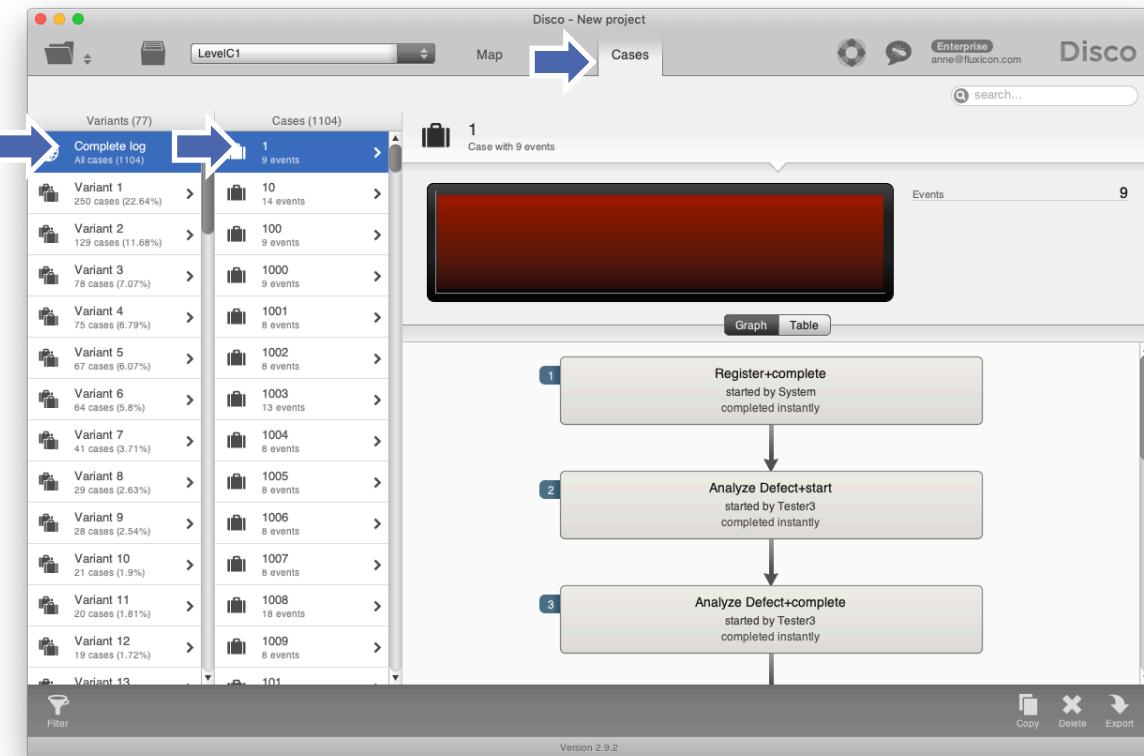
Similar to A1 and B1, a message notifies the user that due to the lack of a defined classifier, the standard event attribute concept:name is used as the activity name.



# IMPORT



# IMPORT

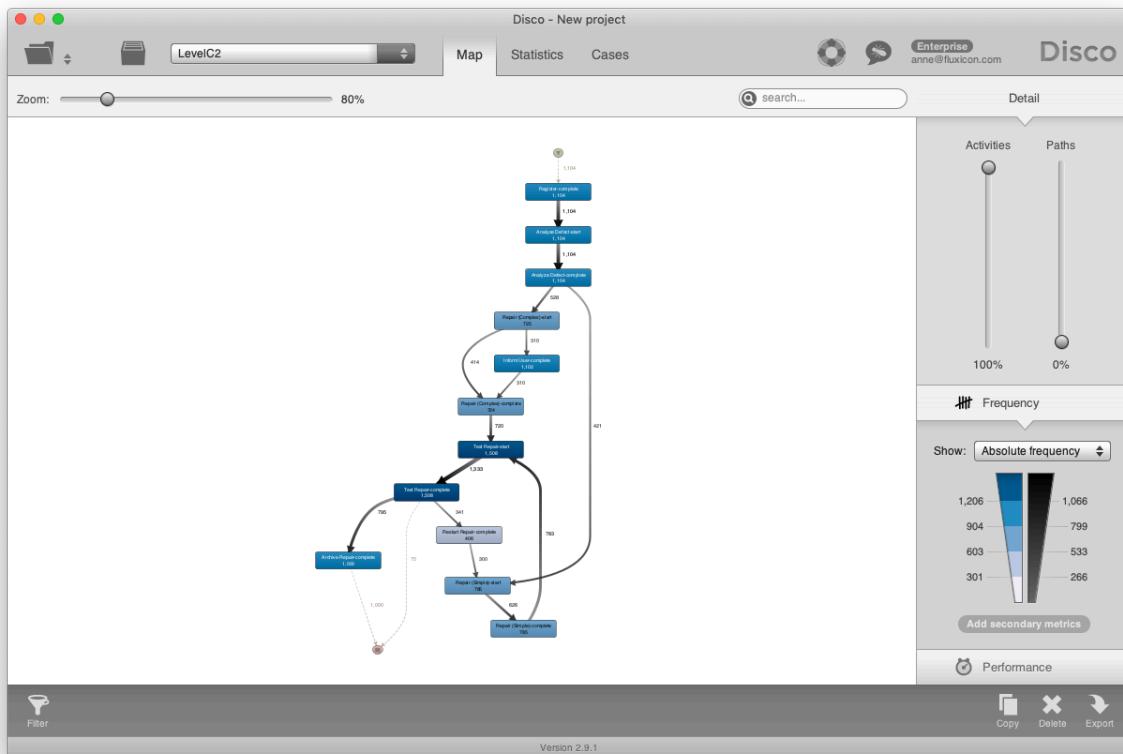


The above screenshots show that the concept:name and org:resource attributes contained in the log were used.

# IMPORT

## Level C2

The classifier is used for the activity name.

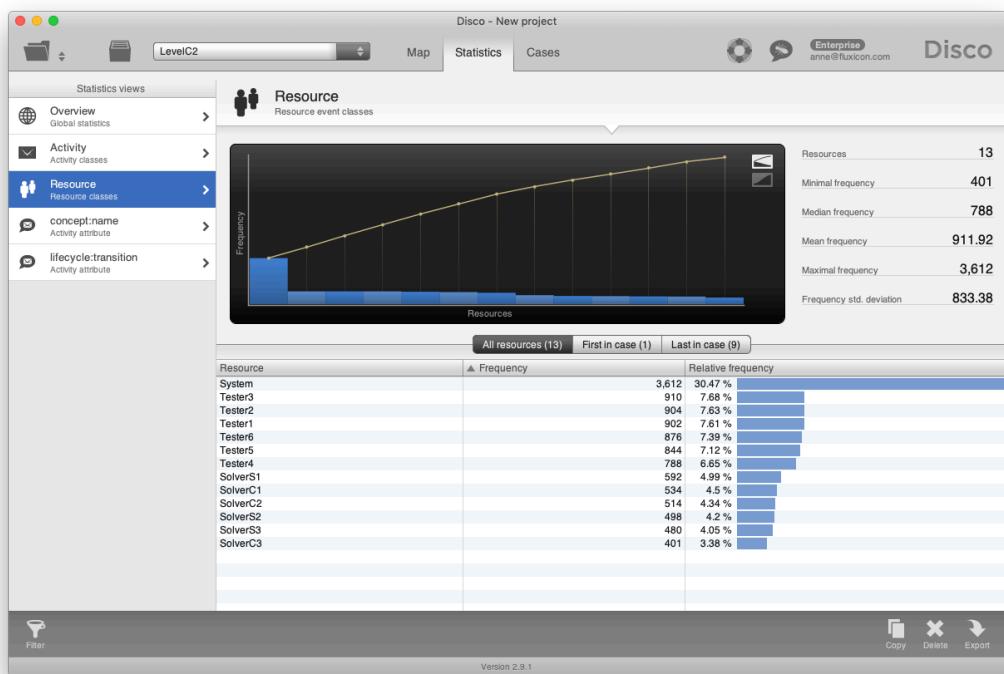
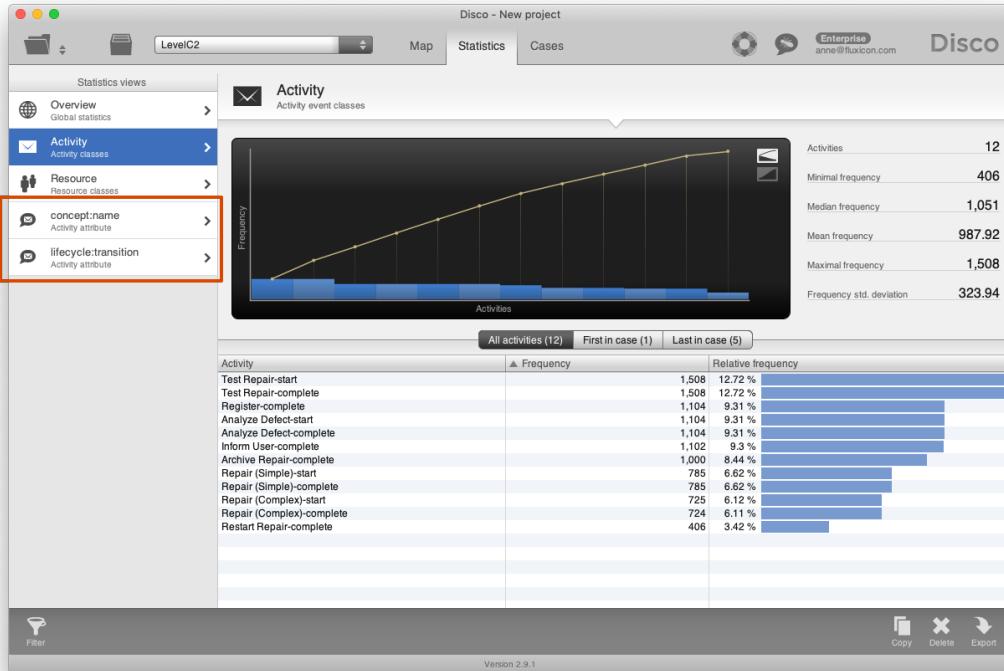


Because the classifier combines concept:name and lifecycle:transition, the activity name is the combination of these two fields. The individual standard event attributes concept:name and lifecycle:transition are also still available for display, statistics, and for filtering (see screenshot on next page).

The org:resource attribute is used for the resource (see screenshot on next page).

This shows that the classifier and the org:resource attributes contained in the log were used.

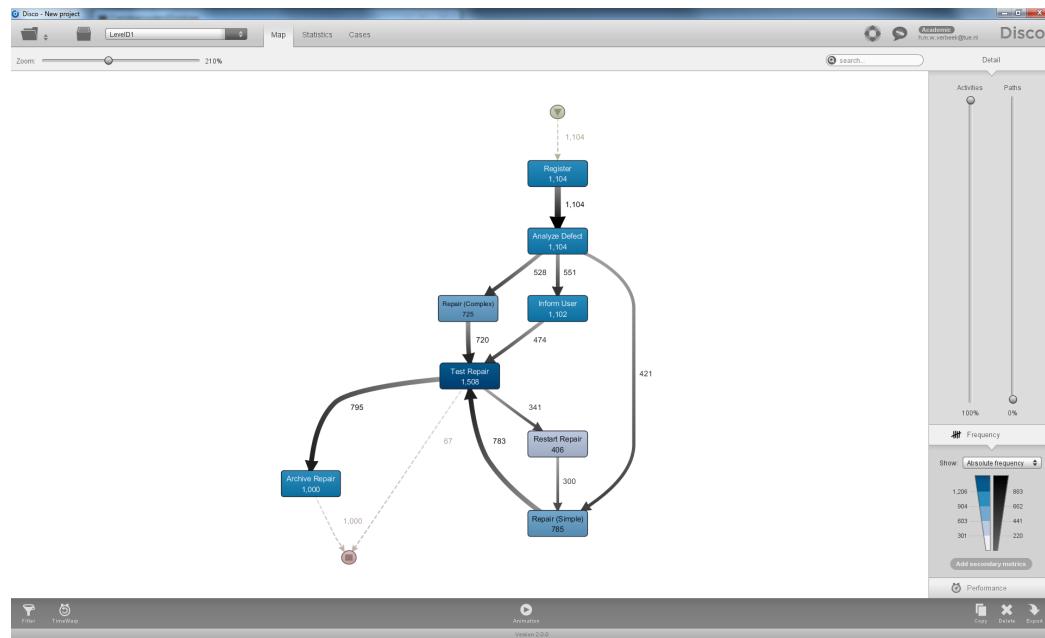
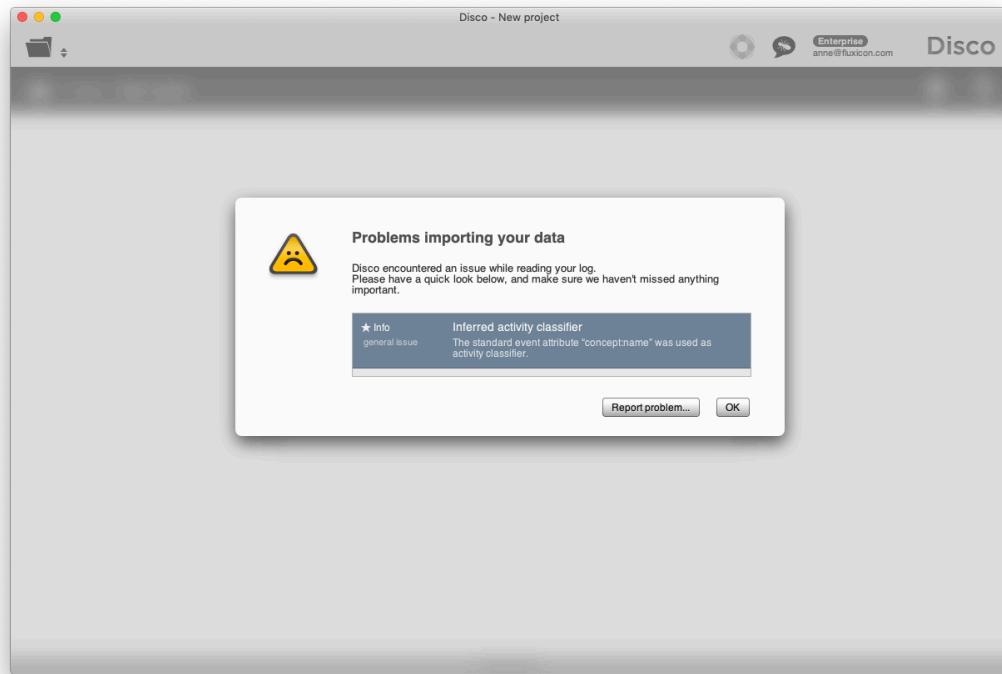
# IMPORT



