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Process Mining Tutorial

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Goals of this tutorial

- Understand phases of process mining analysis
- Be able to get started and play around with your own data

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Outline

1. **Example Scenario**
2. Roadmap
3. Hands-on Session
4. Take-away Points

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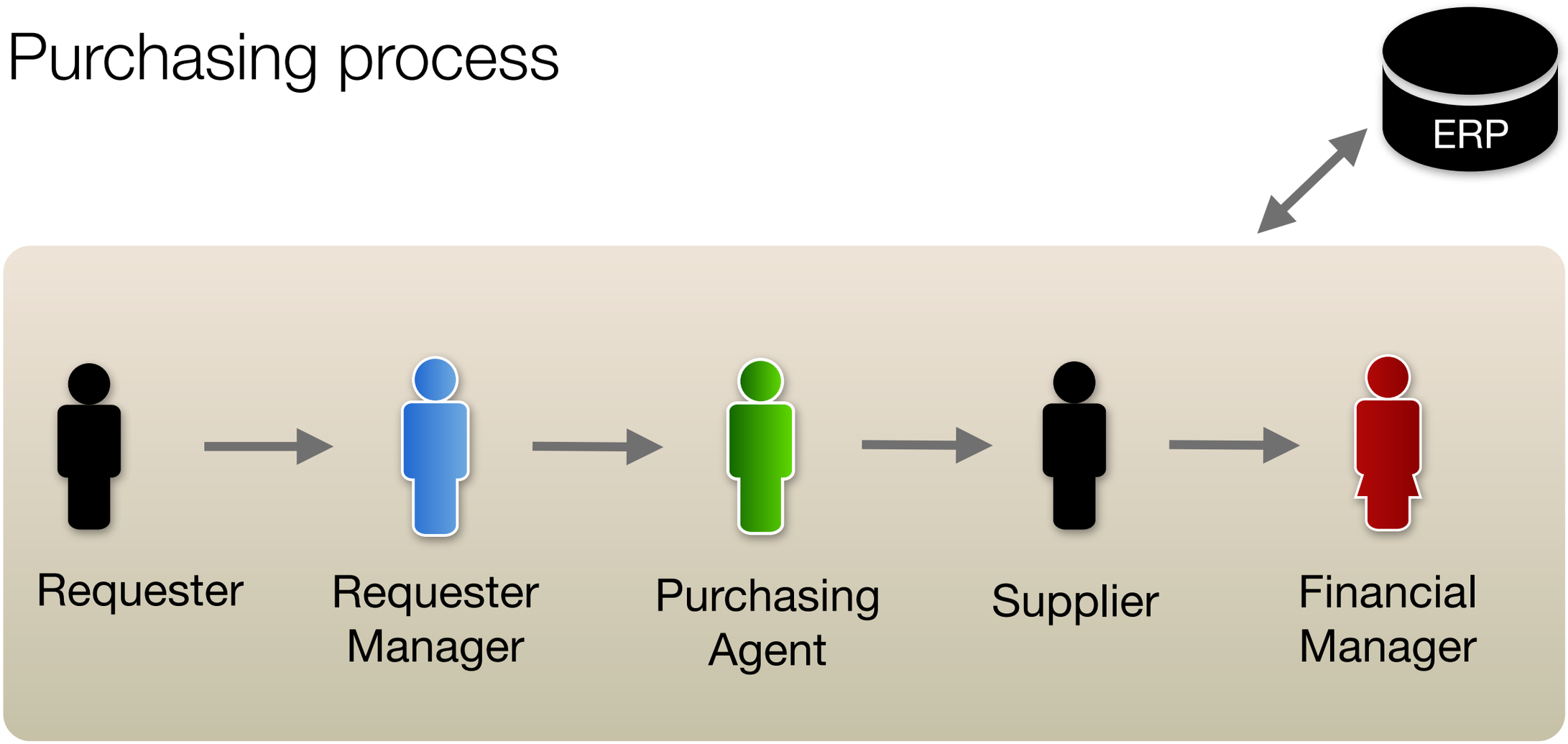
Example Scenario

Purchasing process



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Problems

1. **Inefficient** operations
2. Need to demonstrate **compliance**
3. **Complaints** about process duration

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Analysis Goals

1. **Understand the process** in detail
2. **Check** whether there are **deviations** from the payment guidelines
3. **Control performance** targets (21 days)

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Outline

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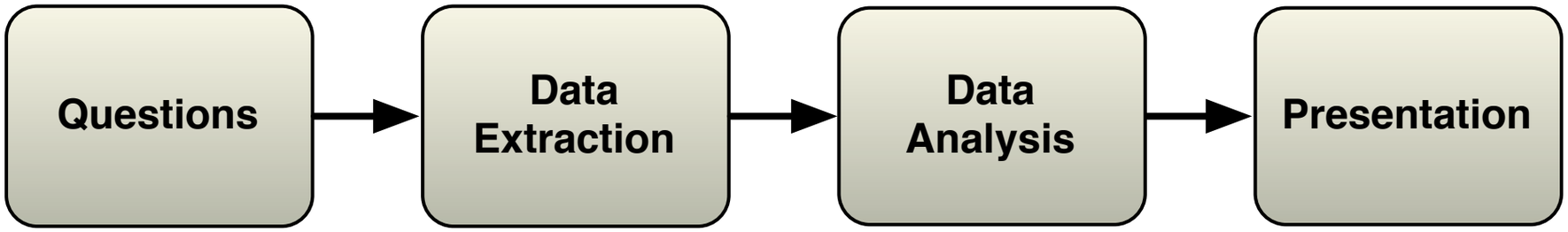
Roadmap



- Determine questions
- Process scope
- Which IT systems

- Via DB administrator
- CSV file or database extract

- Extract ‘As-is’ process
- Answer questions

- Present results (e.g., report, presentation, workshop etc.)

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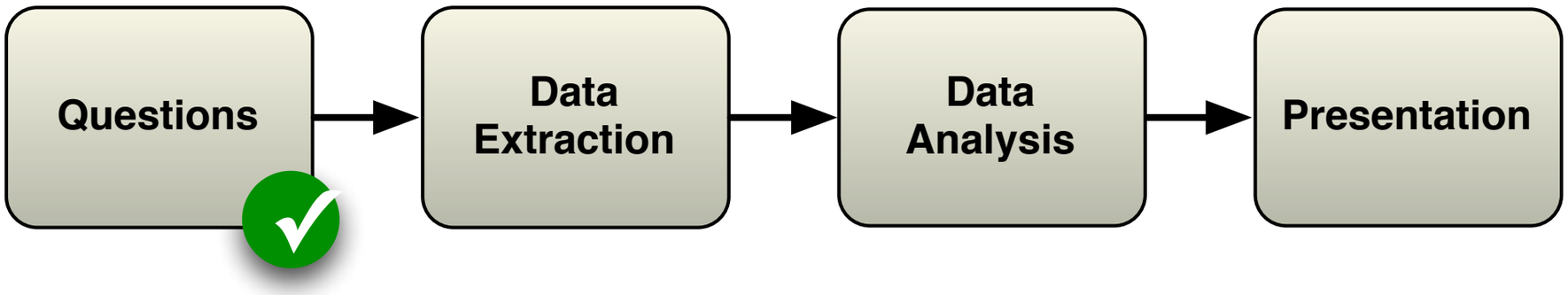
Roadmap



1. How does the process actually look like?
2. Are there deviations from the prescribed process?
3. Do we meet the performance targets?

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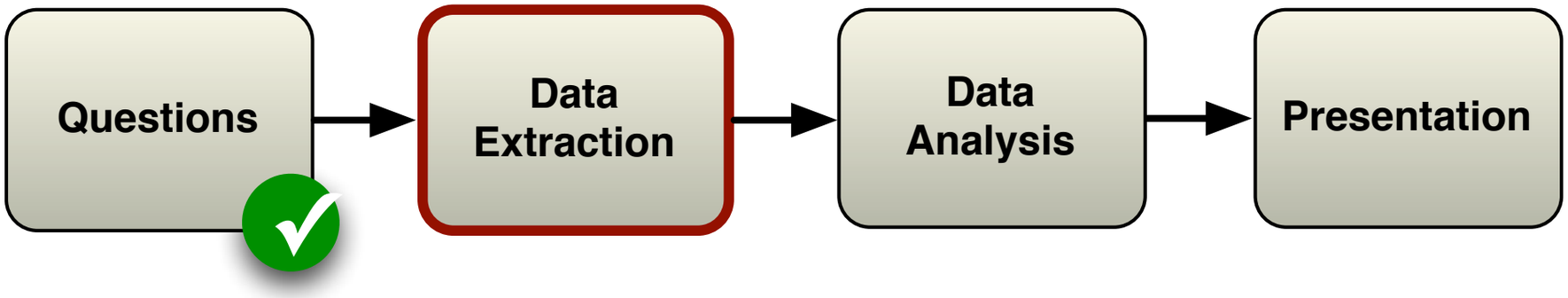
Roadmap



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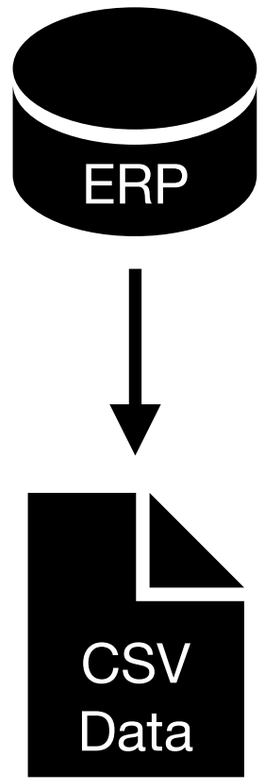
Data Extraction

IT staff extracts history logs from the ERP system



CSV file is starting point for our session

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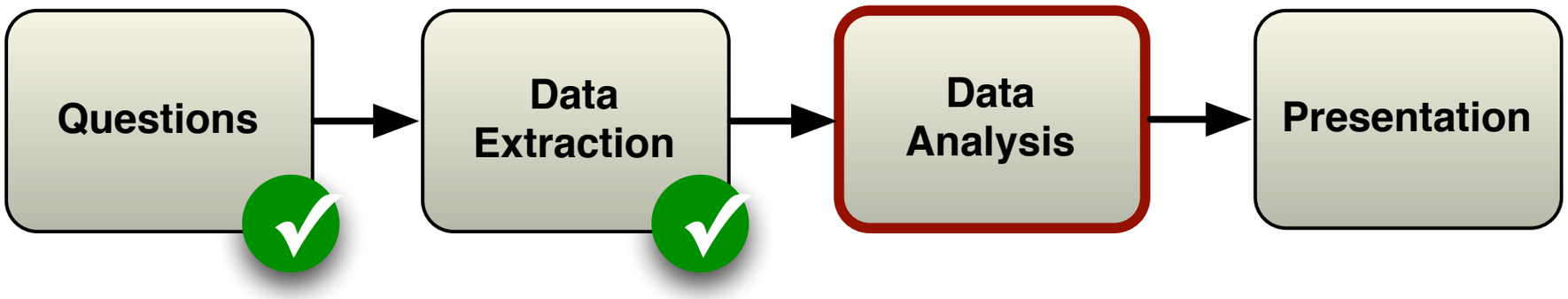
Roadmap