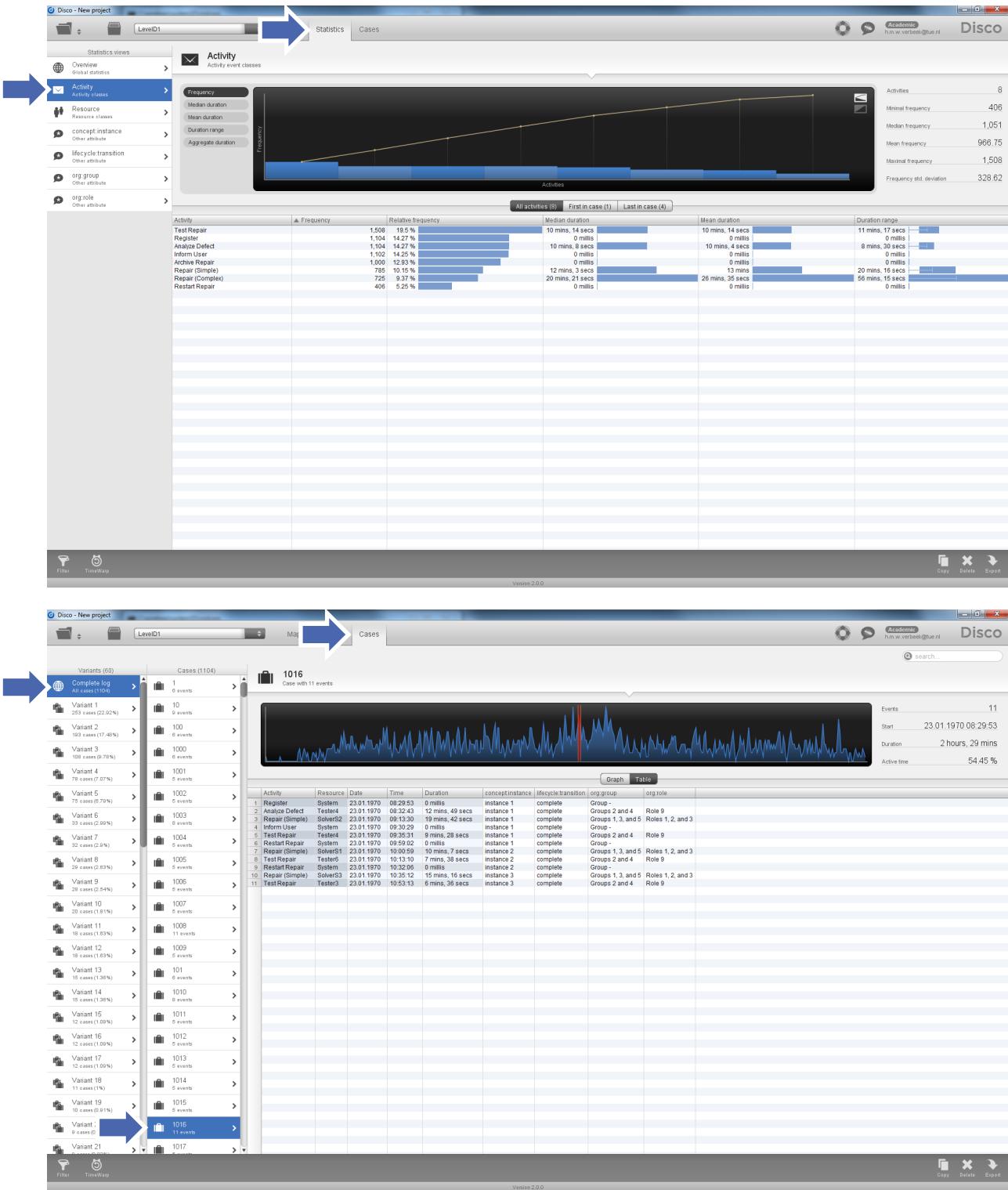
# IMPORT

## Level D1

Again, the user is notified about the missing classifier and the standard event attribute concept:name is used as the activity name instead.



# IMPORT

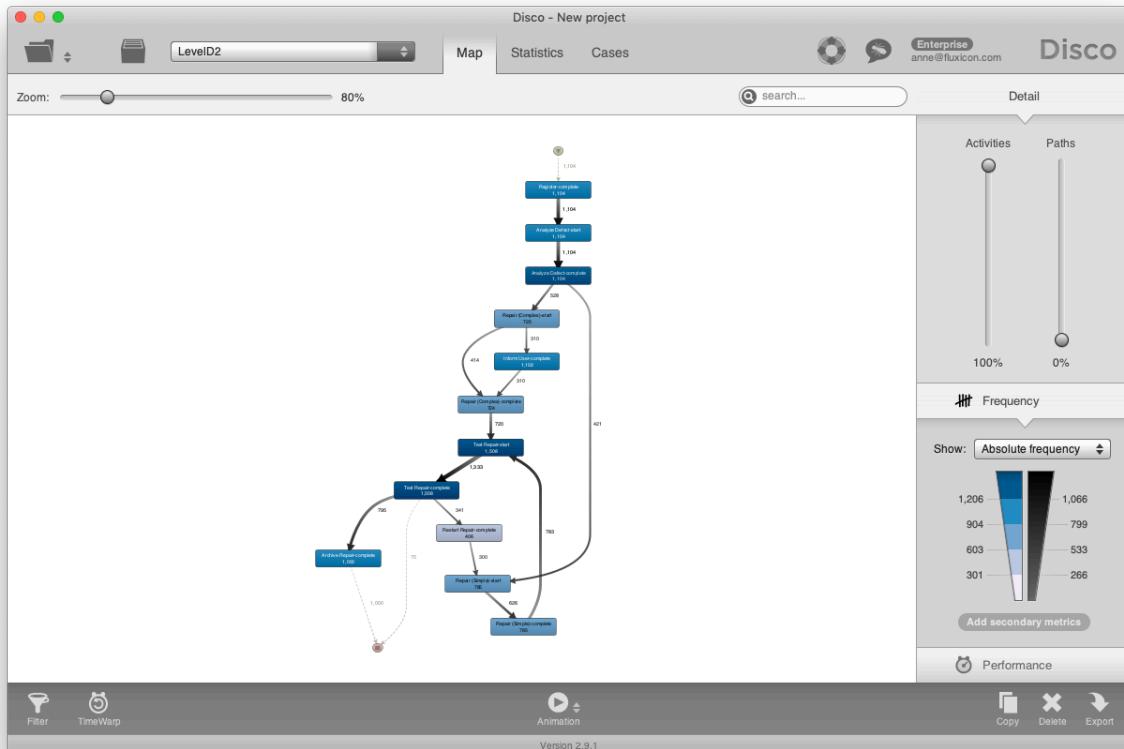


## IMPORT

This shows that all attributes contained in the log were used.

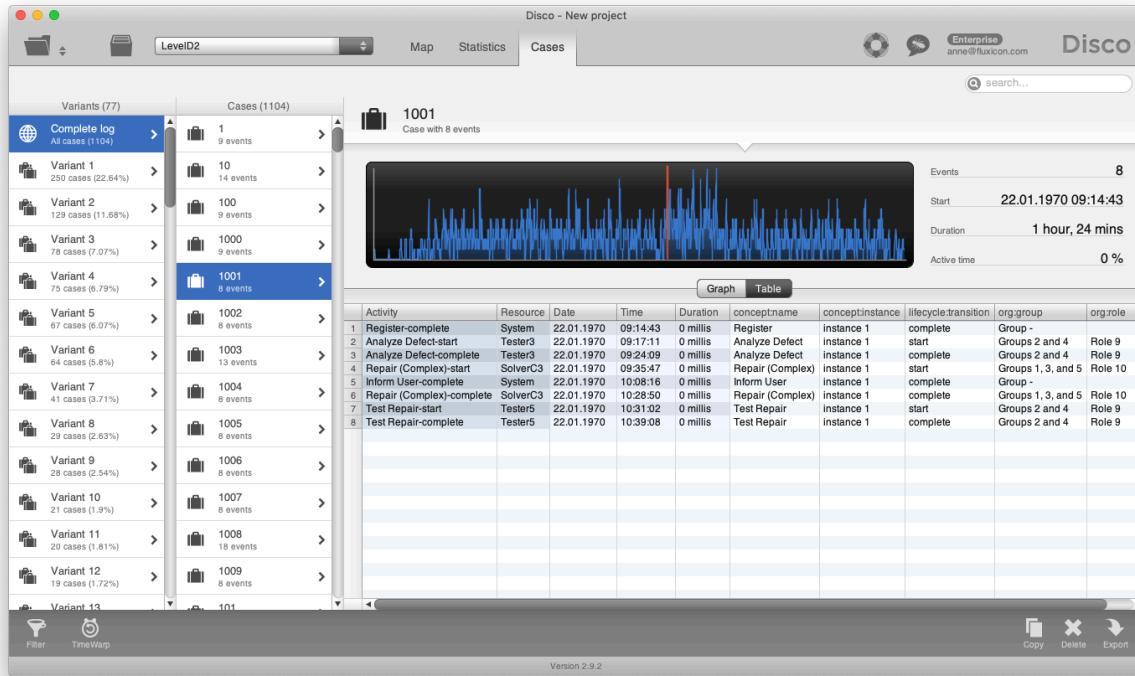
## Level D2

The classifier combines concept:name and lifecycle:transition and is used for the activity name.



# IMPORT

All the other attributes are imported as well (see screenshot below). Furthermore, the timestamps are used to calculate waiting times in the process as well as case durations.

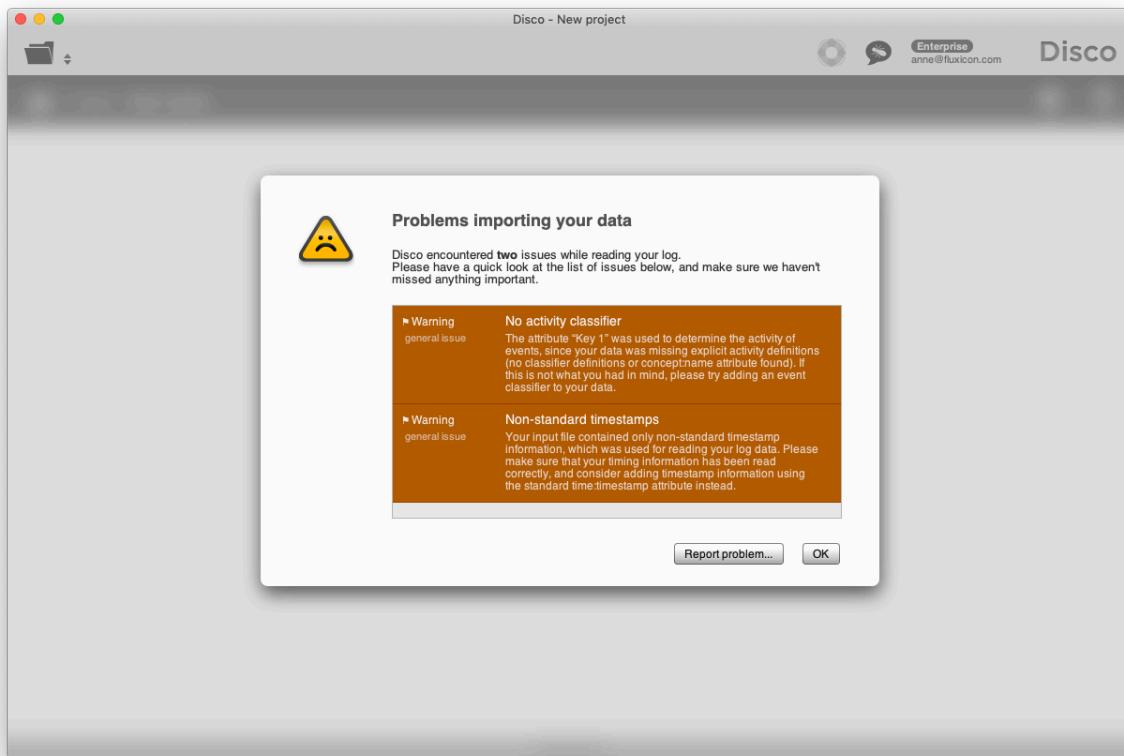


This shows that the classifier and all standard attributes contained in the log were used.

# IMPORT

## Flag X1

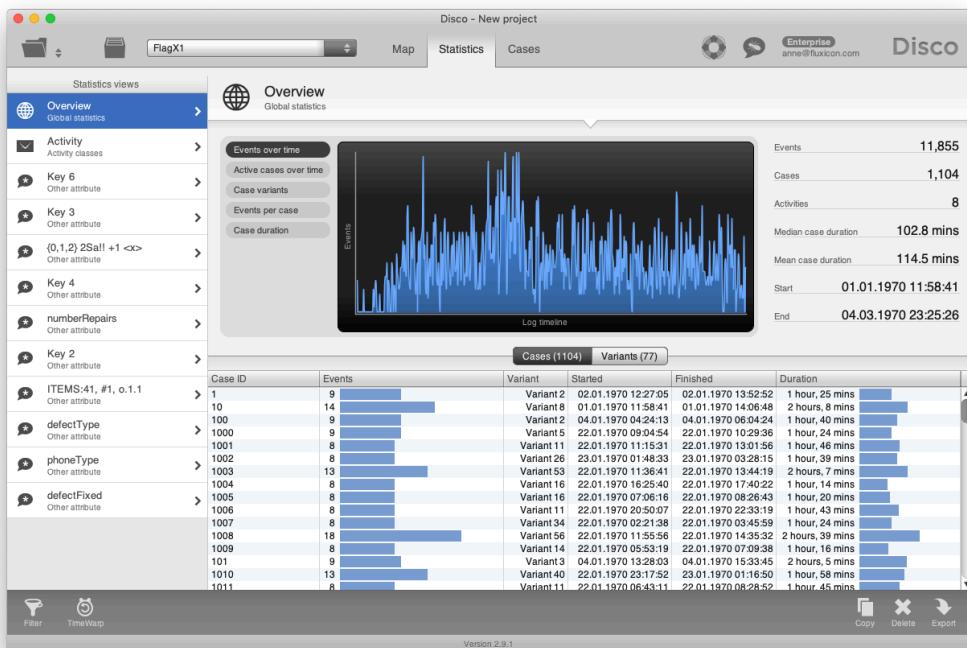
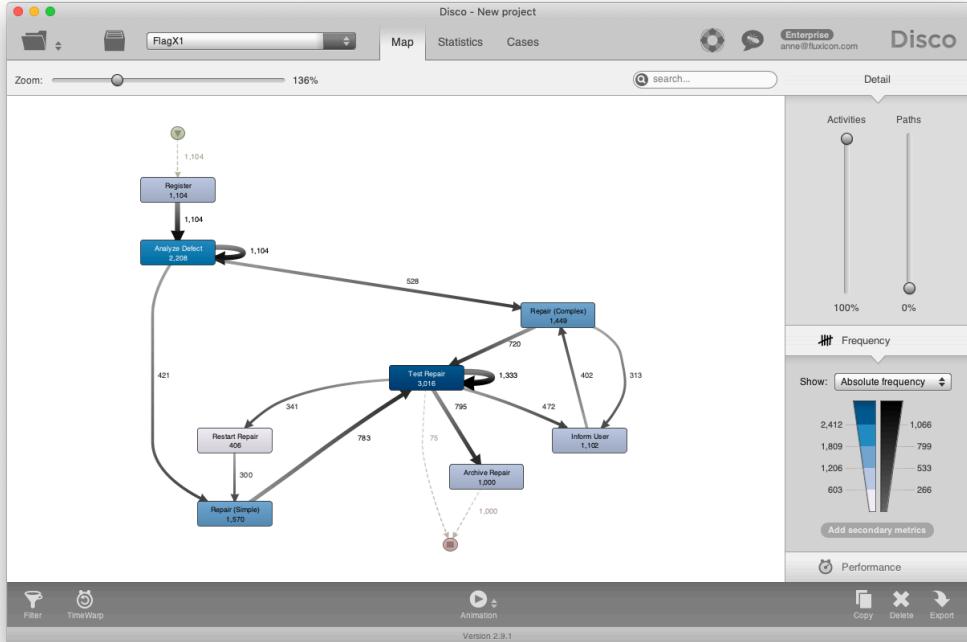
Disco displays a warning to show that neither a classifier nor the standard event attribute concept:name was found in the log. It uses the first attribute "Key 1" as the activity name instead. Furthermore, no standard time:timestamp attribute was found. Disco found timestamp information in non-standard attributes and will use this instead (see screenshot below).



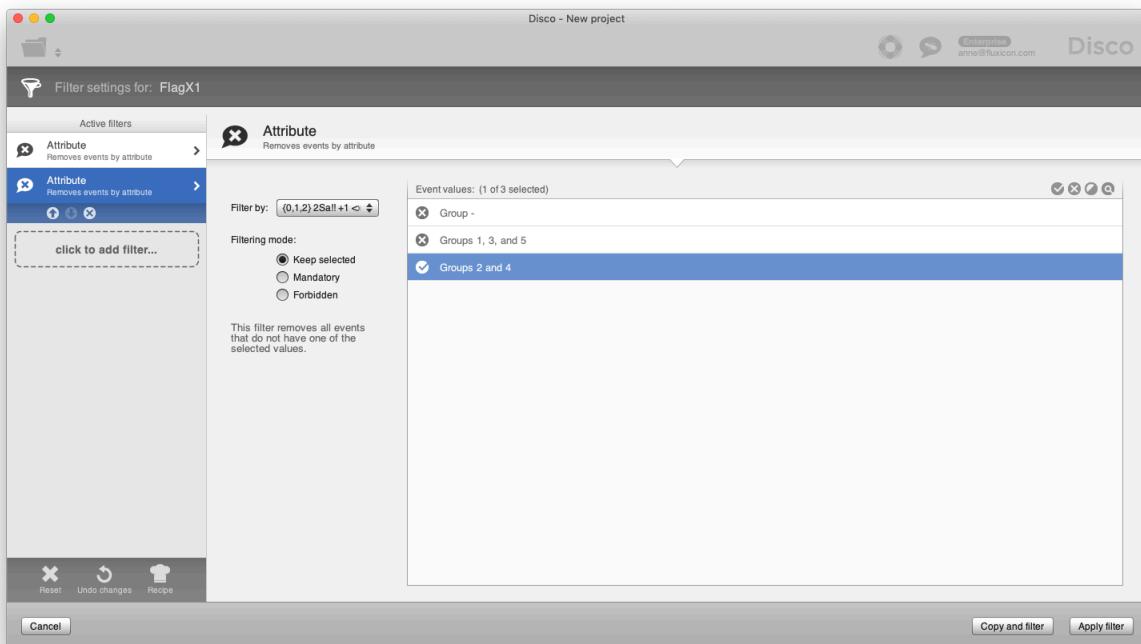
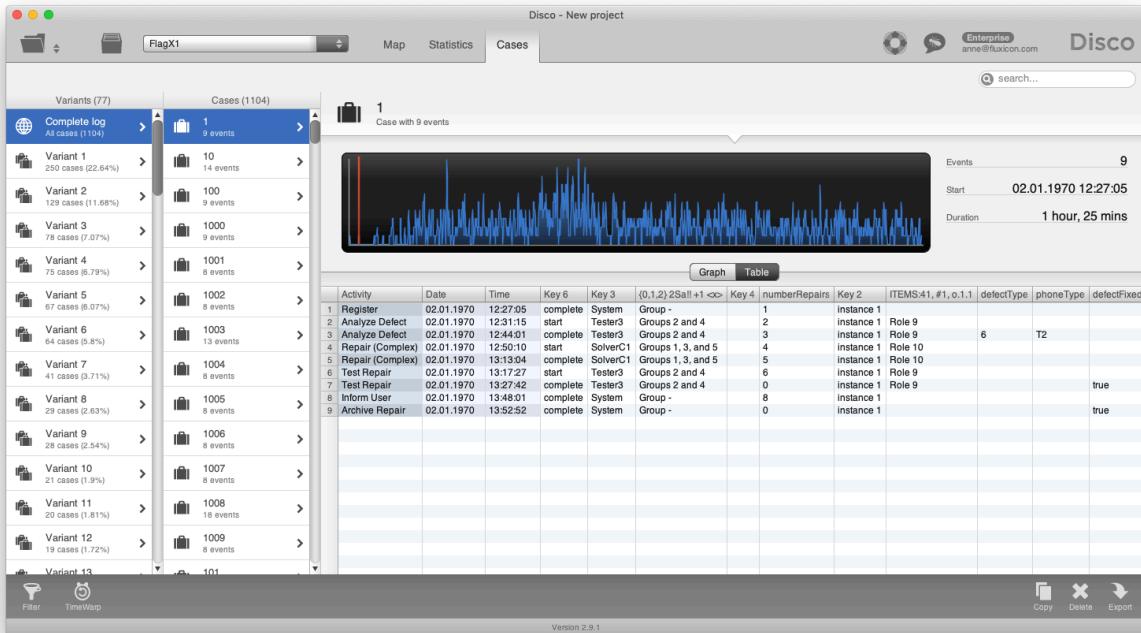
The process map is discovered based on the chosen activity attribute (see screenshot on next page). The other attributes are imported as well and the timestamps are used to calculate performance statistics (see screenshot on next page). All attributes can be displayed in the Cases view and also be used for filtering (see screenshots on the page after the next page).

This shows that all non-standard attributes contained in the log were used.

# IMPORT



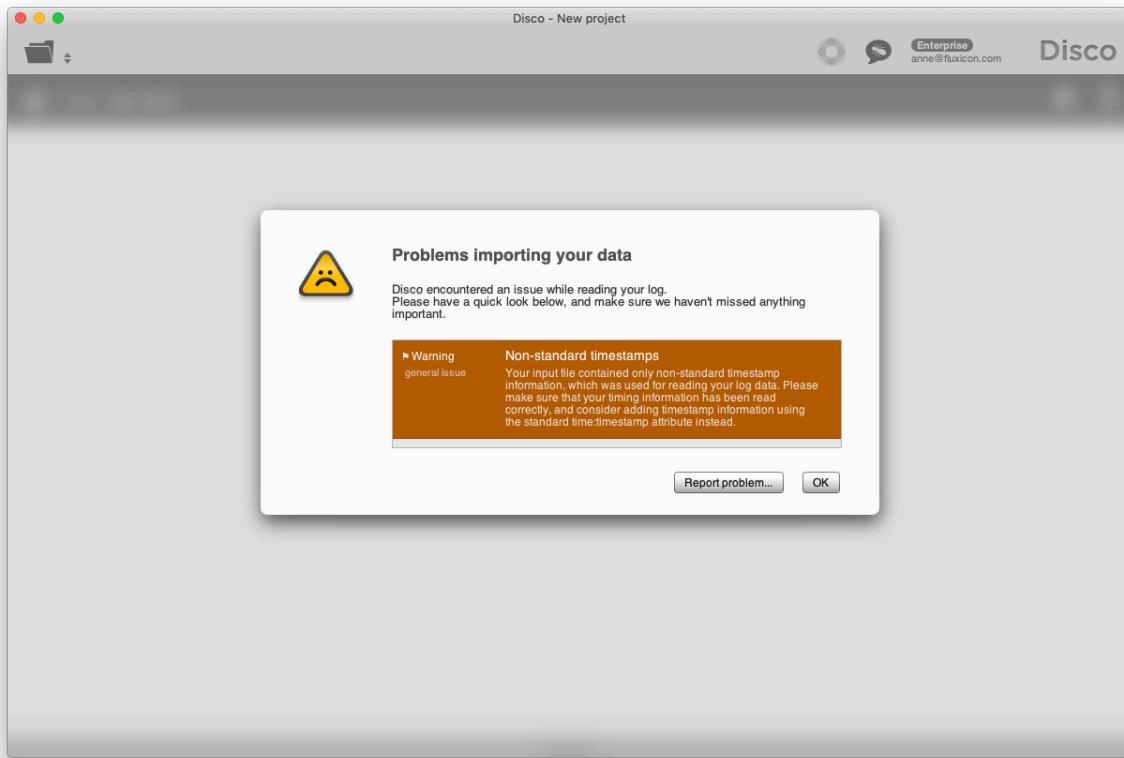
# IMPORT



# IMPORT

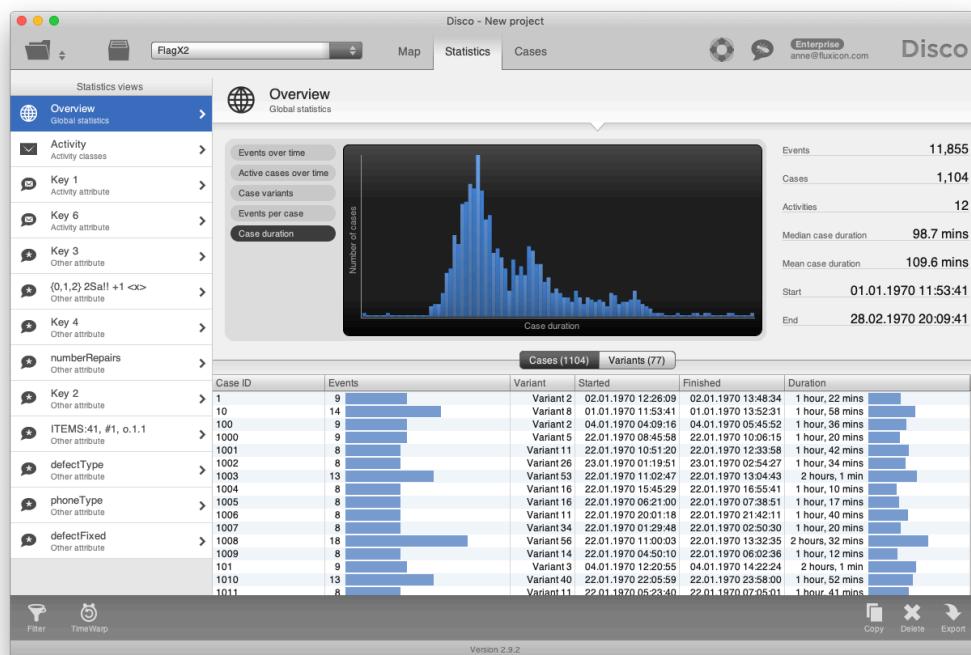
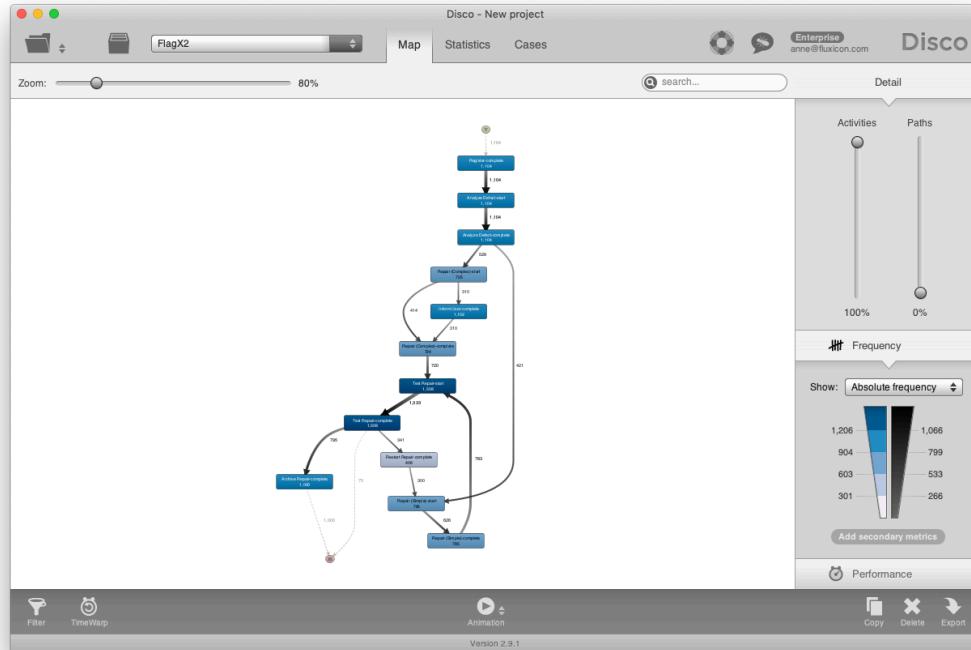
## Flag X2

Disco displays a warning to show that no standard time:timestamp attribute has been found. Disco uses a non-standard attribute that contains timestamp information instead (see screenshot below).



The classifier (Key 1 AND Key 6) is used for the activity name and all the non-standard attributes are imported as well (see screenshots on the next page).