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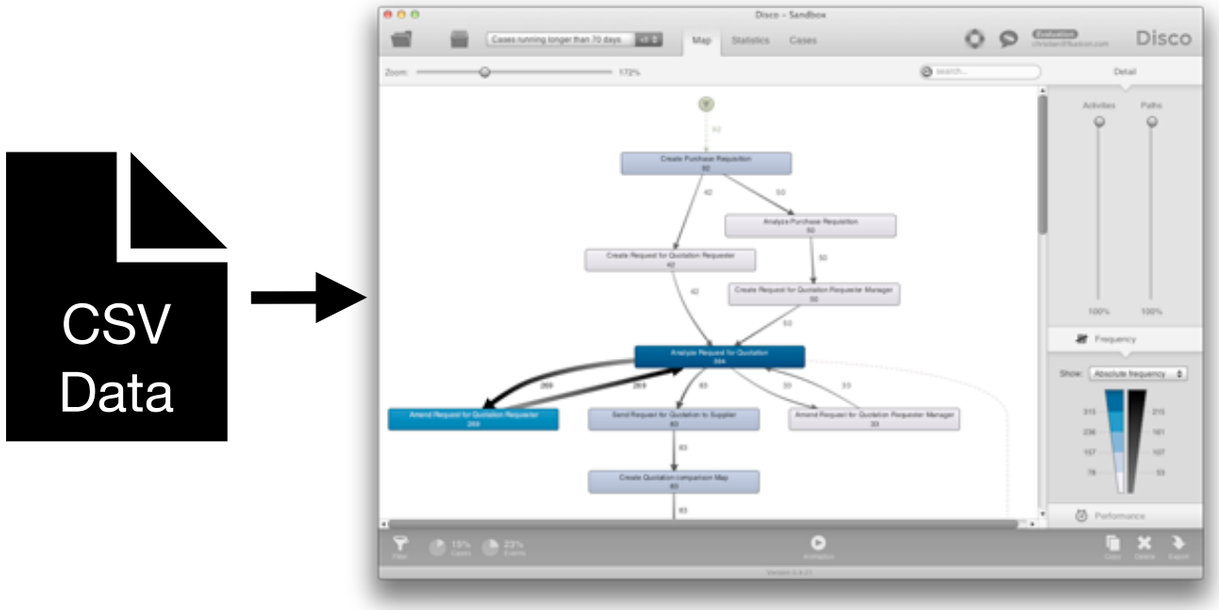
Data Analysis

We use the process mining tool Disco to perform the data analysis



Download from
fluxicon.com/disco

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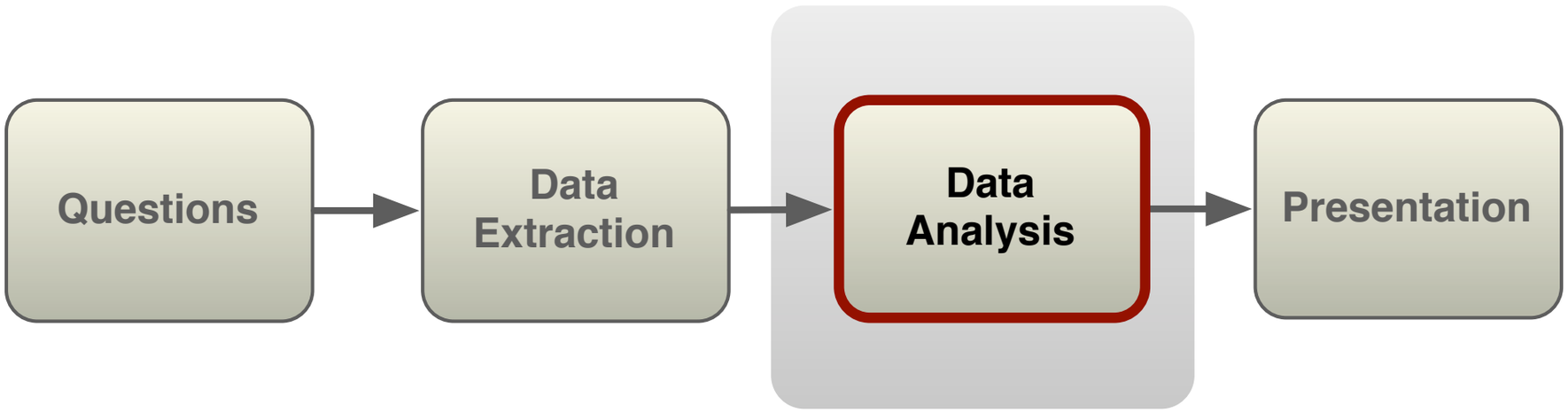
Roadmap



Focus of today's session

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Outline

1. Example Scenario
2. Roadmap
3. **Hands-on Session**
4. Take-away Points

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Hands-on Session

Let’s get started!

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Step 1 - Inspect Data

Open **`PurchasingExample.csv`** file in Excel and inspect its contents

- Every row corresponds to one event
- You can see information about Case IDs, Activities, Start and end times, Resources, Roles

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PurchasingExample.csv

New Open Save Print Import Copy Paste Format Undo Redo AutoSum Sort A-Z Sort Z-A Gallery Toolbox 100% Zoom Help

Sheets Charts SmartArt Graphics WordArt

	A	B	C	D	E	F
1	Case ID	Start Timestamp	Complete Timestamp	Activity	Resource	Role
2	1	2011/01/01 00:00:00.000	2011/01/01 00:37:00.000	Create Purchase Requisition	Kim Passa	Requester
3	2	2011/01/01 00:16:00.000	2011/01/01 00:29:00.000	Create Purchase Requisition	Immanuel Karagianni	Requester
4	3	2011/01/01 02:23:00.000	2011/01/01 03:03:00.000	Create Purchase Requisition	Kim Passa	Requester
5	1	2011/01/01 05:37:00.000	2011/01/01 05:45:00.000	Create Request for Quotation	Kim Passa	Requester
6	1	2011/01/01 06:41:00.000	2011/01/01 06:55:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
7	2	2011/01/01 08:16:00.000	2011/01/01 08:26:00.000	Create Request for Quotation	Alberto Duport	Requester
8	4	2011/01/01 08:39:00.000	2011/01/01 09:00:00.000	Create Purchase Requisition	Fjodor Kowalski	Requester
9	2	2011/01/01 09:34:00.000	2011/01/01 09:38:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
10	5	2011/01/01 09:49:00.000	2011/01/01 10:35:00.000	Create Purchase Requisition	Esmana Liubiata	Requester
11	2	2011/01/01 10:16:00.000	2011/01/01 10:21:00.000	Amend Request for Quotation	Christian Francois	Requester
12	2	2011/01/01 11:15:00.000	2011/01/01 11:48:00.000	Analyze Request for Quotation	Magdalena Predutta	Purchasing Agent
13	6	2011/01/01 11:20:00.000	2011/01/01 11:37:00.000	Create Purchase Requisition	Christian Francois	Requester
14	1	2011/01/01 11:43:00.000	2011/01/01 12:09:00.000	Send Request for Quotation to Supplier	Karel de Groot	Purchasing Agent
15	1	2011/01/01 12:32:00.000	2011/01/01 16:03:00.000	Create Quotation comparison Map	Magdalena Predutta	Purchasing Agent
16	2	2011/01/01 12:33:00.000	2011/01/01 12:39:00.000	Amend Request for Quotation	Esmana Liubiata	Requester
17	2	2011/01/01 13:28:00.000	2011/01/01 13:38:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
18	7	2011/01/01 14:05:00.000	2011/01/01 15:00:00.000	Create Purchase Requisition	Esmana Liubiata	Requester
19	8	2011/01/01 14:27:00.000	2011/01/01 15:17:00.000	Create Purchase Requisition	Fjodor Kowalski	Requester
20	2	2011/01/01 15:18:00.000	2011/01/01 15:40:00.000	Send Request for Quotation to Supplier	Francois de Perrier	Purchasing Agent
21	2	2011/01/01 15:55:00.000	2011/01/01 16:43:00.000	Create Quotation comparison Map	Karel de Groot	Purchasing Agent
22	9	2011/01/01 16:17:00.000	2011/01/01 16:34:00.000	Create Purchase Requisition	Tesca Lobes	Requester
23	6	2011/01/01 17:32:00.000	2011/01/01 17:45:00.000	Create Request for Quotation	Alberto Duport	Requester
24	8	2011/01/01 18:00:00.000	2011/01/01 18:07:00.000	Create Request for Quotation	Tesca Lobes	Requester
25	6	2011/01/01 18:39:00.000	2011/01/01 18:55:00.000	Analyze Request for Quotation	Magdalena Predutta	Purchasing Agent
26	4	2011/01/01 18:45:00.000	2011/01/01 18:51:00.000	Analyze Purchase Requisition	Maris Freeman	Requester Manager
27	4	2011/01/01 18:56:00.000	2011/01/01 18:58:00.000	Create Request for Quotation	Heinz Gutschmidt	Requester Manager
28	8	2011/01/01 19:04:00.000	2011/01/01 19:27:00.000	Analyze Request for Quotation	Francois de Perrier	Purchasing Agent
29	6	2011/01/01 19:47:00.000	2011/01/01 19:55:00.000	Amend Request for Quotation	Penn Osterwalder	Requester
30	4	2011/01/01 19:58:00.000	2011/01/01 20:19:00.000	Analyze Request for Quotation	Francois de Perrier	Purchasing Agent
31	8	2011/01/01 20:21:00.000	2011/01/01 20:34:00.000	Amend Request for Quotation	Tesca Lobes	Requester
32	6	2011/01/01 20:55:00.000	2011/01/01 21:28:00.000	Analyze Request for Quotation	Francois de Perrier	Purchasing Agent
33	4	2011/01/01 21:06:00.000	2011/01/01 21:14:00.000	Amend Request for Quotation	Nico Ojenbeer	Requester
34	8	2011/01/01 21:35:00.000	2011/01/01 22:01:00.000	Analyze Request for Quotation	Magdalena Predutta	Purchasing Agent
35	4	2011/01/01 22:01:00.000	2011/01/01 22:24:00.000	Analyze Request for Quotation	Francois de Perrier	Purchasing Agent
36	6	2011/01/01 22:13:00.000	2011/01/01 22:28:00.000	Amend Request for Quotation	Anne Olwada	Requester

PurchasingExample.csv

Normal View Ready Sum=2

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Step 2 - Import Data

Load **`PurchasingExample.csv`** in Disco

Assign columns as follows:

- Case ID → Case ID
- Start and Complete Timestamp → Timestamp
- Activity → Activity
- Resource → Resource
- Role → Other

Click ‘Start import’

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Disco – Tutorial

Enterprise
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Disco

Case ID

column is used

Case

	Case ID	Start Timestamp	Complete Timestamp	Activity	Resource	Role
1	1	2011/01/01 00:00:00.000	2011/01/01 00:37:00.000	Create Purchase Requisition	Kim Passa	Requester
2	2	2011/01/01 00:16:00.000	2011/01/01 00:29:00.000	Create Purchase Requisition	Immanuel Karagianni	Requester
3	3	2011/01/01 02:23:00.000	2011/01/01 03:03:00.000	Create Purchase Requisition	Kim Passa	Requester
4	1	2011/01/01 05:37:00.000	2011/01/01 05:45:00.000	Create Request for Quotation	Kim Passa	Requester
5	1	2011/01/01 06:41:00.000	2011/01/01 06:55:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
6	2	2011/01/01 08:16:00.000	2011/01/01 08:26:00.000	Create Request for Quotation	Alberto Duport	Requester
7	4	2011/01/01 08:39:00.000	2011/01/01 09:00:00.000	Create Purchase Requisition	Fjodor Kowalski	Requester
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9	5	2011/01/01 09:49:00.000	2011/01/01 10:35:00.000	Create Purchase Requisition	Esmana Liubiata	Requester
10	2	2011/01/01 10:16:00.000	2011/01/01 10:21:00.000	Amend Request for Quotation	Christian Francois	Requester
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28	6	2011/01/01 19:47:00.000	2011/01/01 19:55:00.000	Amend Request for Quotation	Penn Osterwalder	Requester

Cancel | File encoding: UTF-8 | Use quotes | Ready to start import. | Start import

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Step 3 - Inspect Process

Look at the resulting process model

- Numbers in rectangles are activity frequencies
- Number at arcs is frequency of connection

→ You see the main process flows

- All 608 cases start with activity ‘Create Purchase Requisition’
- Lots of changes were made (amendments)!