## IMPORT

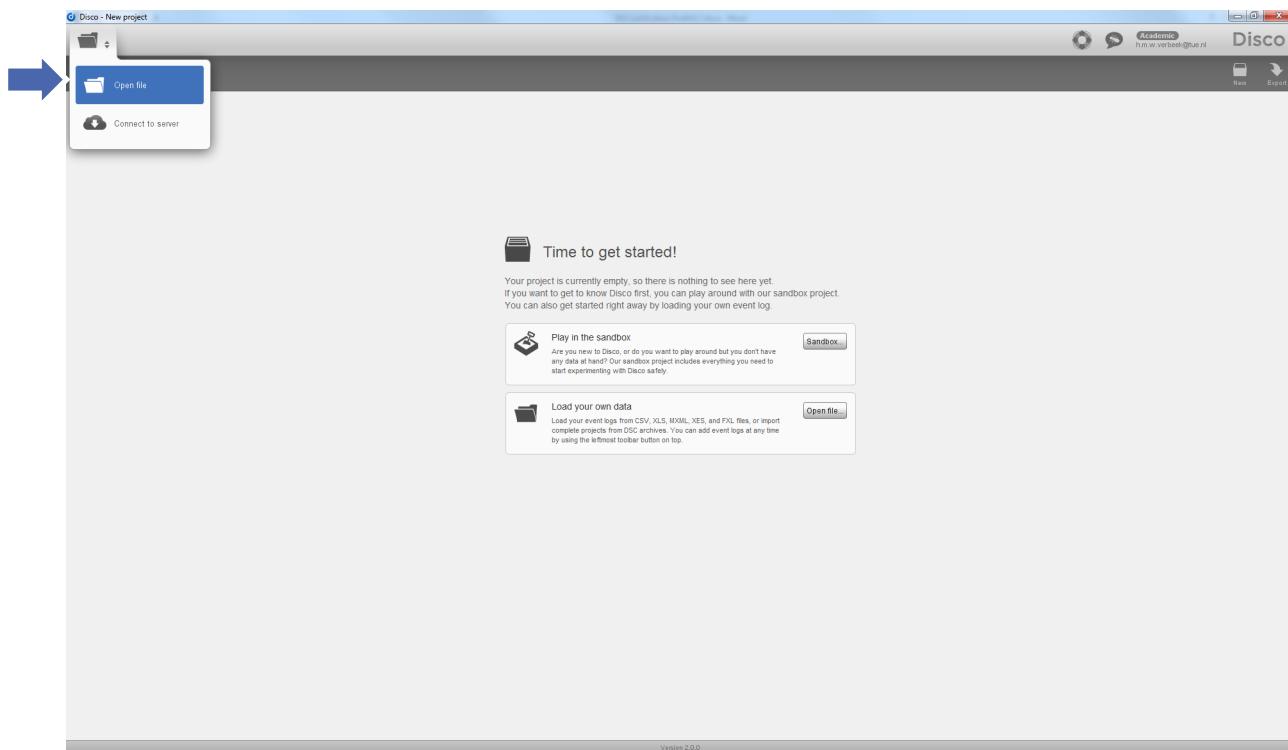


# EXPORT

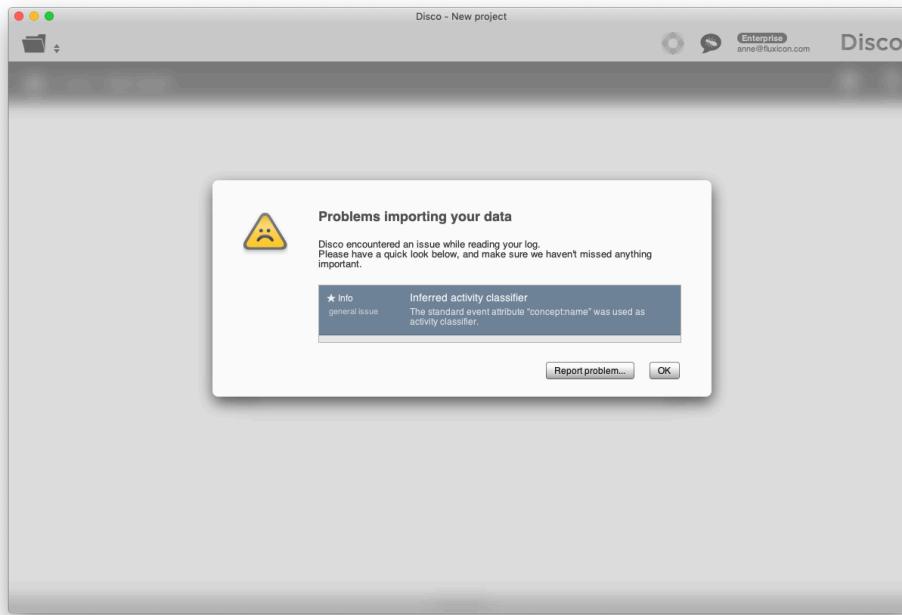
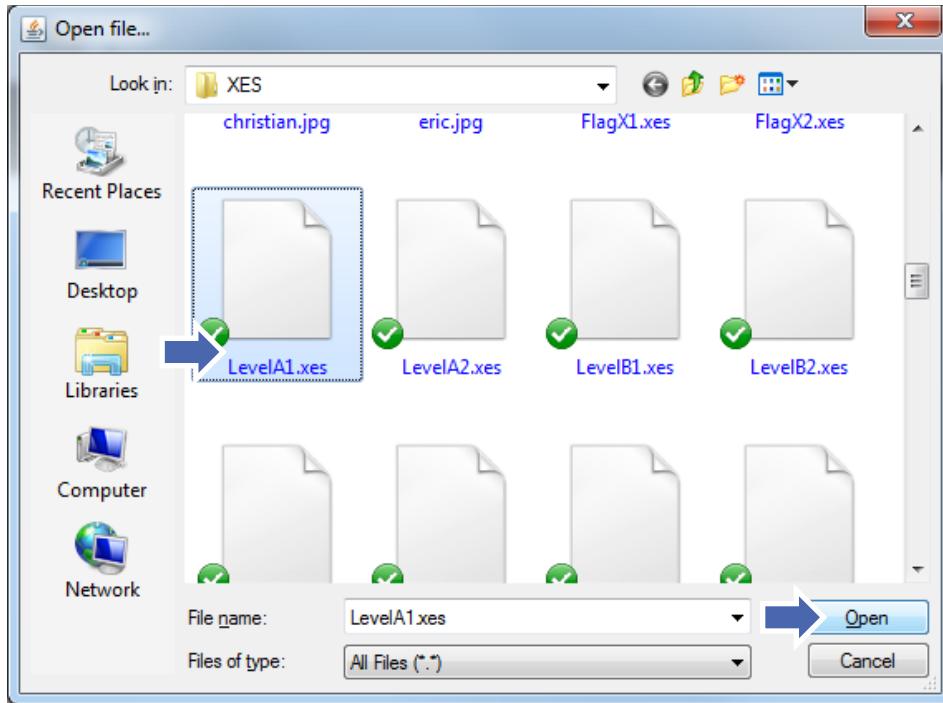
## Export

Now we know that the import is working on all levels and we can use it to test the export. We do this by first importing the log for the given level, export that log to a file, import the log from that file again, and show that the results are the same as with the import as shown in the previous section. After the export the previously imported file is deleted to avoid confusion. For sake of brevity, we show the full import-export-import sequence for the first (A1) log and only show the final screenshot after the re-import for the remaining data sets.

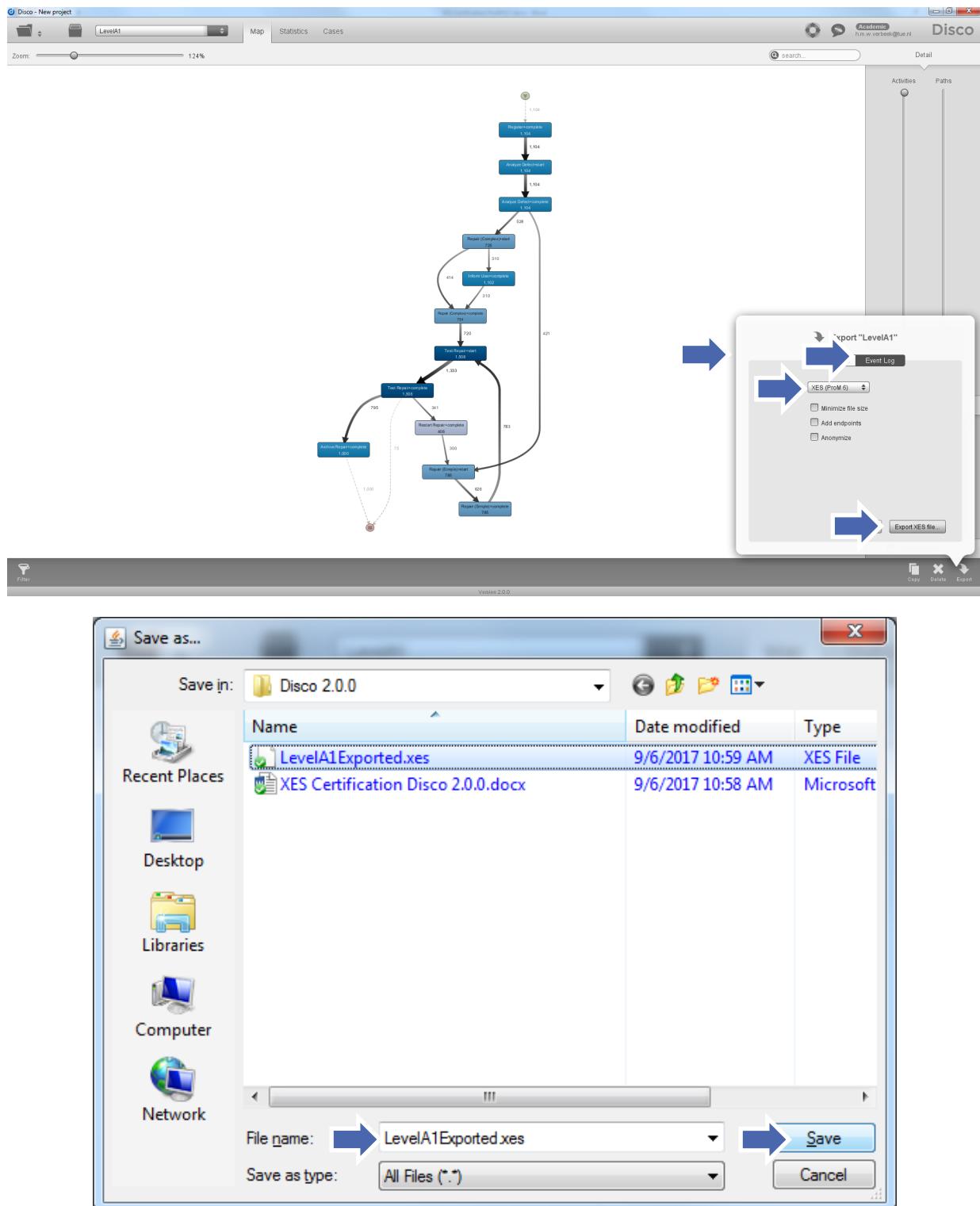
### Level A1



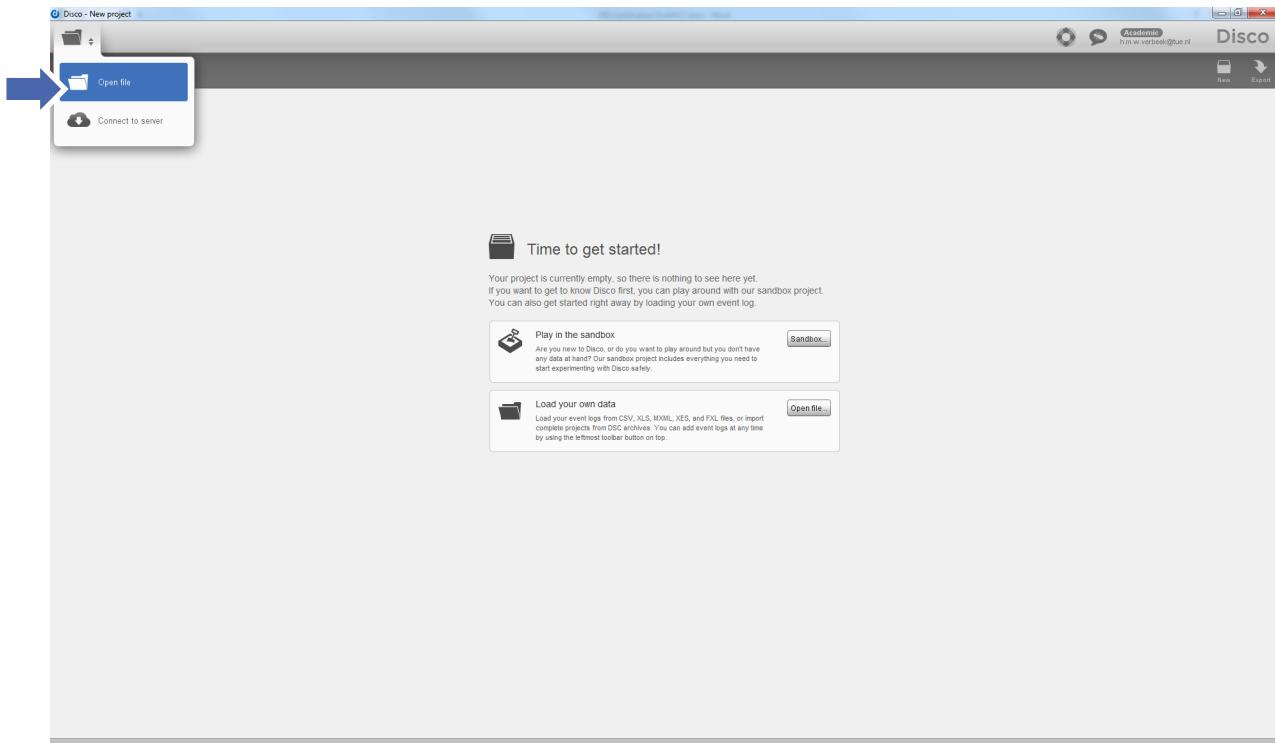
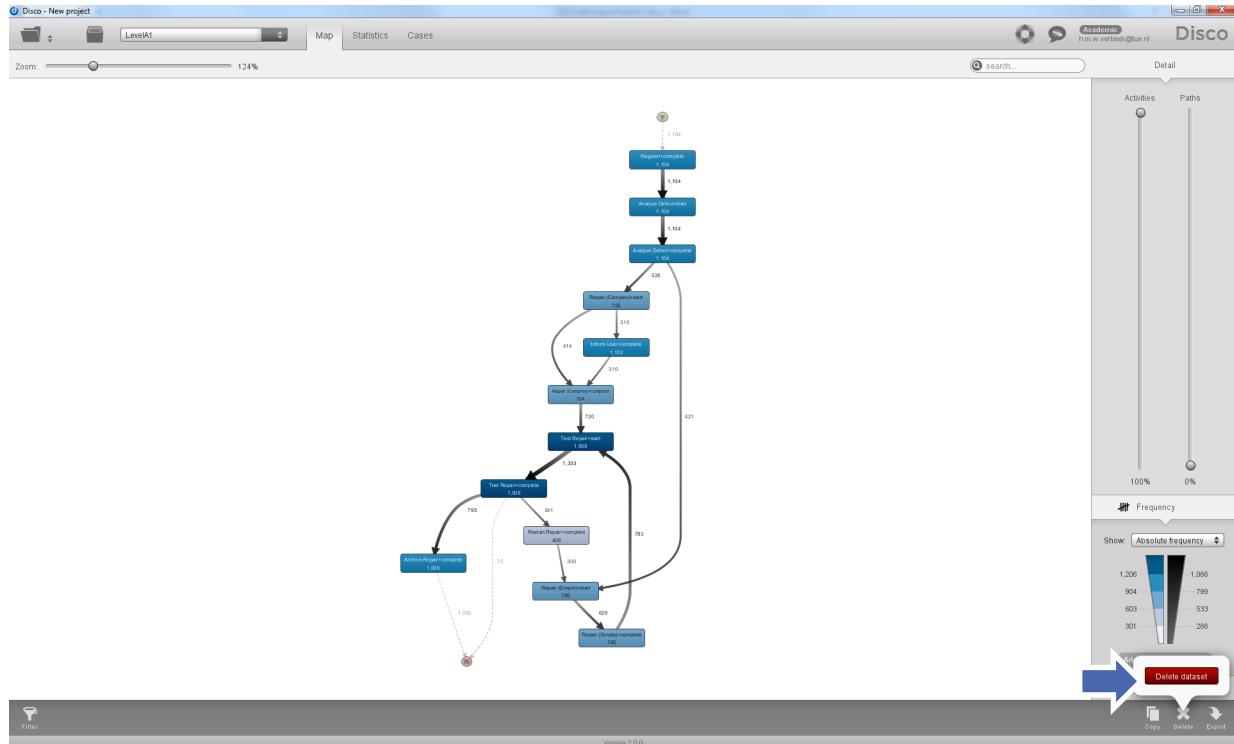
# EXPORT



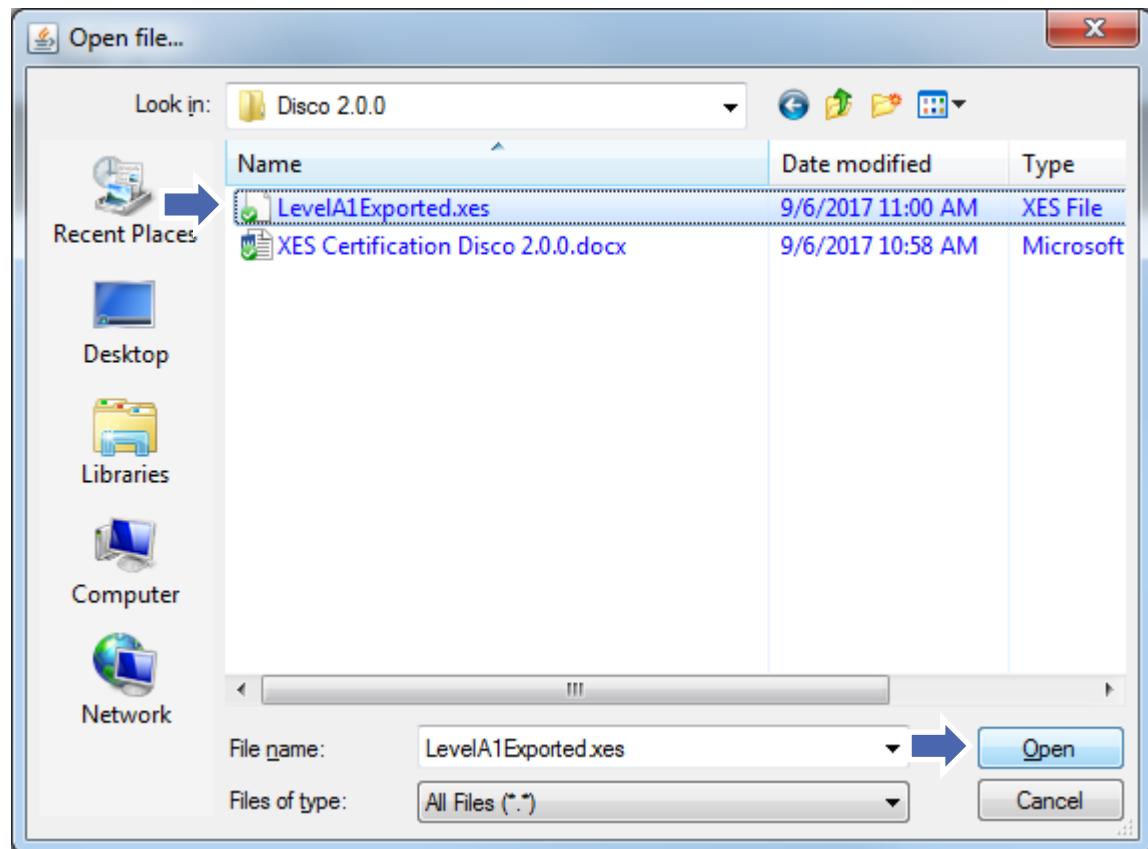
# EXPORT



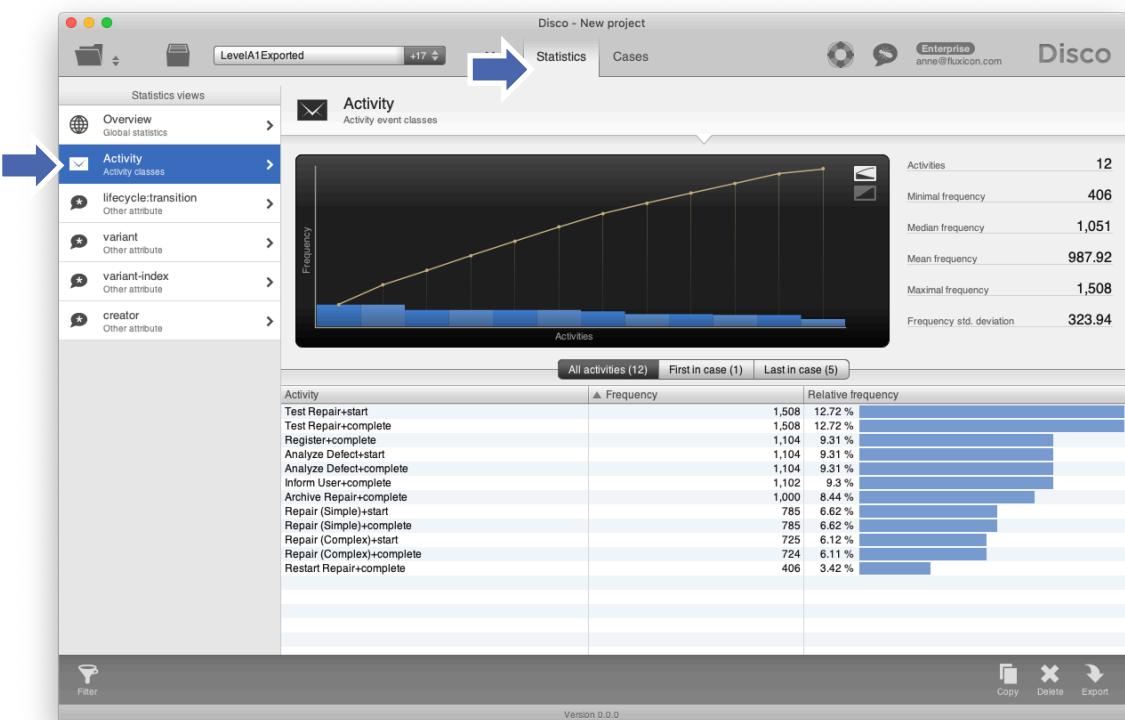
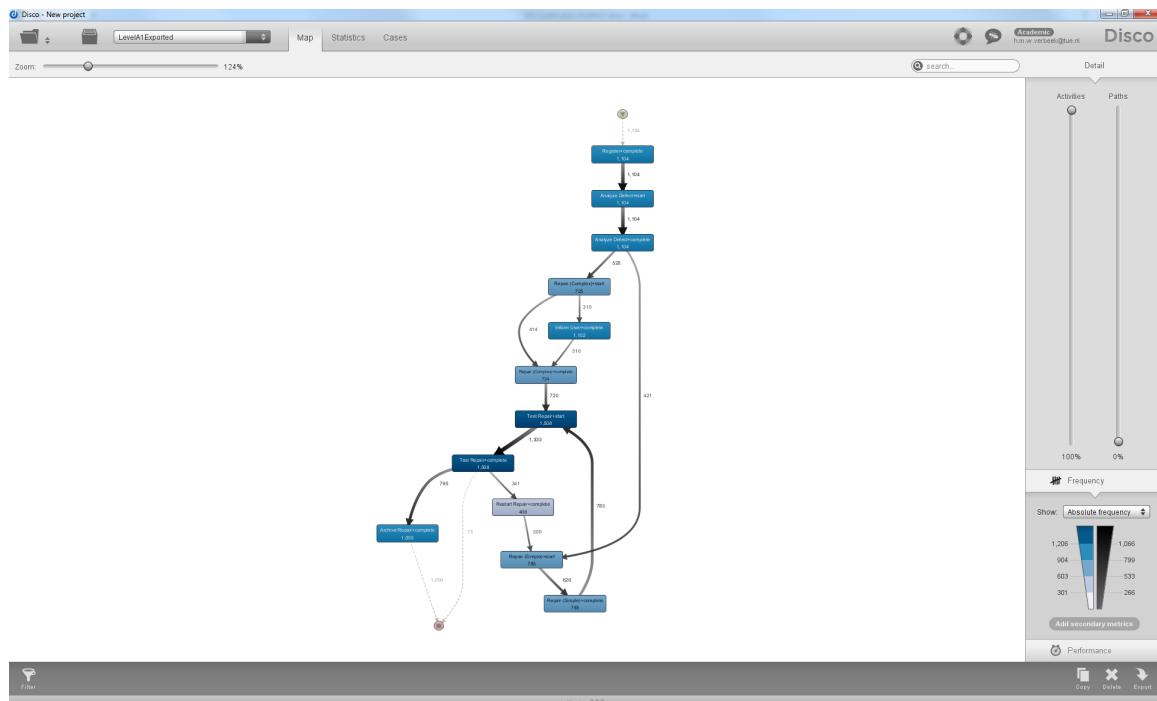
# EXPORT



## EXPORT



# EXPORT



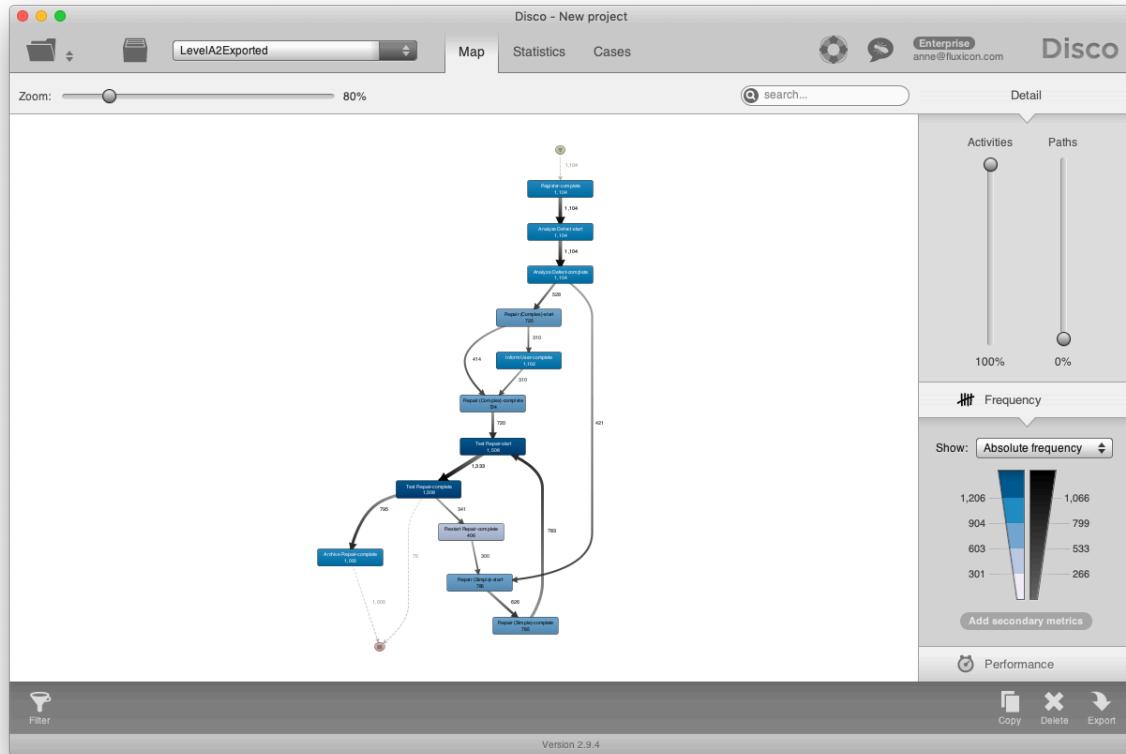
## EXPORT

This shows that the current data as stored by the tool is exported successfully to a log, and that the concept:name attributes as contained in the log match the current data as stored by the tool.

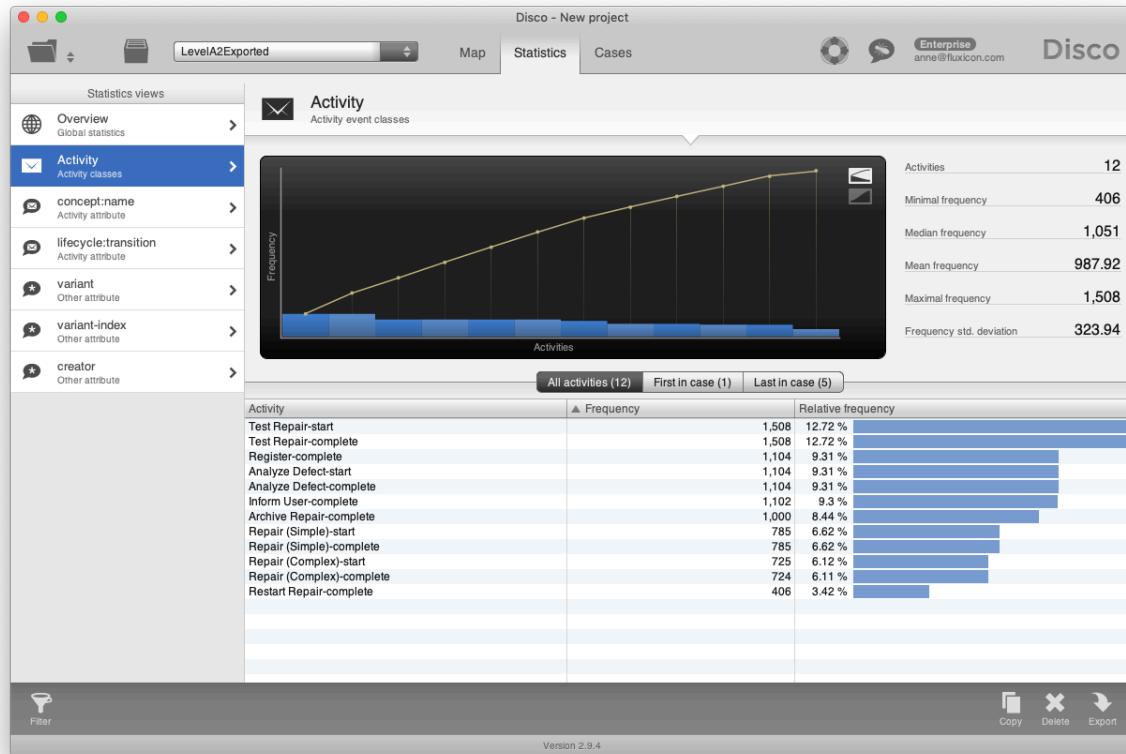
Notice further that Disco creates a classifier in the export, which is why the informational message notifying the user about the missing activity classifier is not present in the second import after the export.