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Start point

Disco – Tutorial

PurchasingExample

Map | Statistics

Disco

Zoom: 150%

search...

Detail

608

Create Purchase Requisition
608

374

Analyze Purchase Requisition
382

307 | 11 | 8

Create Request for Quotation
544

Amend Purchase Requisition
11

544

Analyze Request for Quotation
1107

413 | 563 | 563

Send Request for Quotation to Supplier
413

Amend Request for Quotation
563

413

Create Quotation comparison Map
413

413

Activities

Paths

100%

0%

Frequency

Show: Absolute frequency

885
664
442
221

450
337
225
112

Performance

Filter

Animation

Copy

Delete

Export

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Step 3 - Inspect Process

It’s important to be able to adjust the level of detail for the process map

Move up the ‘Activities’ slider down to lowest position (0%)

- Only the activities from the most frequent process variant are shown

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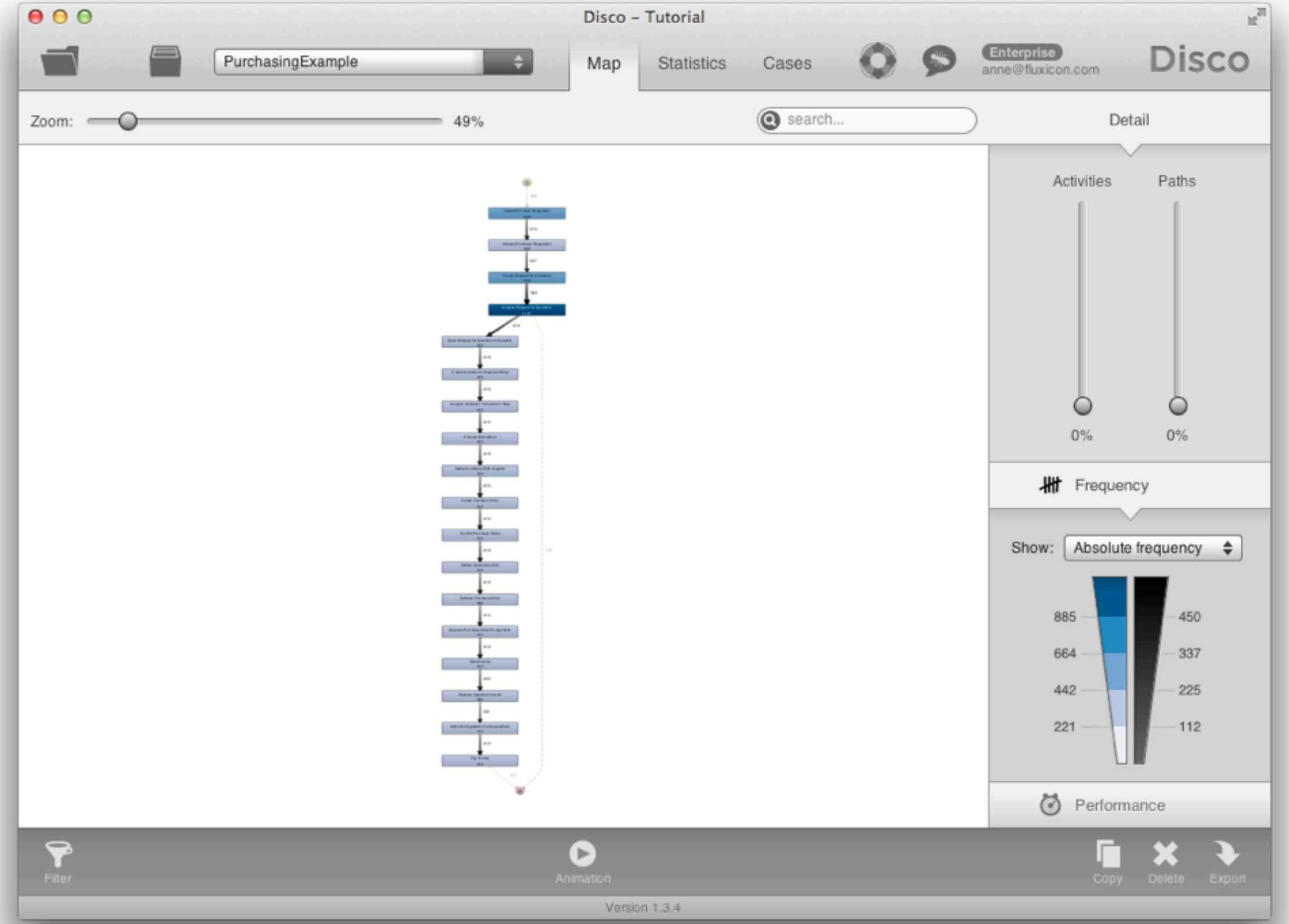
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Map
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Cases
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Activities
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Performance
Filter
Animation
Copy
Delete
Export
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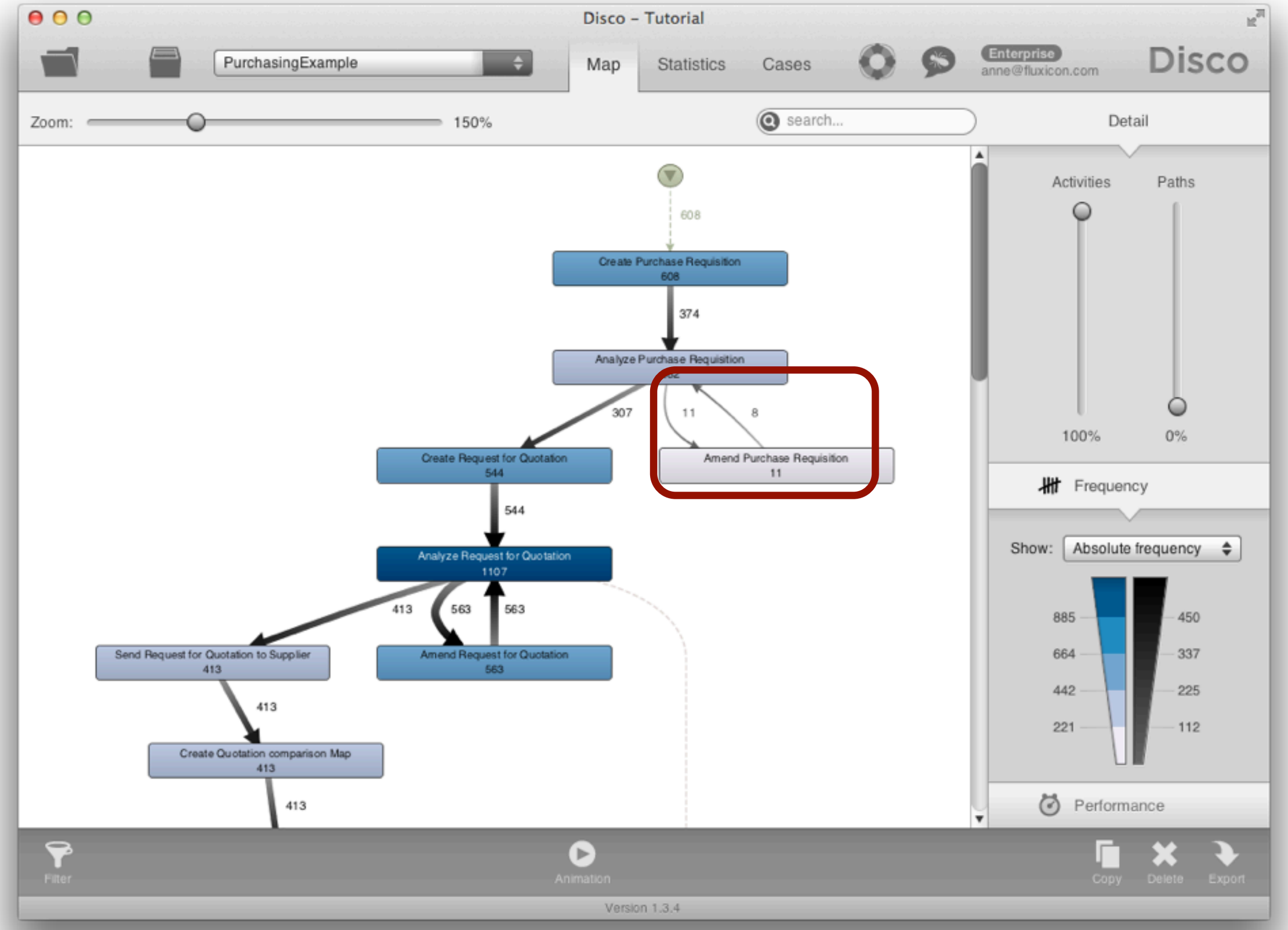
Step 3 - Inspect Process

Gradually move the ‘Activities’ slider up to 100% again until all activities are shown

- Even infrequent activities such as ‘Amend Purchase Requisition’ are shown

You’ll notice that 11 cases are flowing in to ‘Amend Purchase Requisition’ but only 8 are moving out - Where are the other 3?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Absolute frequency
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337
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112
Performance
Filter
Animation
Copy
Delete
Export
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Step 3 - Inspect Process

Move up the ‘Paths’ slider up to the top

You now see a 100% detailed picture of the executed process

- The 3 missing cases move from ‘Amend Purchase Requisition’ to ‘Create Request for Quotation’

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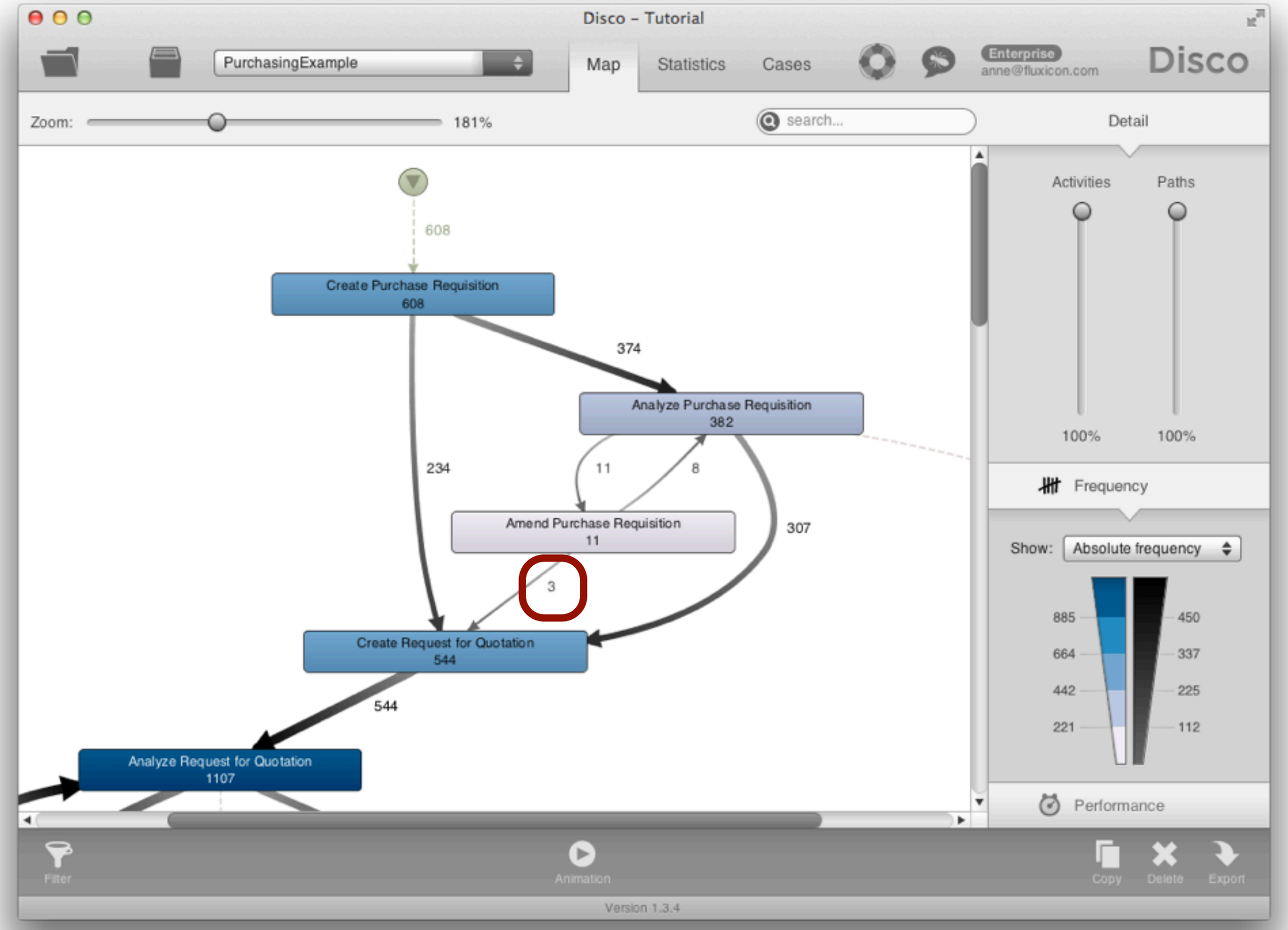
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Performance
Filter
Animation
Copy
Delete
Export
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Step 4 - Inspect Statistics