## EXPORT

## Level A2



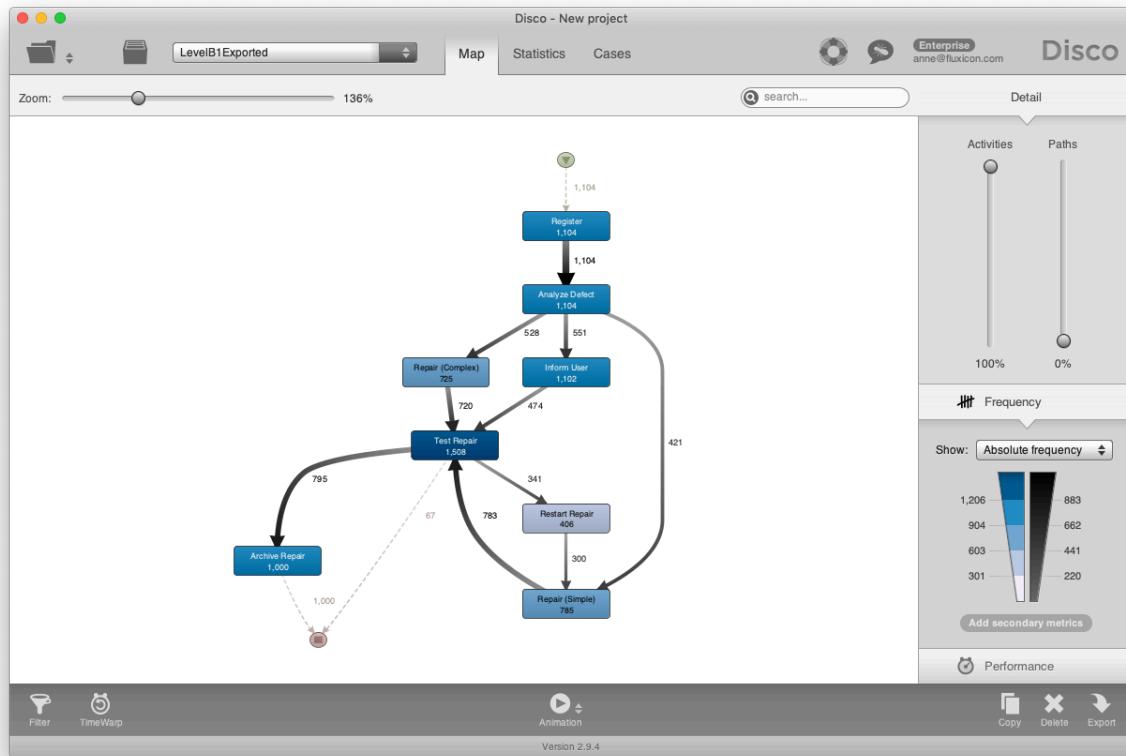
# EXPORT



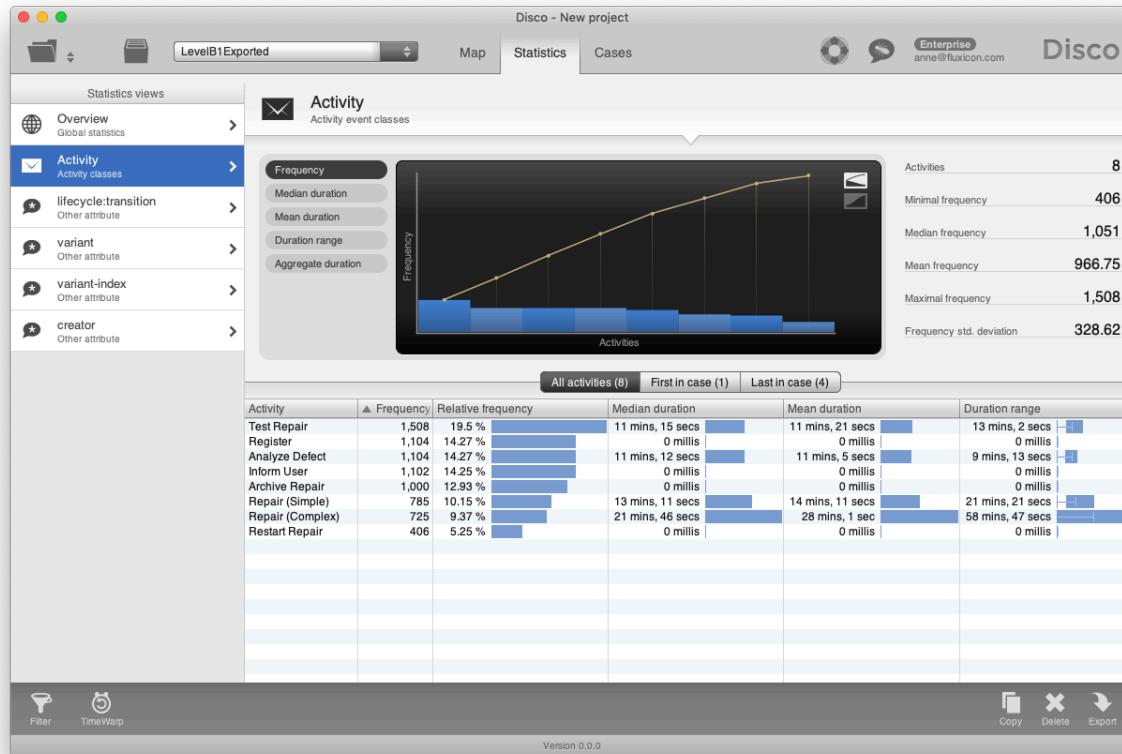
This shows that the classifier as contained in the log matches the current data as stored by the tool.

# EXPORT

## Level B1



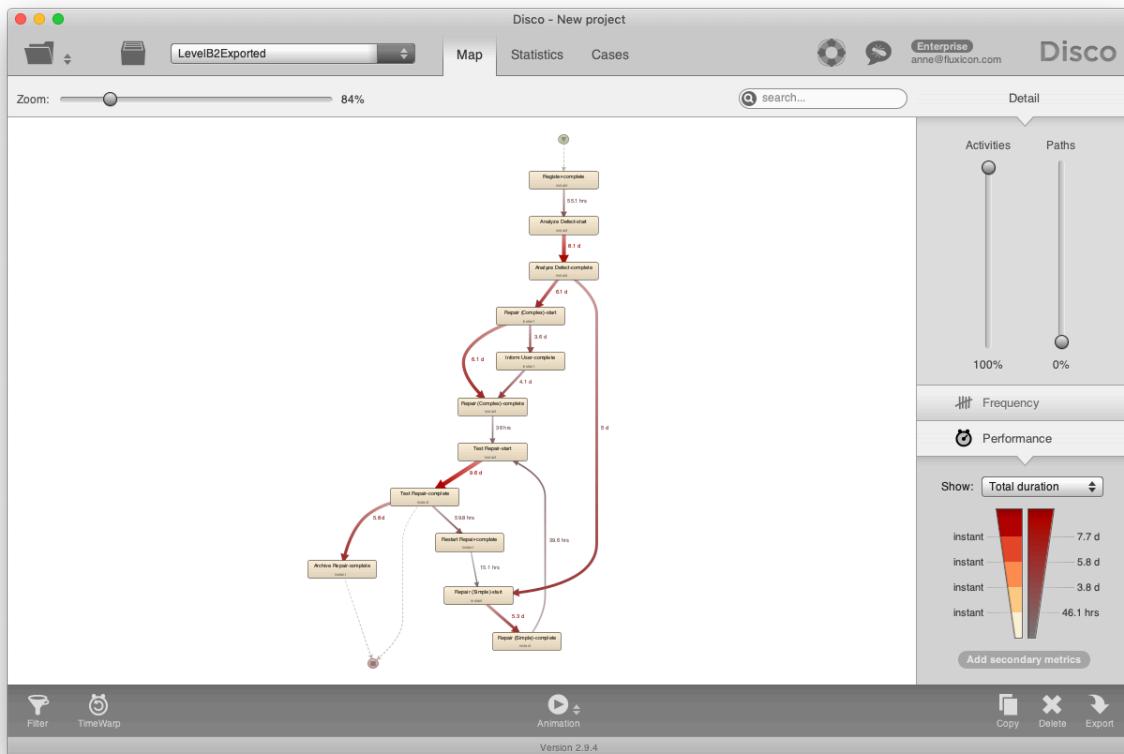
# EXPORT



This shows that the current data as stored by the tool is exported successfully to a log, and that the concept:name, lifecycle:transition, and time:timestamp attributes as contained in the log match the current data as stored by the tool.

# EXPORT

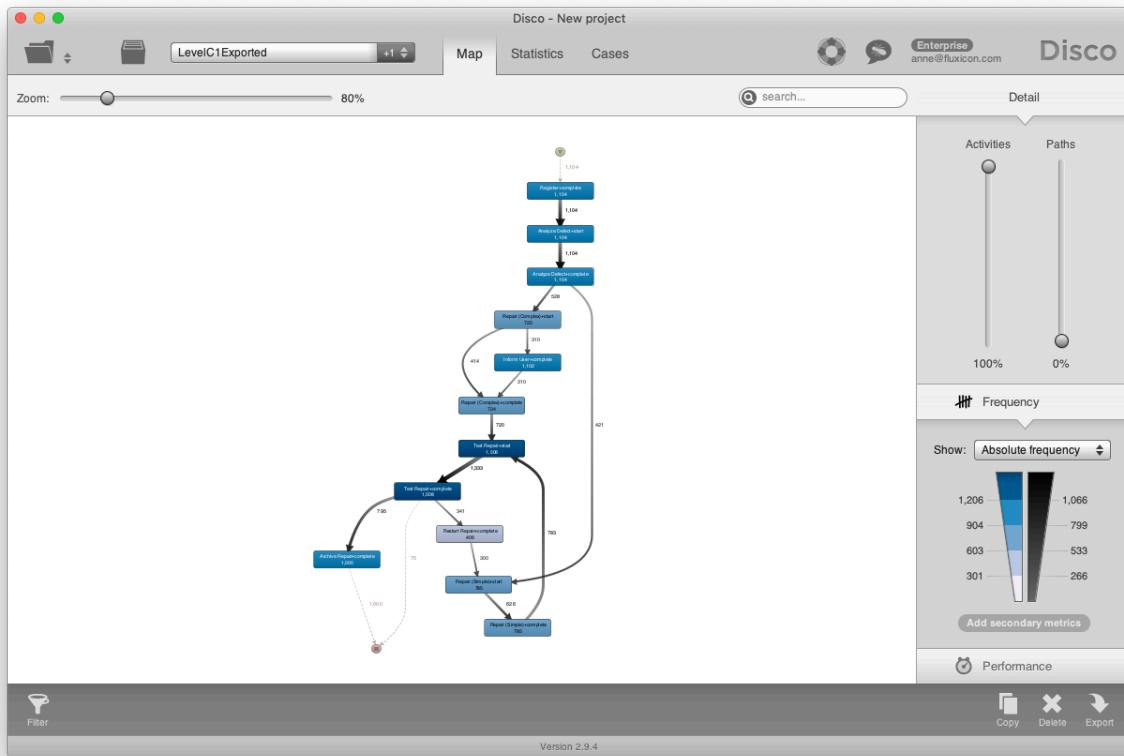
## Level B2



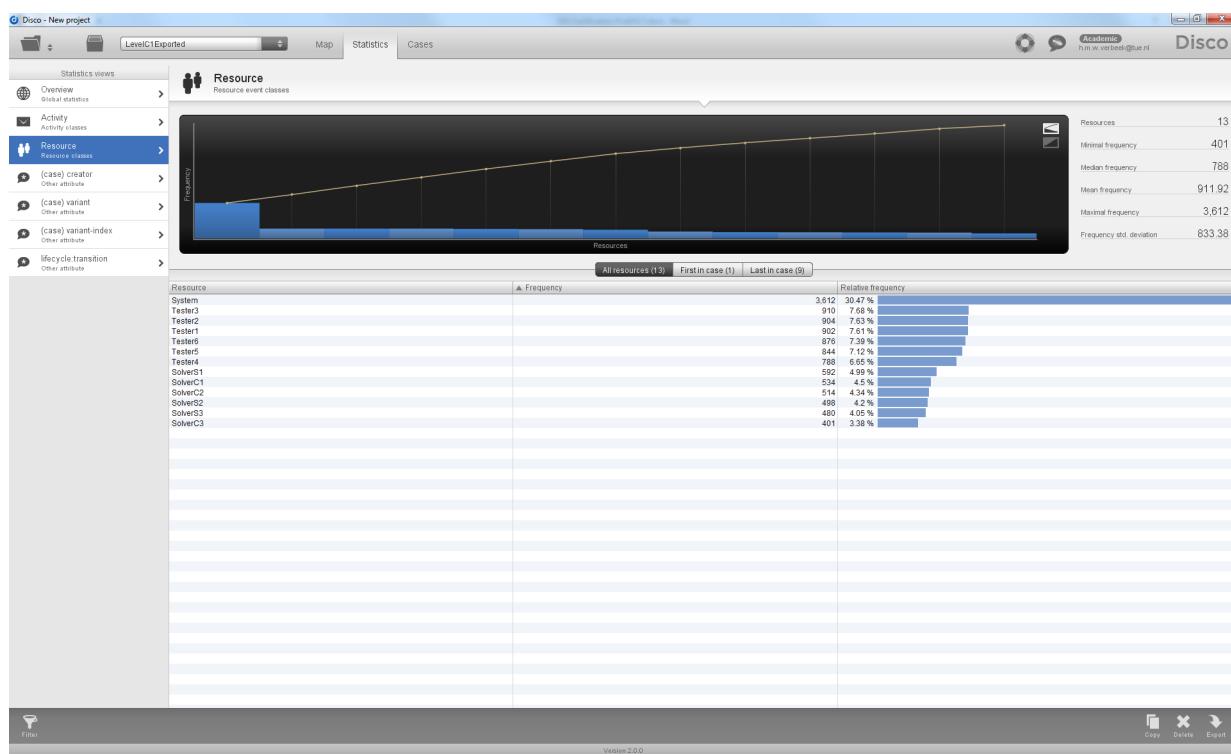
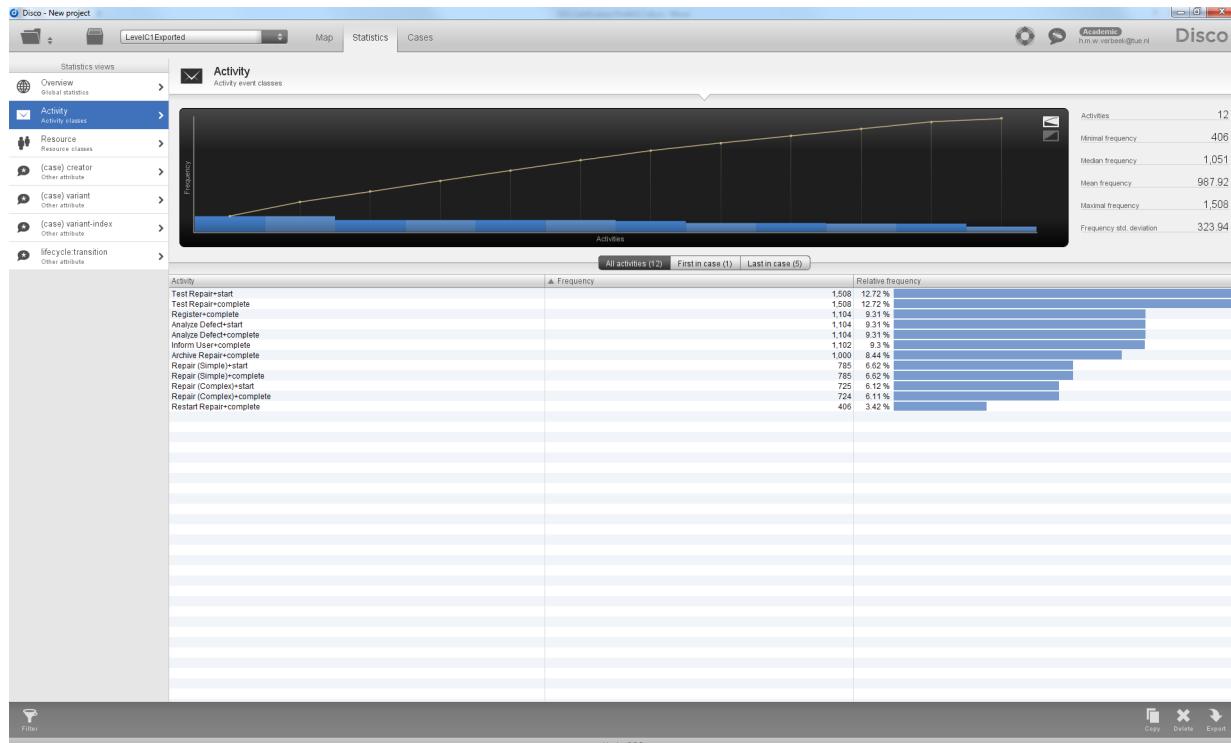
This shows that the classifier (combining concept:name AND lifecycle:transition) and time:timestamp attributes as contained in the log matches the current data as stored by the tool.

# EXPORT

## Level C1



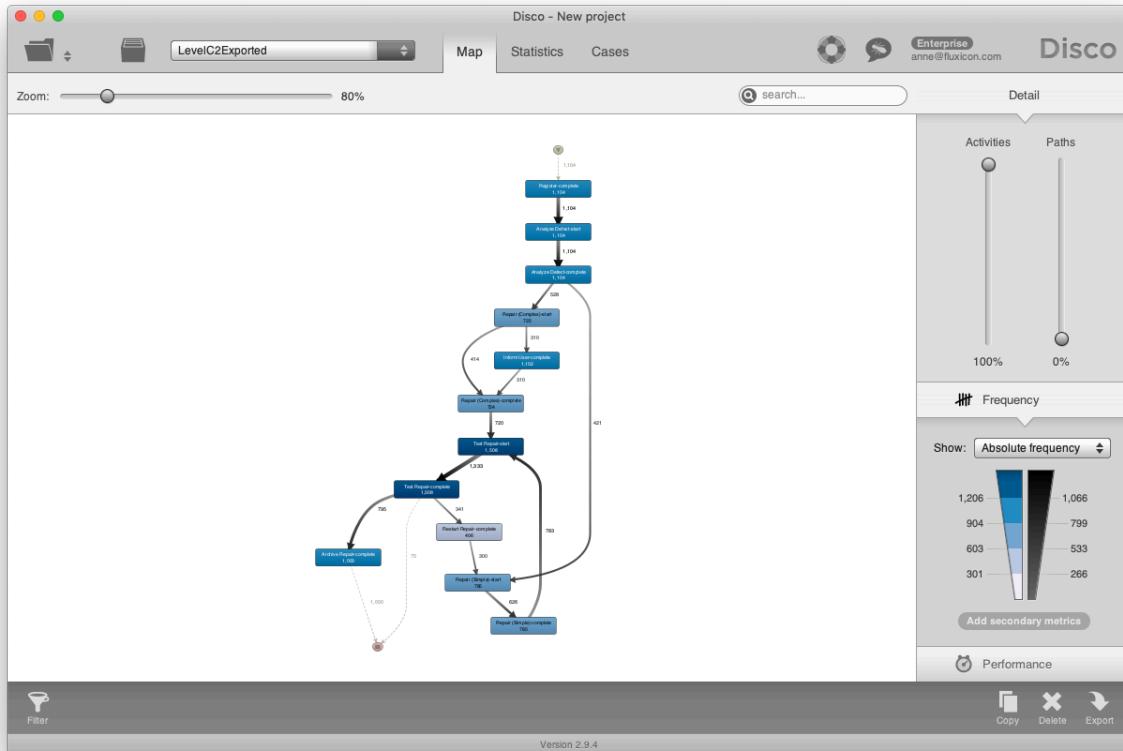
# EXPORT



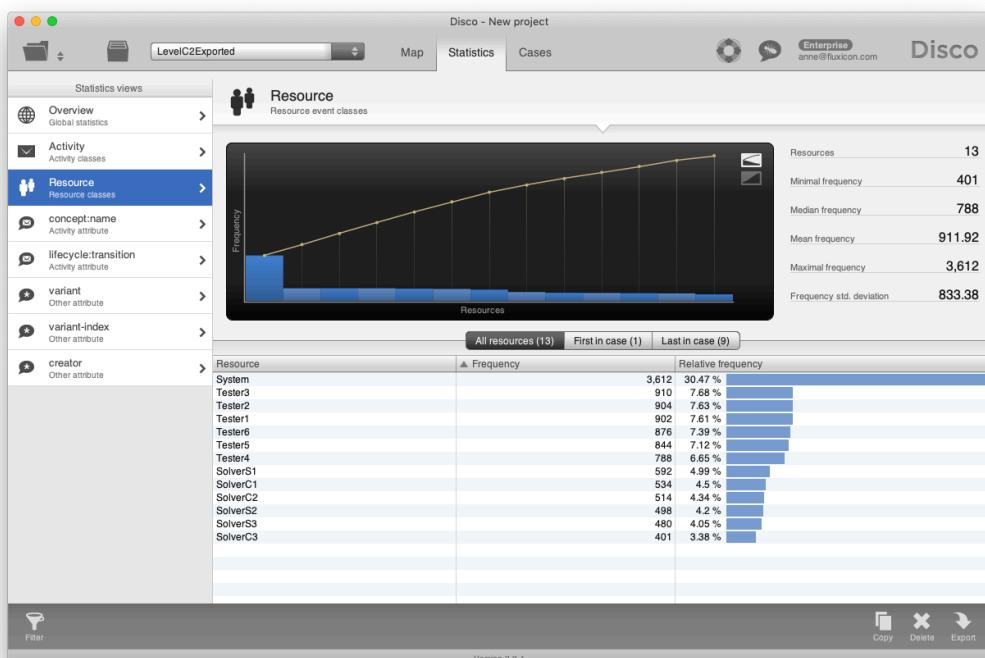
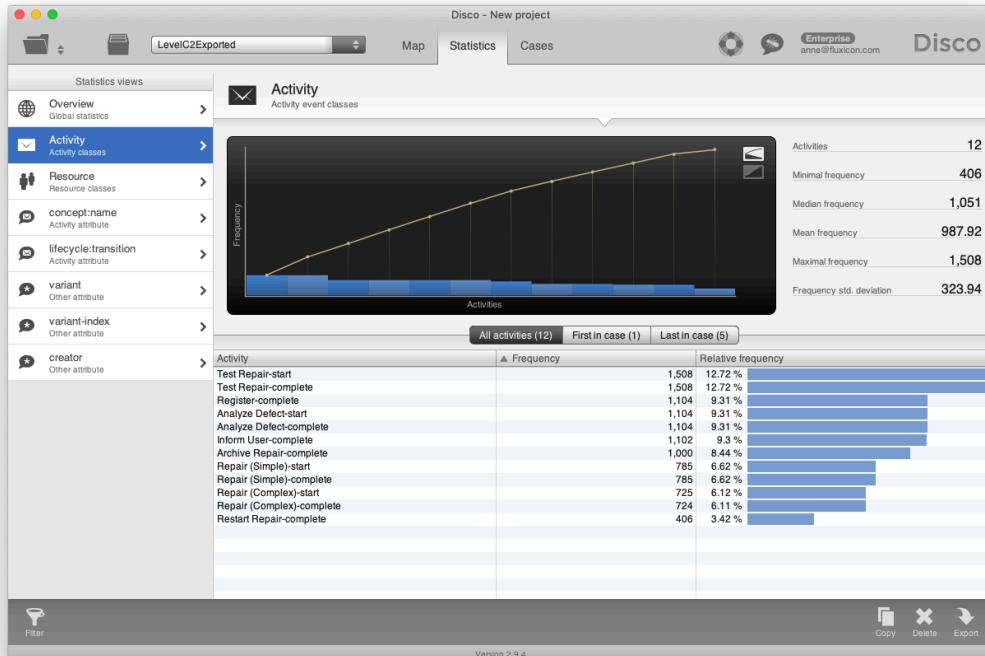
# EXPORT

This shows that the current data as stored by the tool is exported successfully to a log, and that the concept:name and org:resource attributes as contained in the log match the current data as stored by the tool.

## Level C2



# EXPORT

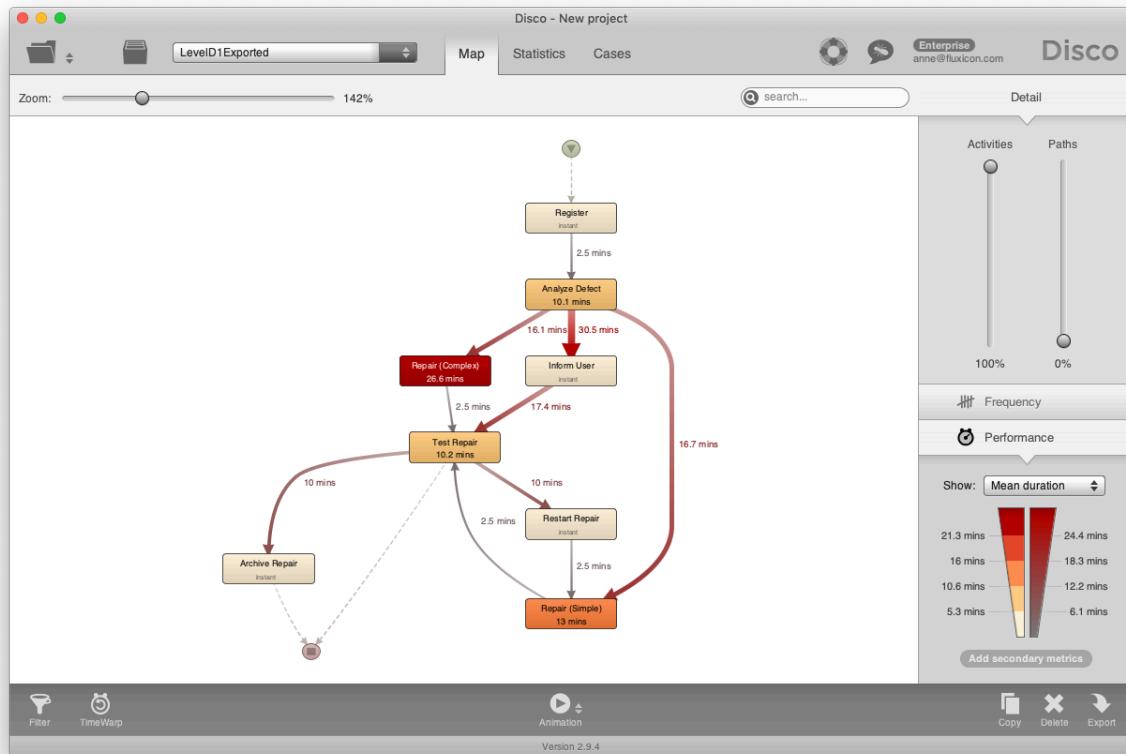


## EXPORT

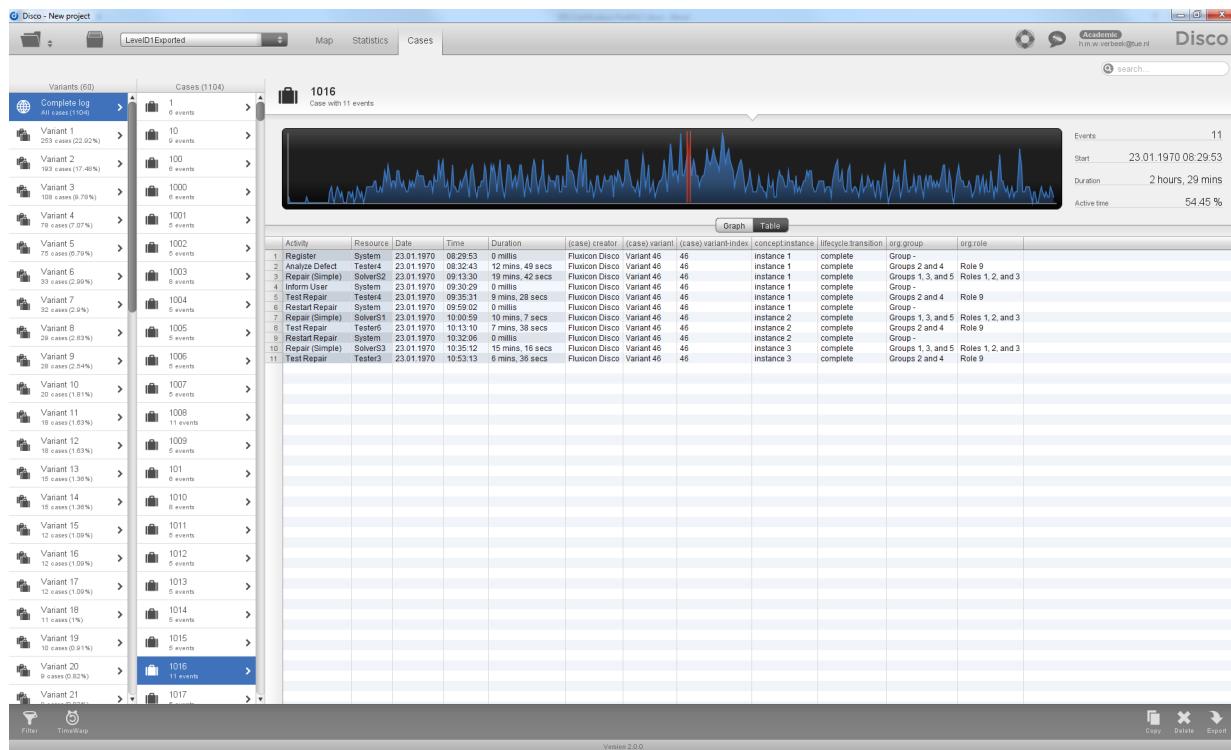
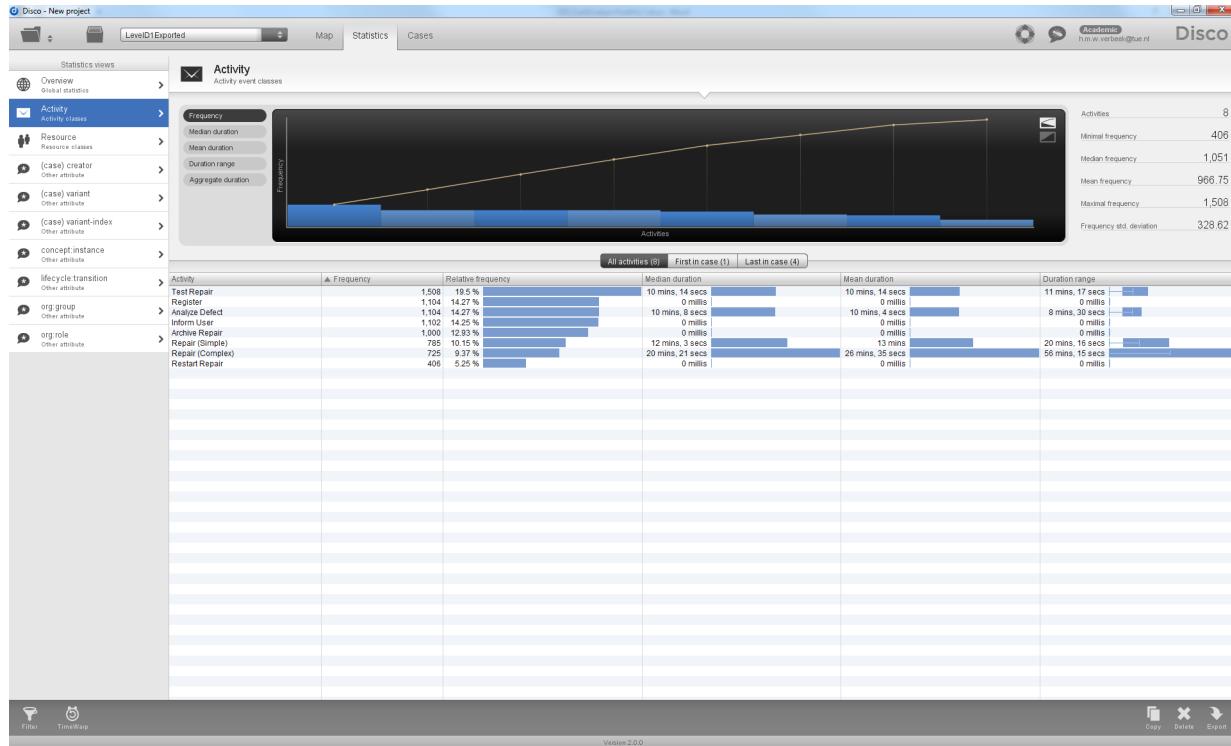
This shows that the classifier and the org:resource attributes as contained in the log match the current data as stored by the tool.