Look at ‘Statistics’ tab to see overview information about event log

- 9,119 events were recorded for 608 cases
- Timeframe is January - October 2011

The case duration is typically up to 15 or 16 days, but some cases take very long (more than 70 or 80 days!)

Disco – Tutorial

PurchasingExample

Map | Statistics | Cases

Enterprise
anne@fluxicon.com

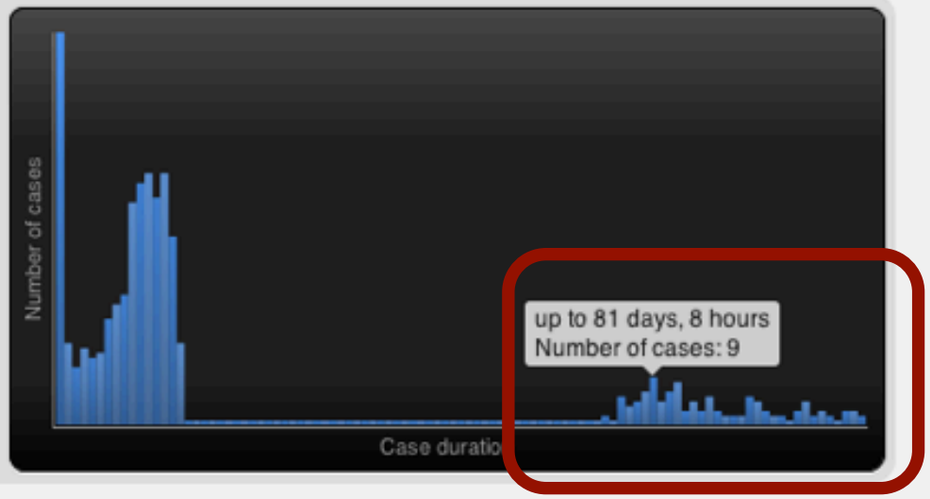
Disco

Statistics views

- Overview — Global statistics
- Activity — Activity classes
- Resource — Resource classes
- Role — Other attribute

Overview
Global statistics

- Events over time
- Active cases over time
- Case variants
- Events per case
- Case duration
- Case utilization
- Mean activity duration
- Mean waiting time



Events	9,119
Cases	608
Activities	21
Resources	27
Attributes	3
Start	01.01.2011 00:00:00
End	14.10.2011 15:31:00

Cases (608) | Variants (70)

Case ID	Events	Started	Finished	Duration
1	17	01.01.2011 00:00:00	04.01.2011 15:31:00	3 days, 15 hours
2	22	01.01.2011 00:16:00	06.01.2011 06:32:00	5 days, 6 hours
3	18	01.01.2011 02:23:00	07.01.2011 16:31:00	6 days, 14 hours
4	19	01.01.2011 08:39:00	06.01.2011 21:32:00	5 days, 12 hours
5	19	01.01.2011 09:49:00	06.01.2011 23:04:00	5 days, 13 hours
6	21	01.01.2011 11:20:00	06.01.2011 13:50:00	5 days, 2 hours
7	22	01.01.2011 14:05:00	07.01.2011 09:53:00	5 days, 19 hours
8	19	01.01.2011 14:27:00	07.01.2011 16:04:00	6 days, 1 hour
9	15	01.01.2011 16:17:00	04.01.2011 05:56:00	2 days, 13 hours
10	18	02.01.2011 02:52:00	10.01.2011 16:16:00	8 days, 13 hours
11	6	02.01.2011 05:12:00	03.01.2011 19:57:00	1 day, 14 hours
12	25	02.01.2011 05:31:00	10.01.2011 16:02:00	8 days, 10 hours
13	25	02.01.2011 07:47:00	10.01.2011 06:49:00	7 days, 23 hours

Filter | Copy | Delete | Export

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Step 5 - Inspect Cases

Select ‘Cases’ tab to inspect variants and individual service instances

- The third most frequent process variant ends after ‘Analyze Purchase Requisition’ (ca. 10.36% of all cases follow this pattern)

→ Why are so many requests stopped? Do people not know what they can buy? (We can find this back in the process map, too)

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Disco – Tutorial

PurchasingExample

Map | Statistics | Cases

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Disco

search...

Variants (70)	Cases (63)
Complete log All cases (608)	32 2 events
Variant 1 88 cases (14.47%)	63 2 events
Variant 2 77 cases (12.66%)	89 2 events
Variant 3 63 cases (10.36%)	109 2 events
Variant 4 48 cases (7.89%)	151 2 events
Variant 5 32 cases (5.26%)	172 2 events
Variant 6 30 cases (4.93%)	175 2 events
Variant 7 26 cases (4.28%)	268 2 events
Variant 8 21 cases (3.45%)	418 2 events
Variant 9 17 cases (2.8%)	423 2 events
Variant 10 14 cases (2.3%)	452 2 events
Variant 11 14 cases (2.3%)	522 2 events

423
Case with 2 events

Events	2
Start	02.03.2011 07:36:00
Duration	12 hours, 42 mins
Active time	8.4 %

Graph | Table

	Activity	Resource	Date	Time	Duration	Role
1	Create Purchase Requisition	Clement Duchot	02.03.2011	07:36:00	55 mins	Requester
2	Analyze Purchase Requisition	Heinz Gutschmidt	02.03.2011	20:09:00	9 mins	Requester

Filter | Copy | Delete | Export

Version 1.3.4

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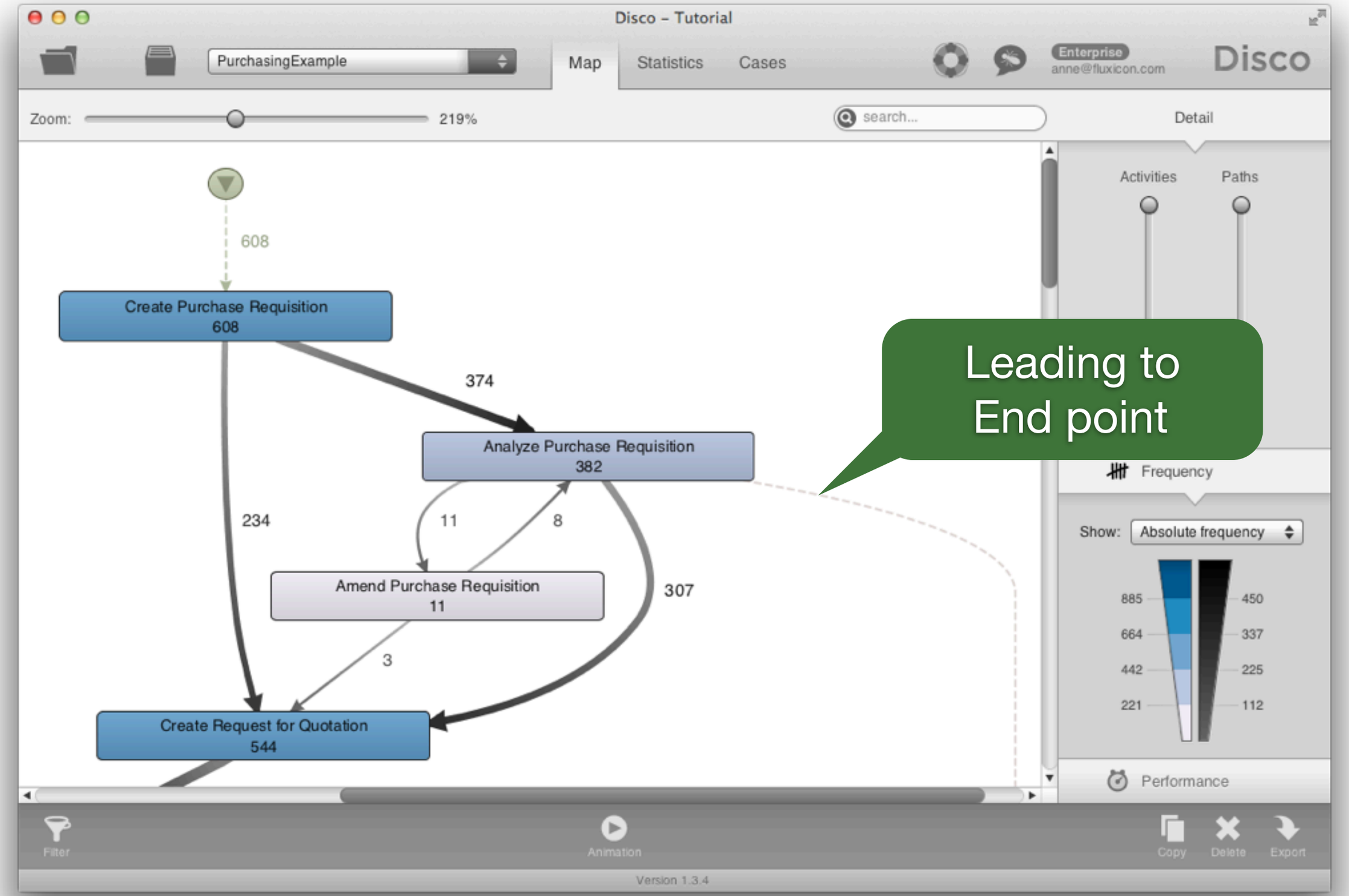
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608
Create Purchase Requisition
608
374
Analyze Purchase Requisition
382
234
11
8
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Amend Purchase Requisition
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Create Request for Quotation
544
Leading to
End point
Frequency
Show:
Absolute frequency
885
664
442
221
450
337
225
112
Performance
Filter
Animation
Copy
Delete
Export
Version 1.3.4

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Results so far…

Original Questions:

1. How does the process actually look like?
   - Objective process map discovered
   - Lots of amendments and stopped requests:
     Update of purchasing guidelines needed
2. Are there deviations from the prescribed process?
3. Do we meet the performance targets?
   - Not by all (some take longer than 21 days):
     Where in the process do we lose the time? -> **Next**

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Step 6 - Filter on Performance

Click on the Filter symbol in the lower left corner and add a Performance filter

- Select 21 days as lower boundary
- You'll see that ca. 15% of the purchase orders take longer than 21 days

Press 'Apply filter' to focus only on those cases that take longer than 21 days

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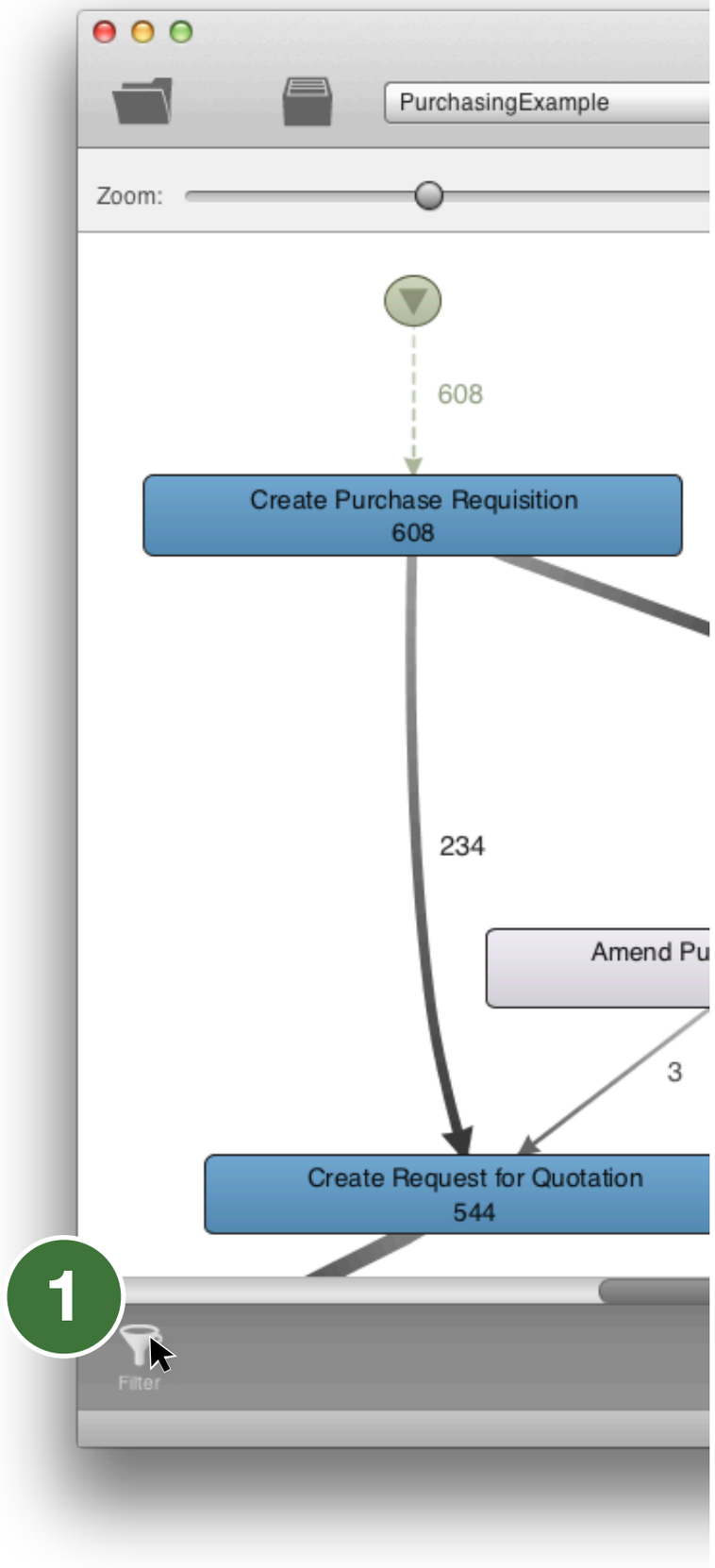
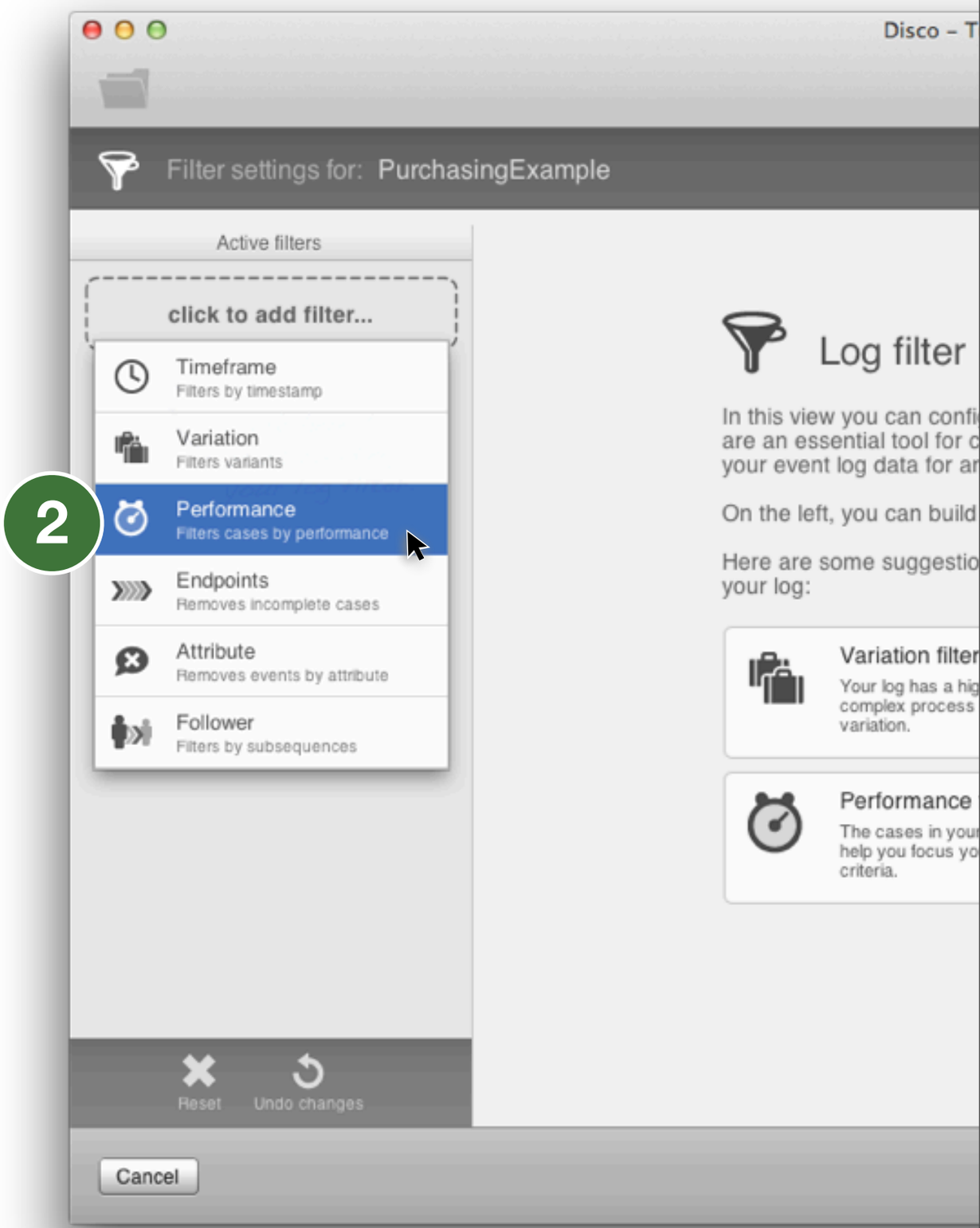
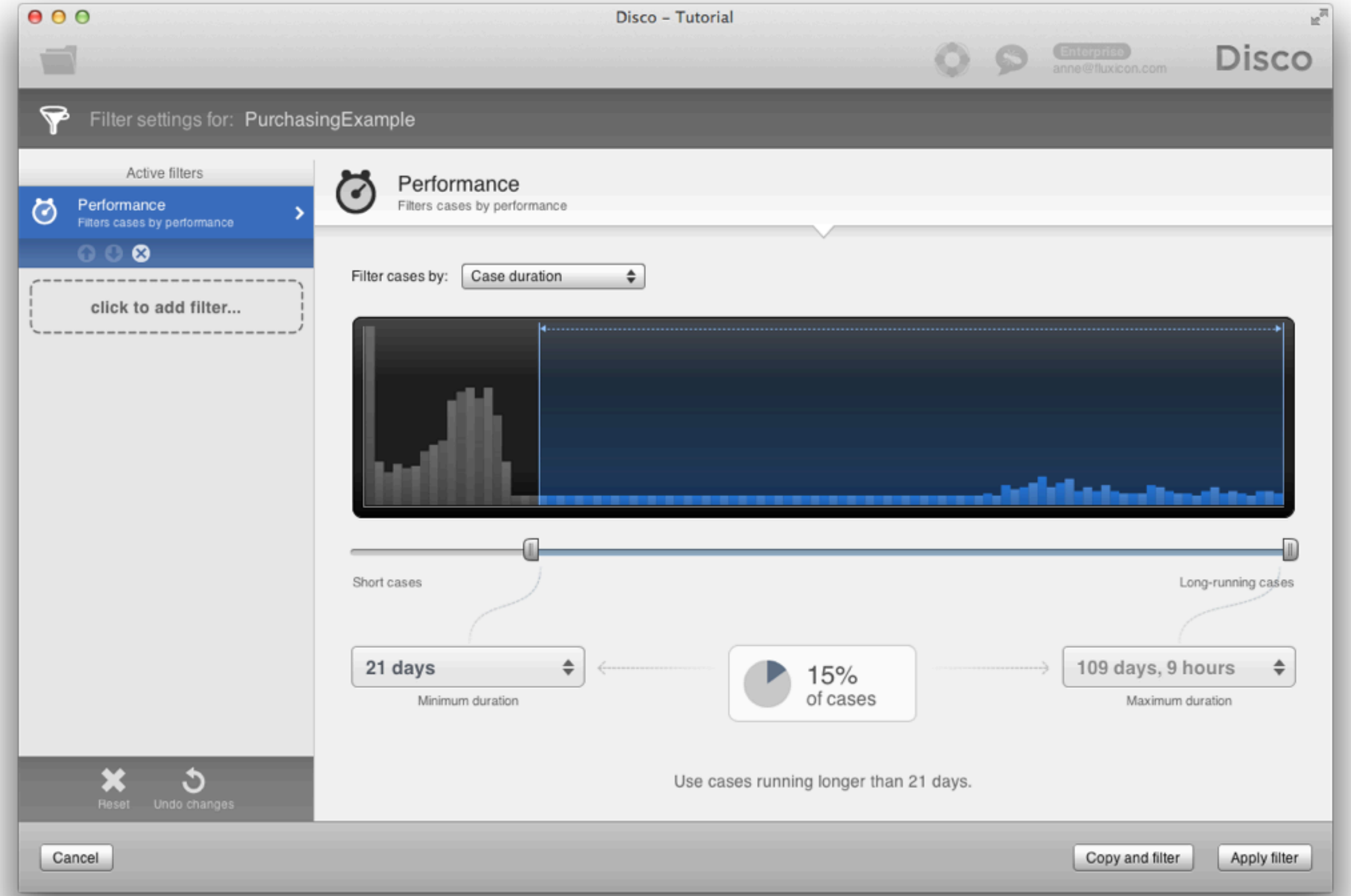

PurchasingExample
Zoom:
608
Create Purchase Requisition
608
234
Amend Pu
3
Create Request for Quotation
544
1
Filter


Disco – T
Filter settings for: PurchasingExample
Active filters
click to add filter...
Timeframe
Filters by timestamp
Variation
Filters variants
2
Performance
Filters cases by performance
Endpoints
Removes incomplete cases
Attribute
Removes events by attribute
Follower
Filters by subsequences
Log filter
In this view you can confi
are an essential tool for c
your event log data for ar
On the left, you can build
Here are some suggestio
your log:
Variation filter
Your log has a hig
complex process
variation.
Performance
The cases in you
help you focus yo
criteria.
Reset
Undo changes
Cancel

fluxicon


Disco – Tutorial
Enterprise
anne@fluxicon.com
Disco
Filter settings for: PurchasingExample
Active filters
Performance
Filters cases by performance
click to add filter...
Performance
Filters cases by performance
Filter cases by:
Case duration
Short cases
Long-running cases
21 days
Minimum duration
15%
of cases
109 days, 9 hours
Maximum duration
Use cases running longer than 21 days.
Reset
Undo changes
Cancel
Copy and filter
Apply filter

fluxicon

Step 7 - Visualize Bottlenecks

The filtered process map shows process flow for the 92 (15%) slow cases

- On average 3 amendments per case!