# EXPORT

## Level D1



# EXPORT

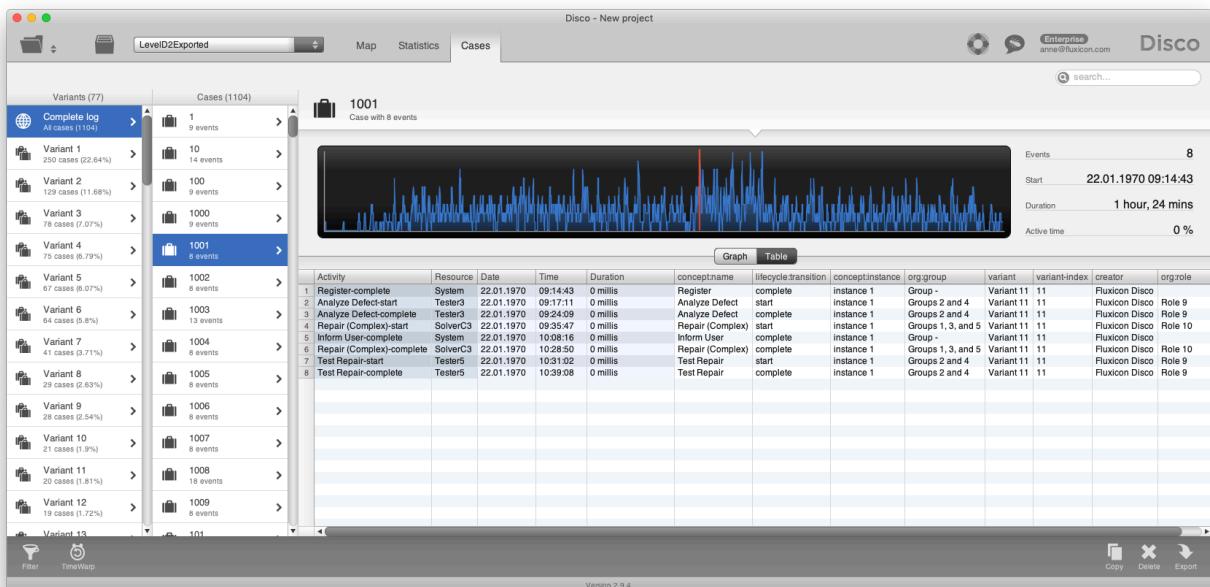
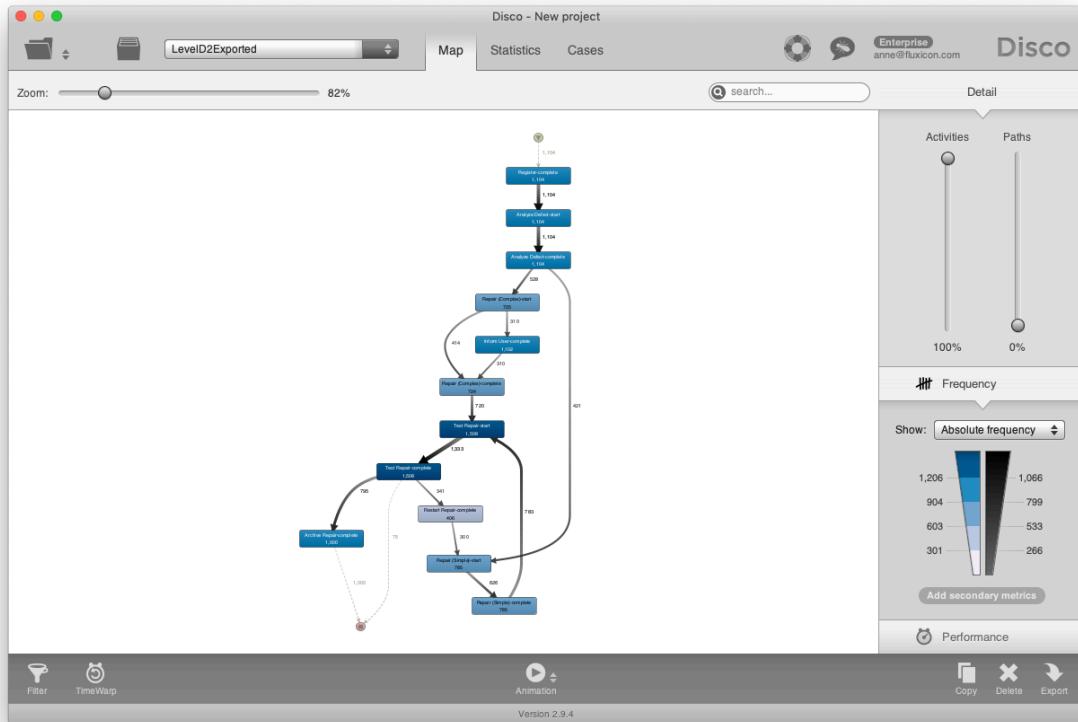


## EXPORT

This shows that the current data as stored by the tool is exported successfully to a log, and that all standard attributes as contained in the log match the current data as stored by the tool.

# EXPORT

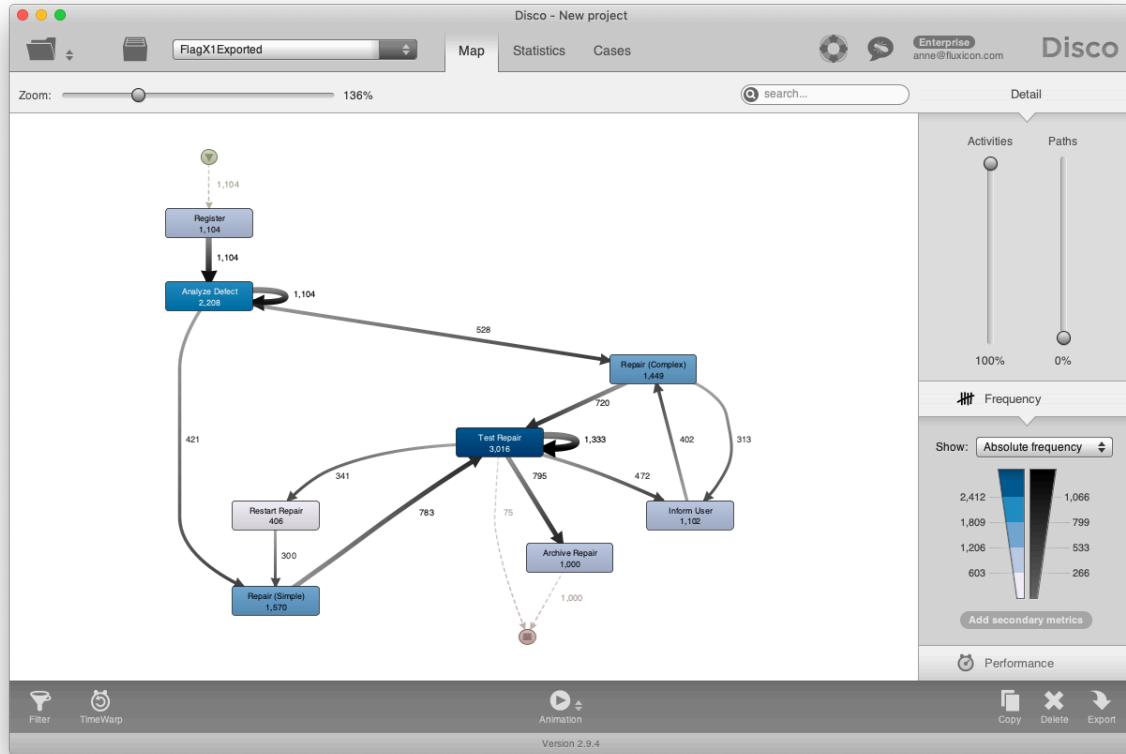
## Level D2



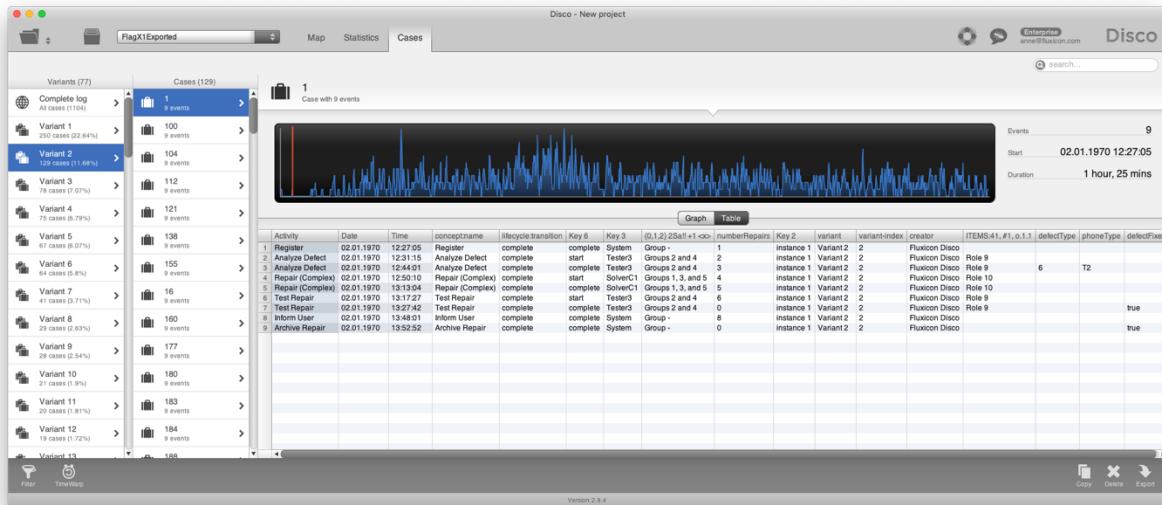
# EXPORT

This shows that the classifier and all standard attributes as contained in the log matches the current data as stored by the tool.

## Flag X1



# EXPORT

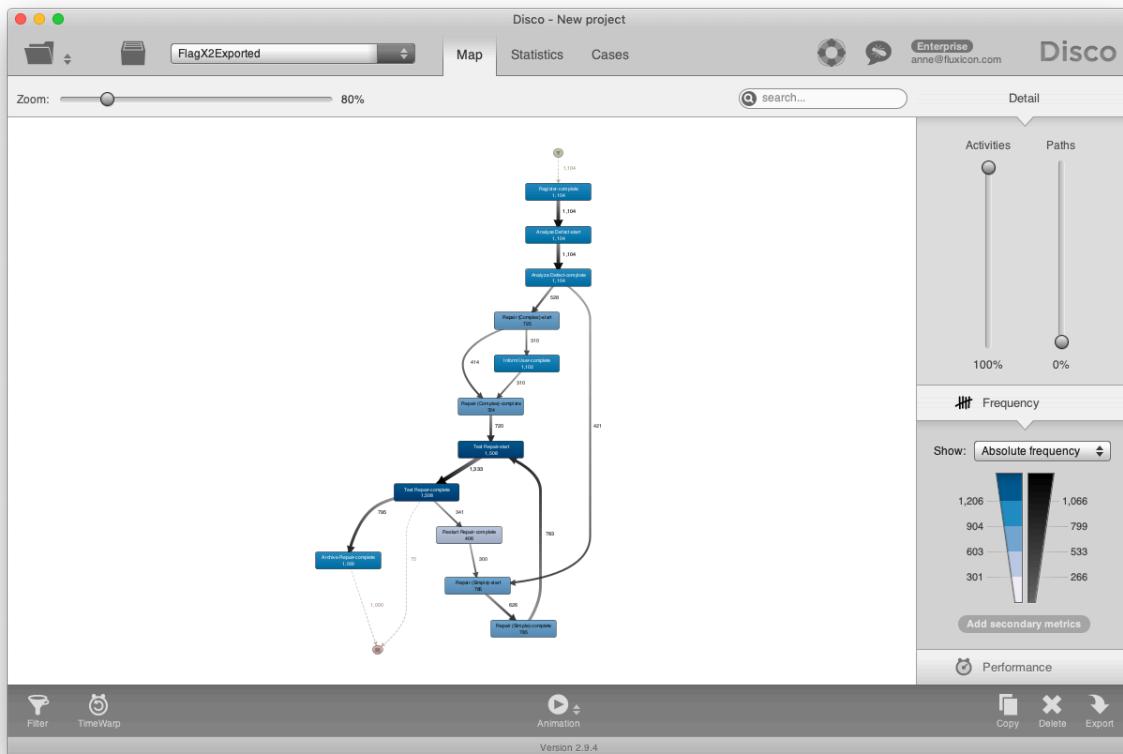


The same results as with the imported log.

This shows that the current data as stored by the tool is exported successfully to a log, and that all (standard or non-standard) attributes as contained in the log match the current data as stored by the tool.

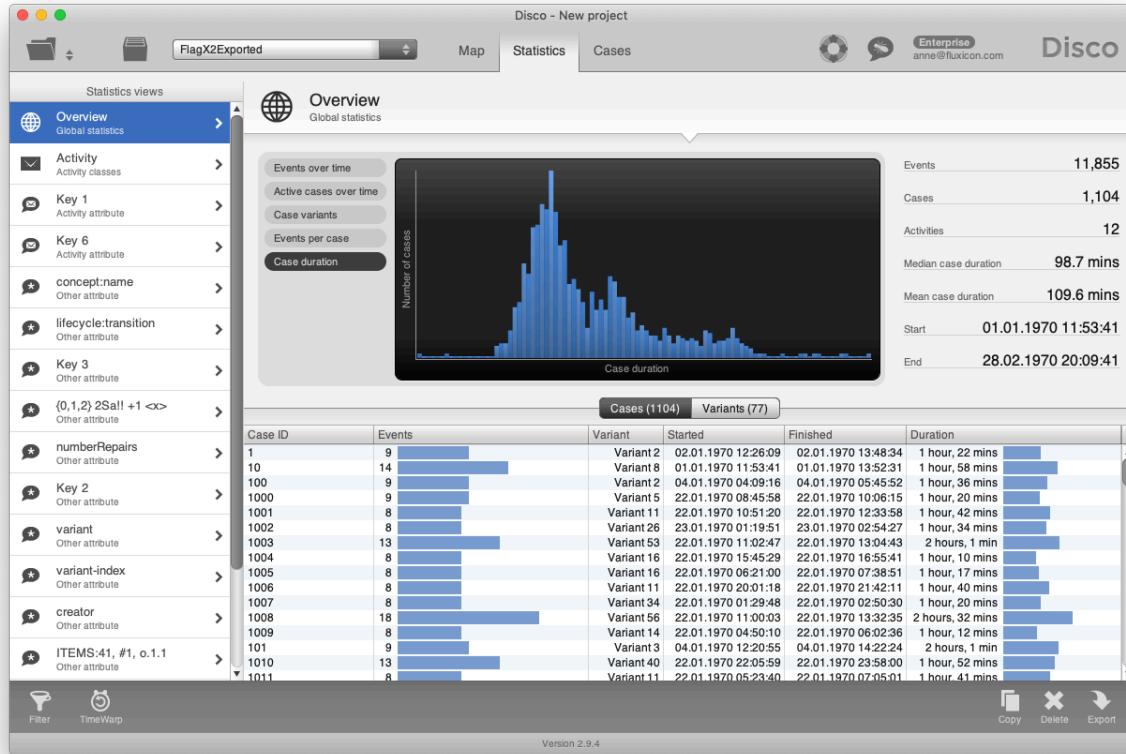
# EXPORT

## Flag X2



This shows that the classifier and classified attributes (Key 1 AND Key 6) contained in the log were exported correctly.

# EXPORT



Again, we have the same results as with the imported log.

This shows that the current data as stored by the tool is exported successfully to a log, and that the classifier and all (standard or non-standard) attributes as contained in the log matches the current data as stored by the tool.

# CONTACT INFORMATION

## Contact Information

WIL VAN DER AALST  
CHAIR



**Tel** +31 40 247 4295  
[w.m.p.v.d.aalst@tue.nl](mailto:w.m.p.v.d.aalst@tue.nl)

CHRISTIAN GÜNTHER  
VICE-CHAIR



**Tel** +31 64 1780680  
[christian@fluxicon.com](mailto:christian@fluxicon.com)

ERIC VERBEEK  
SECRETARY



**Tel** +31 40 247 3755  
[h.m.w.verbeek@tue.nl](mailto:h.m.w.verbeek@tue.nl)

IEEE XES Working Group  
IEEE Task Force on Process Mining  
<http://www.win.tue.nl/ieeetfpmpm>