Switch to ‘Performance’ view

- ‘Total duration’ shows the high-impact areas
- Switch to ‘Mean duration’: On average it takes **more than 14 days** to return from the rework loop to the normal process

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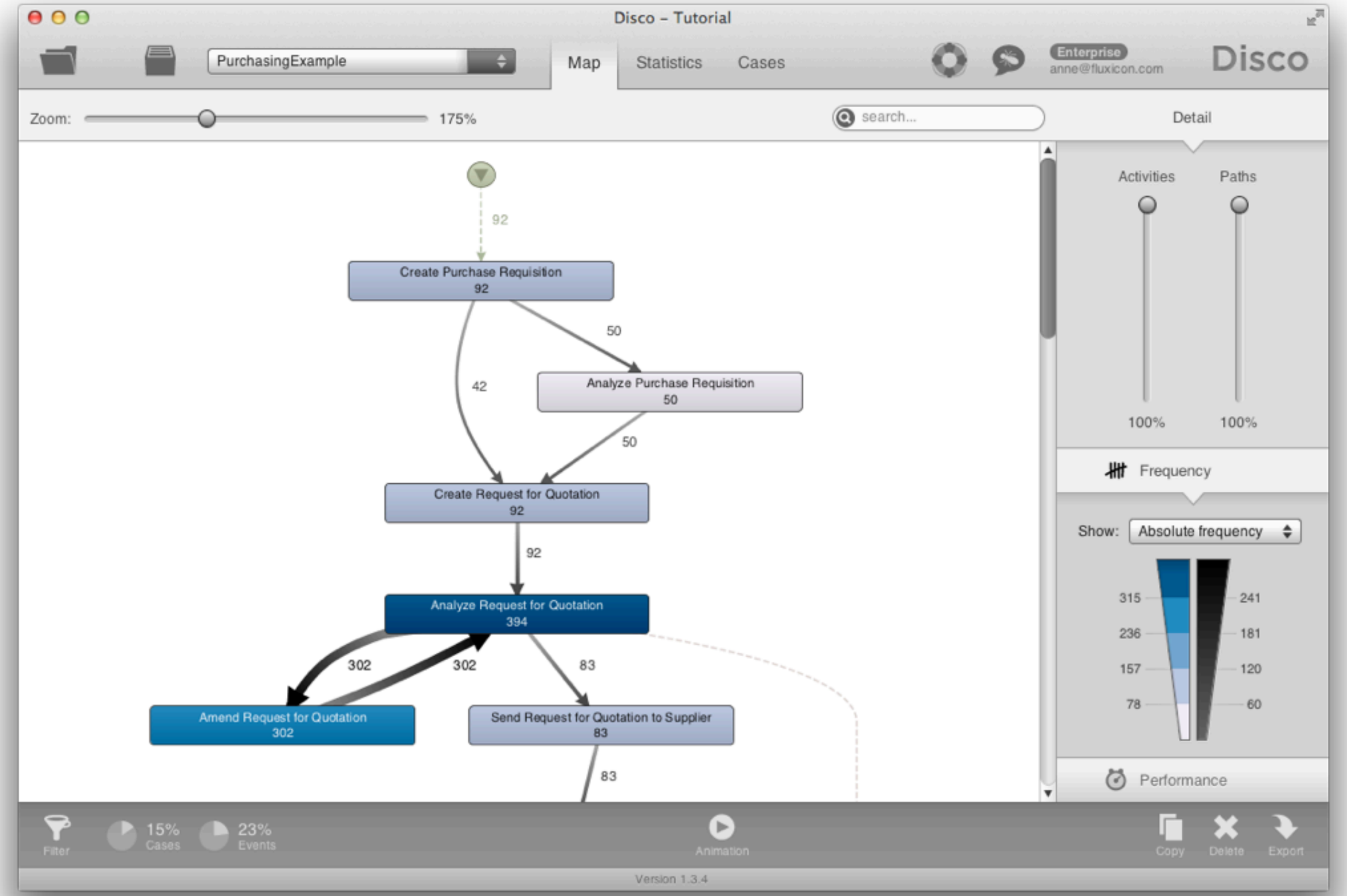
Disco – Tutorial
PurchasingExample
Map
Statistics
Cases
Enterprise
anne@fluxicon.com
Disco
Zoom:
175%
search...
Detail
Create Purchase Requisition
92
Analyze Purchase Requisition
50
Create Request for Quotation
92
Analyze Request for Quotation
394
Amend Request for Quotation
302
Send Request for Quotation to Supplier
83
92
50
42
50
92
302
302
83
83
Activities
Paths
100%
100%
Frequency
Show:
Absolute frequency
315
236
157
78
241
181
120
60
Performance
Filter
15%
Cases
23%
Events
Animation
Copy
Delete
Export
Version 1.3.4

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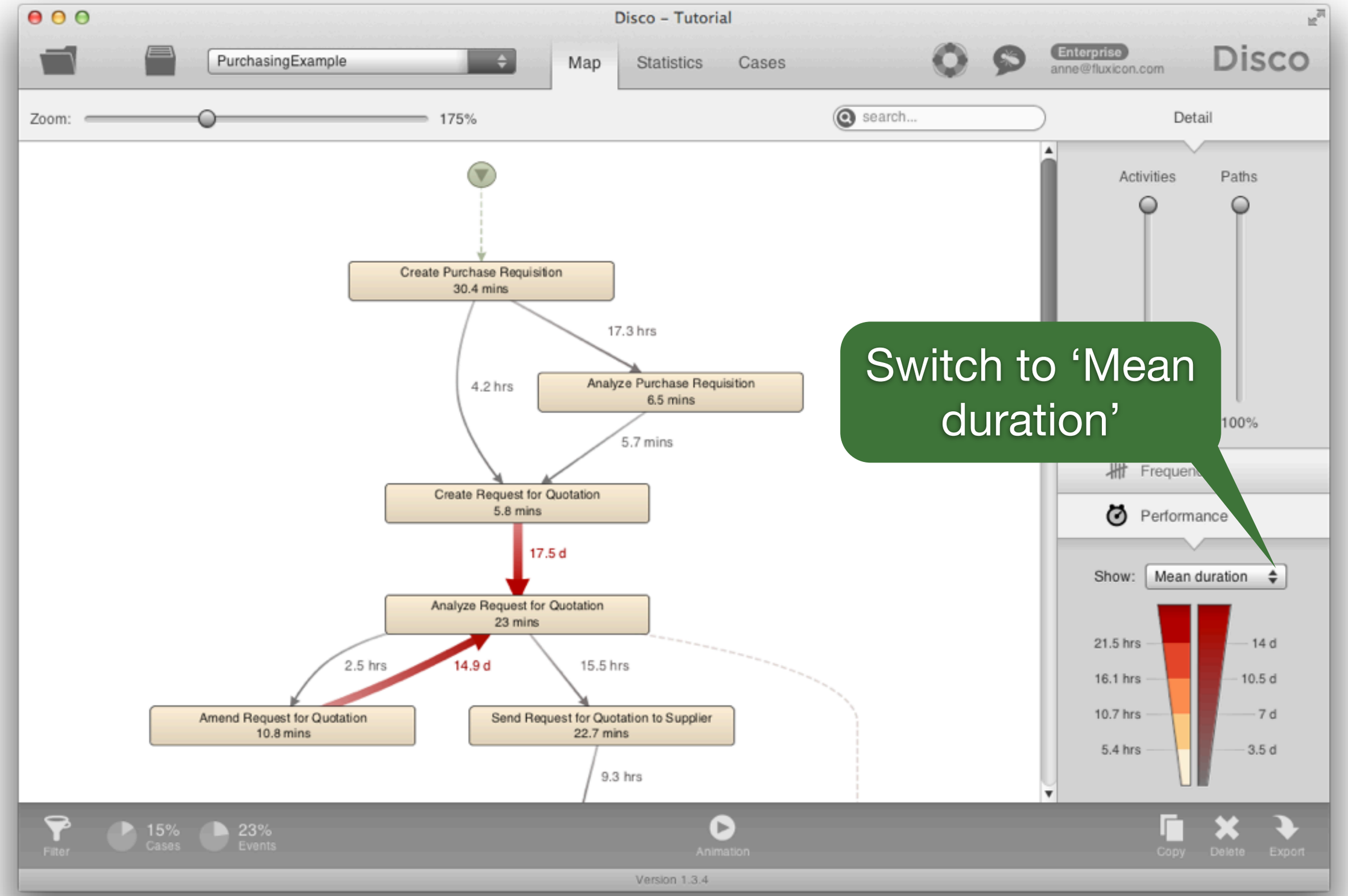
Disco – Tutorial
PurchasingExample
Map
Statistics
Cases
Enterprise
anne@fluxicon.com
Disco
Zoom:
175%
search...
Detail
Activities
Paths
100%
Create Purchase Requisition
30.4 mins
17.3 hrs
4.2 hrs
Analyze Purchase Requisition
6.5 mins
5.7 mins
Create Request for Quotation
5.8 mins
17.5 d
Analyze Request for Quotation
23 mins
2.5 hrs
14.9 d
15.5 hrs
Amend Request for Quotation
10.8 mins
Send Request for Quotation to Supplier
22.7 mins
9.3 hrs
Switch to ‘Mean duration’
Performance
Show:
Mean duration
21.5 hrs
16.1 hrs
10.7 hrs
5.4 hrs
14 d
10.5 d
7 d
3.5 d
Filter
15%
Cases
23%
Events
Animation
Copy
Delete
Export
Version 1.3.4

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Step 8 - Animate Process

Visualize bottleneck:
Press ▷ button to start animation

Observe how purchase orders move through the process

Drag needle to end of time line and observe how the most used paths get thicker and thicker

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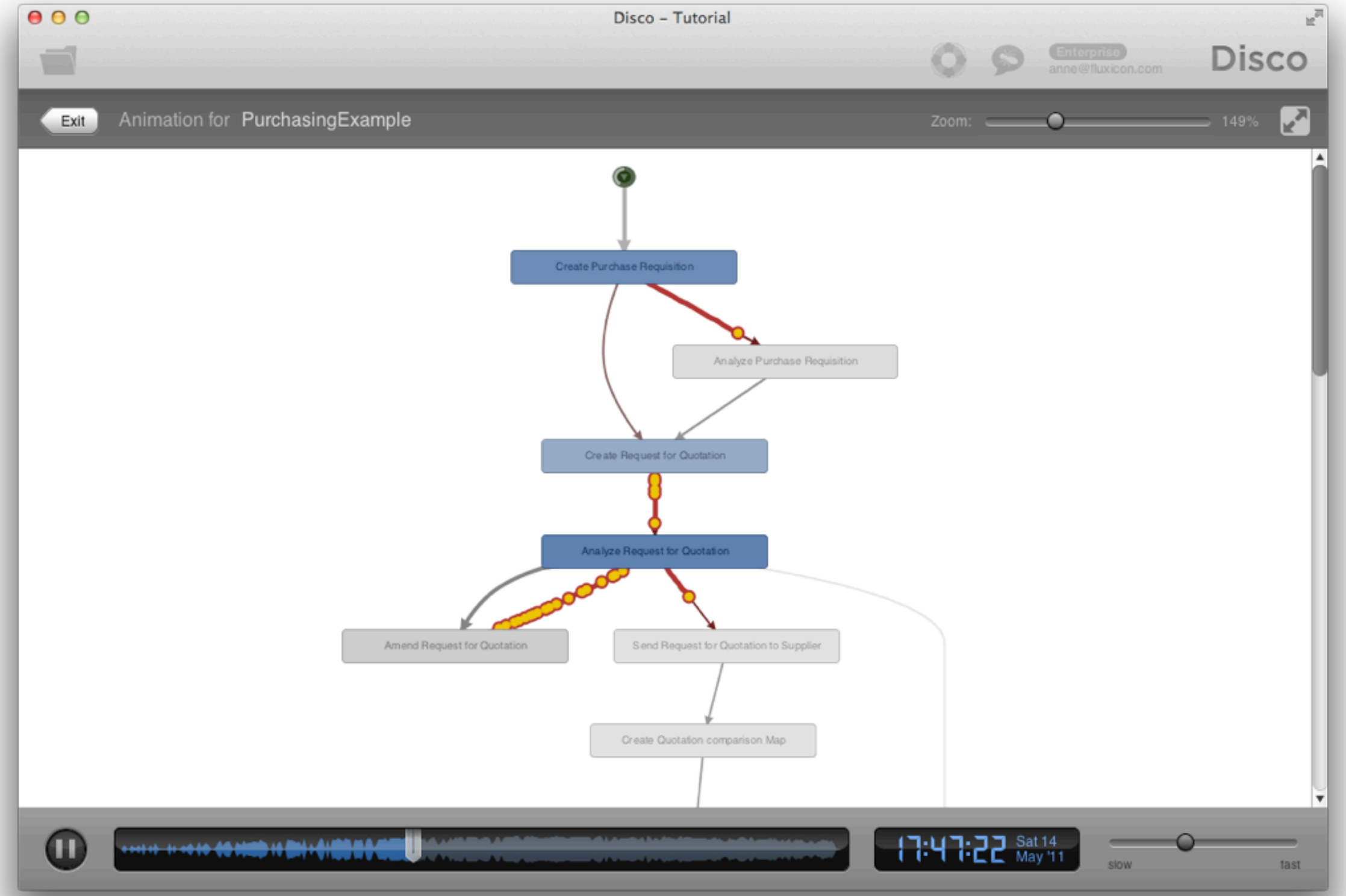

Disco – Tutorial
Enterprise
anne@fluxicon.com
Disco
Exit
Animation for PurchasingExample
Zoom:
149%
Create Purchase Requisition
Analyze Purchase Requisition
Create Request for Quotation
Analyze Request for Quotation
Amend Request for Quotation
Send Request for Quotation to Supplier
Create Quotation comparison Map
17:47:22
Sat 14
May '11
slow
fast

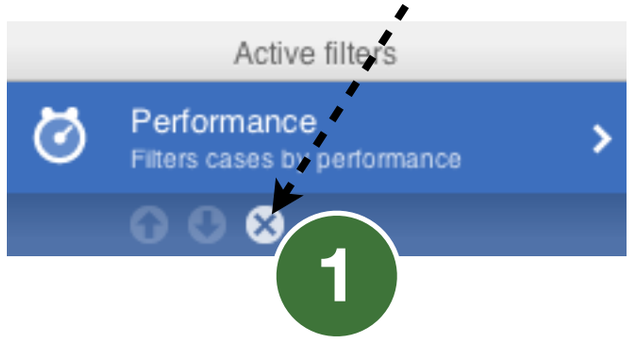
fluxicon

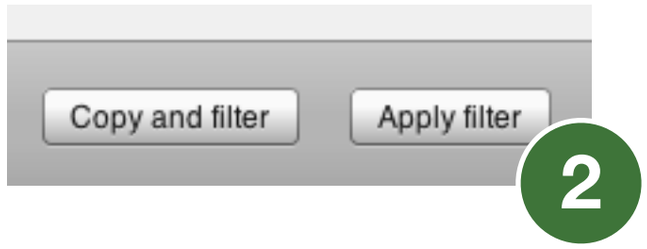
Results so far…

1. How does the process actually look like?
    - Objective process map discovered
    - Lots of amendments and stopped requests: Update of purchasing guidelines needed
2. Are there deviations from the prescribed process? -> **Next**
3. Do we meet the performance targets?
    - Not by all (some take longer than 21 days)
    - The ‘Analyze Request for Quotation’ activity is a huge bottleneck: Process change is needed

Step 9 - Compliance Check

Exit the animation, return to Filter settings, and remove performance filter





Switch back to Frequency Map view and scroll to end of the process

- 10 cases skip the mandatory ‘Release Supplier’s Invoice’ activity!

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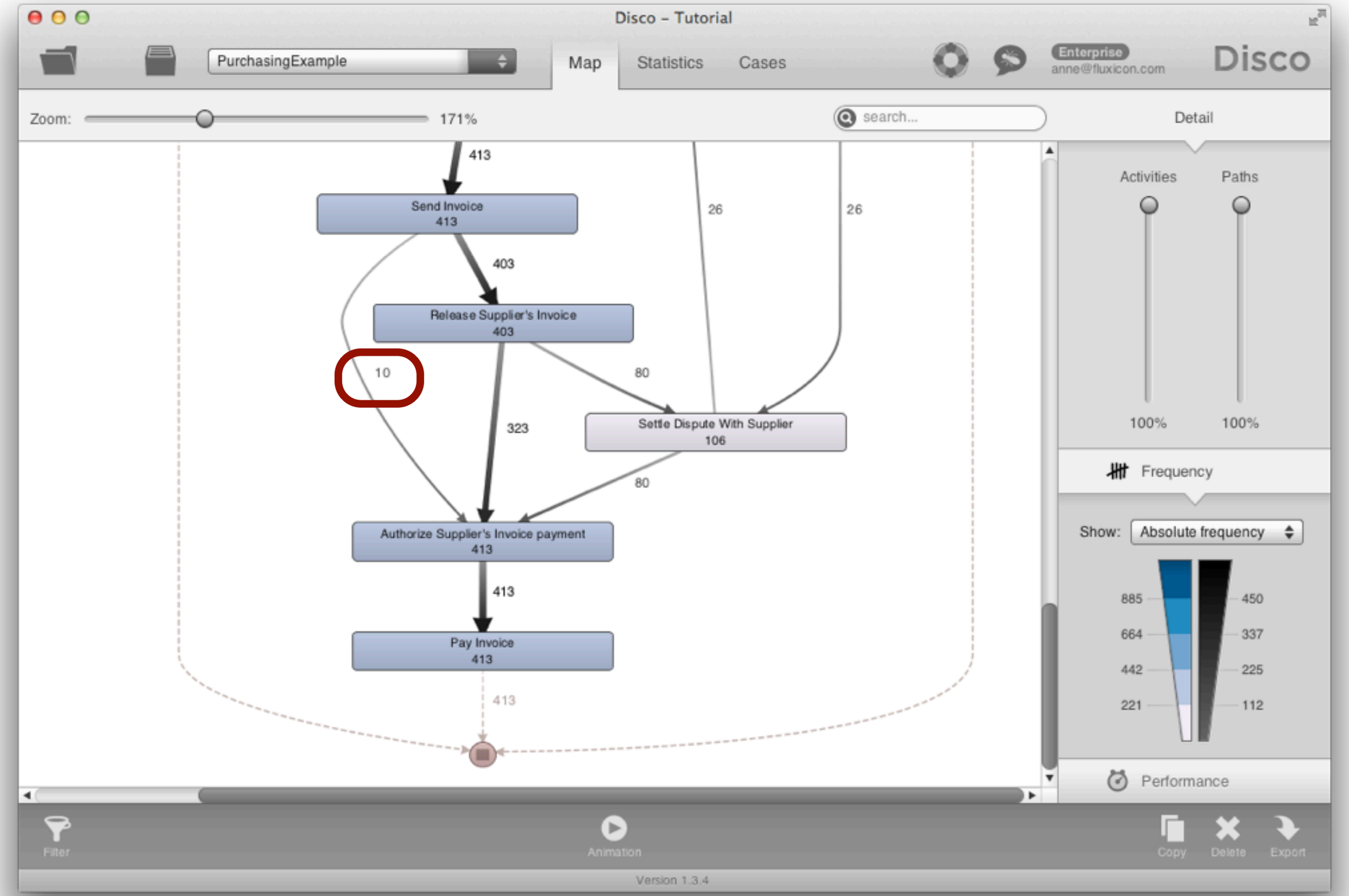
Disco – Tutorial
PurchasingExample
Map
Statistics
Cases
Enterprise
anne@fluxicon.com
Disco
Zoom:
171%
search...
Detail
413
Send Invoice
413
403
Release Supplier's Invoice
403
10
323
80
26
26
Settle Dispute With Supplier
106
80
Authorize Supplier's Invoice payment
413
413
Pay Invoice
413
413
Activities
Paths
100%
100%
Frequency
Show:
Absolute frequency
885
664
442
221
450
337
225
112
Performance
Filter
Animation
Copy
Delete
Export
Version 1.3.4

Step 9 - Compliance Check

Drill down: Click on the path from ‘Send invoice’ to ‘Authorize Supplier’s Invoice payment’ and press ‘Filter this path...’

Switch to Cases view to see the 10 cases

- Actionable result: We can either change the operational system to prevent the violation or provide targeted training

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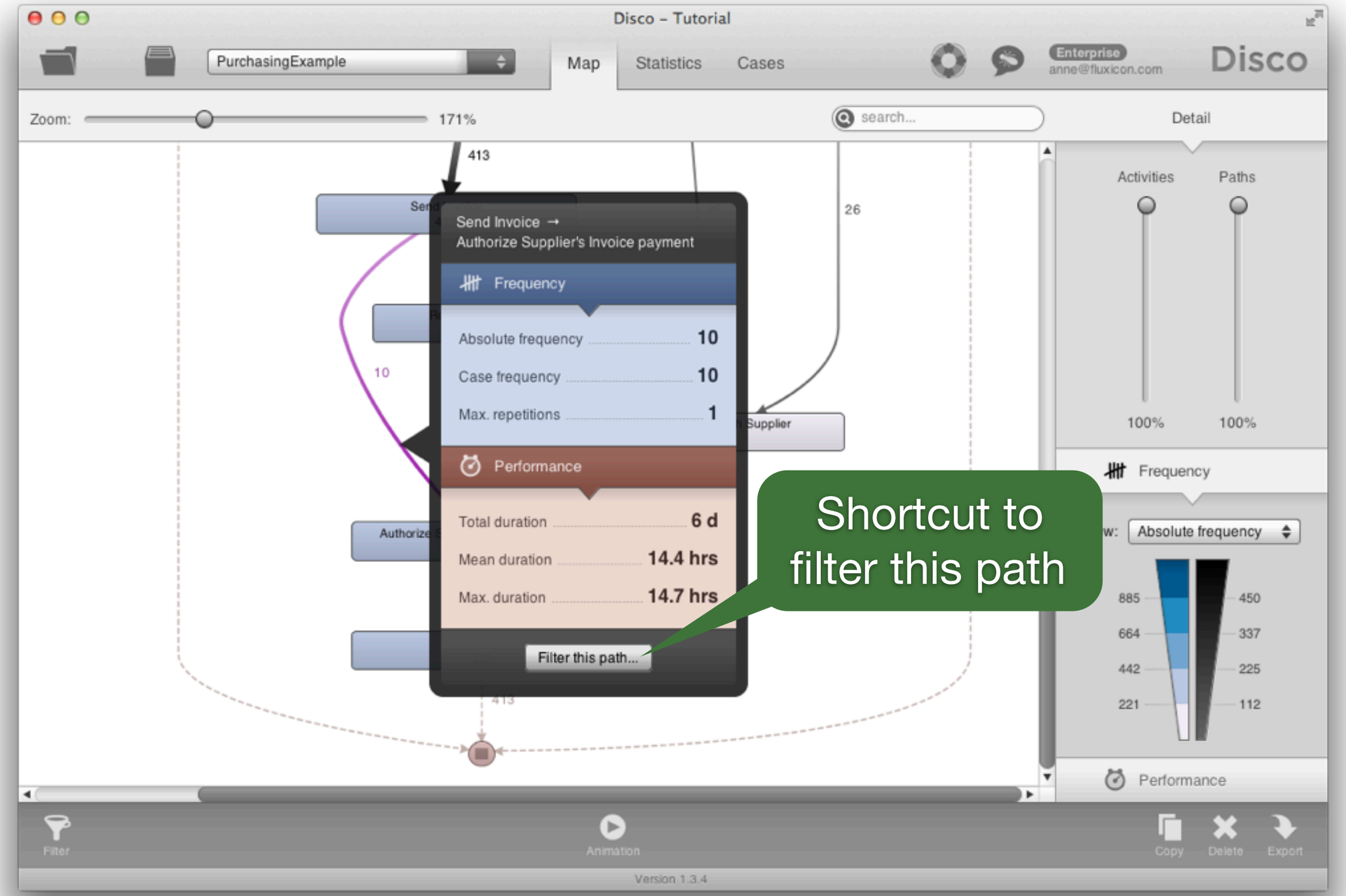
Disco – Tutorial
PurchasingExample
Map
Statistics
Cases
Enterprise
anne@fluxicon.com
Disco
Zoom:
171%
search...
Detail
413
Send Invoice →
Authorize Supplier's Invoice payment
Frequency
Absolute frequency 10
Case frequency 10
Max. repetitions 1
Performance
Total duration 6 d
Mean duration 14.4 hrs
Max. duration 14.7 hrs
Filter this path...
26
10
Supplier
Authorize
413
Activities
Paths
100%
100%
Frequency
Absolute frequency
885
664
442
221
450
337
225
112
Performance
Shortcut to filter this path
Filter
Animation
Copy
Delete
Export
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Disco – Tutorial

PurchasingExample

Map | Statistics | Cases

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Disco

search...

Variants (6)

- Complete log — All cases (10)
- Variant 1 — 3 cases (30%)
- Variant 2 — 2 cases (20%)
- Variant 3 — 2 cases (20%)
- Variant 4 — 1 case (10%)
- Variant 5 — 1 case (10%)
- Variant 6 — 1 case (10%)

Cases (10)

- 4 — 19 events
- 5 — 19 events
- 150 — 17 events
- 170 — 17 events
- 182 — 25 events
- 413 — 17 events
- 424 — 18 events
- 547 — 21 events
- 812 — 16 events
- 940 — 16 events

170
Case with 17 events

Events	17
Start	22.01.2011 22:35:00
Duration	11 days, 7 hours
Active time	19.32 %

Graph | Table

	Activity	Resource	Date	Time	Duration	Role
1	Create Purchase Requisition	Miu Hanwan	22.01.2011	22:35:00	45 mins	Requester
2	Analyze Purchase Requisition	Francis Odell	23.01.2011	15:11:00	5 mins	Requester
3	Create Request for Quotation	Heinz Gutschmidt	23.01.2011	15:21:00	2 mins	Requester
4	Analyze Request for Quotation	Francois de Perrier	25.01.2011	23:48:00	37 mins	Purchasing
5	Send Request for Quotation to Supplier	Karel de Groot	26.01.2011	02:45:00	21 mins	Purchasing
6	Create Quotation comparison Map	Karel de Groot	26.01.2011	03:25:00	3 hours, 22 mins	Purchasing
7	Analyze Quotation Comparison Map	Esmana Liubiata	26.01.2011	13:28:00	32 mins	Requester
8	Choose best option	Tesca Lobes	26.01.2011	14:00:00	0 millis	Requester
9	Settle Conditions With Supplier	Karel de Groot	26.01.2011	20:26:00	14 hours, 1 min	Purchasing
10	Create Purchase Order	Karel de Groot	27.01.2011	22:40:00	10 mins	Purchasing
11	Confirm Purchase Order	Esmeralda Clay	28.01.2011	07:12:00	7 mins	Supplier
12	Deliver Goods Services	Esmeralda Clay	31.01.2011	00:41:00	1 day, 8 hours	Supplier
13	Release Purchase Order	Kim Passa	01.02.2011	16:35:00	1 min	Requester
14	Approve Purchase Order for payment	Magdalena Predutta	02.02.2011	00:15:00	1 min	Purchasing
15	Send Invoice	Sean Manney	02.02.2011	14:17:00	0 millis	Supplier
16	Authorize Supplier's Invoice payment	Karalda Nimwada	03.02.2011	04:57:00	0 millis	Financial
17	Pay Invoice	Pedro Alvares	03.02.2011	05:49:00	6 mins	Financial

Filter | 1% Cases | 2% Events | Copy | Delete | Export

Version 1.3.4

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Results so far…

1. How does the process actually look like?
    - Objective process map discovered
    - Lots of amendments and stopped requests: Update of purchasing guidelines needed
2. Are there deviations from the prescribed process? -> Yes, training or system change needed
3. Do we meet the performance targets?
    - Not by all (some take longer than 21 days)
    - The ‘Analyze Request for Quotation’ activity is a huge bottleneck: Process change is needed

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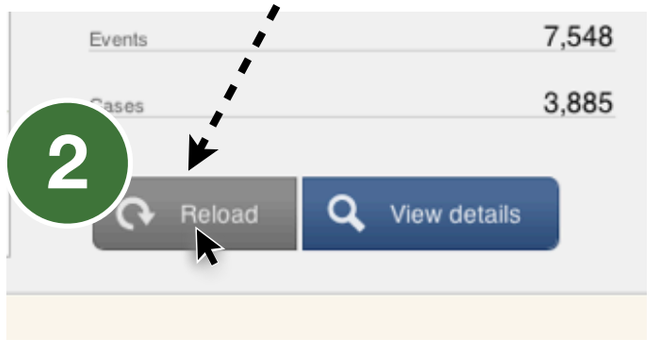
Step 10 - Organizational View

Last Step: We want to take an alternative view on the data to see organizational flow

Go to ‘Project view’ and press ‘Reload’:



Set ‘Activity’ column to ‘Other’ and configure ‘Role’ column as ‘Activity’

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Role

column is used

Activity

Name: Role

	Case ID	Start Timestamp	Complete Timestamp	Activity	Resource	Role
1	1	2011/01/01 00:00:00.000	2011/01/01 00:37:00.000	Create Purchase Requisition	Kim Passa	Requester
2	2	2011/01/01 00:16:00.000	2011/01/01 00:29:00.000	Create Purchase Requisition	Immanuel Karagianni	Requester
3	3	2011/01/01 02:23:00.000	2011/01/01 03:03:00.000	Create Purchase Requisition	Kim Passa	Requester
4	1	2011/01/01 05:37:00.000	2011/01/01 05:45:00.000	Create Request for Quotation	Kim Passa	Requester
5	1	2011/01/01 06:41:00.000	2011/01/01 06:55:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
6	2	2011/01/01 08:16:00.000	2011/01/01 08:26:00.000	Create Request for Quotation	Alberto Duport	Requester
7	4	2011/01/01 08:39:00.000	2011/01/01 09:00:00.000	Create Purchase Requisition	Fjodor Kowalski	Requester
8	2	2011/01/01 09:34:00.000	2011/01/01 09:38:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
9	5	2011/01/01 09:49:00.000	2011/01/01 10:35:00.000	Create Purchase Requisition	Esmana Liubiata	Requester
10	2	2011/01/01 10:16:00.000	2011/01/01 10:21:00.000	Amend Request for Quotation	Christian Francois	Requester
11	2	2011/01/01 11:15:00.000	2011/01/01 11:48:00.000	Analyze Request for Quotation	Magdalena Predutta	Purchasing Agent
12	6	2011/01/01 11:20:00.000	2011/01/01 11:37:00.000	Create Purchase Requisition	Christian Francois	Requester
13	1	2011/01/01 11:43:00.000	2011/01/01 12:09:00.000	Send Request for Quotation to Supplier	Karel de Groot	Purchasing Agent
14	1	2011/01/01 12:32:00.000	2011/01/01 16:03:00.000	Create Quotation comparison Map	Magdalena Predutta	Purchasing Agent
15	2	2011/01/01 12:33:00.000	2011/01/01 12:39:00.000	Amend Request for Quotation	Esmana Liubiata	Requester
16	2	2011/01/01 13:28:00.000	2011/01/01 13:38:00.000	Analyze Request for Quotation	Karel de Groot	Purchasing Agent
17	7	2011/01/01 14:05:00.000	2011/01/01 15:00:00.000	Create Purchase Requisition	Esmana Liubiata	Requester
18	8	2011/01/01 14:27:00.000	2011/01/01 15:17:00.000	Create Purchase Requisition	Fjodor Kowalski	Requester
19	2	2011/01/01 15:18:00.000	2011/01/01 15:40:00.000	Send Request for Quotation to Supplier	Francois de Perrier	Purchasing Agent
20	2	2011/01/01 15:55:00.000	2011/01/01 16:43:00.000	Create Quotation comparison Map	Karel de Groot	Purchasing Agent
21	9	2011/01/01 16:17:00.000	2011/01/01 16:34:00.000	Create Purchase Requisition	Tesca Lobes	Requester
22	6	2011/01/01 17:32:00.000	2011/01/01 17:45:00.000	Create Request for Quotation	Alberto Duport	Requester
23	8	2011/01/01 18:00:00.000	2011/01/01 18:07:00.000	Create Request for Quotation	Tesca Lobes	Requester
24	6	2011/01/01 18:39:00.000	2011/01/01 18:55:00.000	Analyze Request for Quotation	Magdalena Predutta	Purchasing Agent
25	4	2011/01/01 18:45:00.000	2011/01/01 18:51:00.000	Analyze Purchase Requisition	Maris Freeman	Requester Manager
26	4	2011/01/01 18:56:00.000	2011/01/01 18:58:00.000	Create Request for Quotation	Heinz Gutschmidt	Requester Manager
27	8	2011/01/01 19:04:00.000	2011/01/01 19:27:00.000	Analyze Request for Quotation	Francois de Perrier	Purchasing Agent
28	6	2011/01/01 19:47:00.000	2011/01/01 19:55:00.000	Amend Request for Quotation	Penn Osterwalder	Requester

Cancel

File encoding: UTF-8

Use quotes

Ready to start import.

Start import

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Step 10 - Organizational View

Instead of the activity flow, we are now looking at how the process moves through different *roles* in the organization

- Inefficiencies can often be found at the borders of organizational units
- Clearly, the Purchasing agents are causing the biggest delays in the process!

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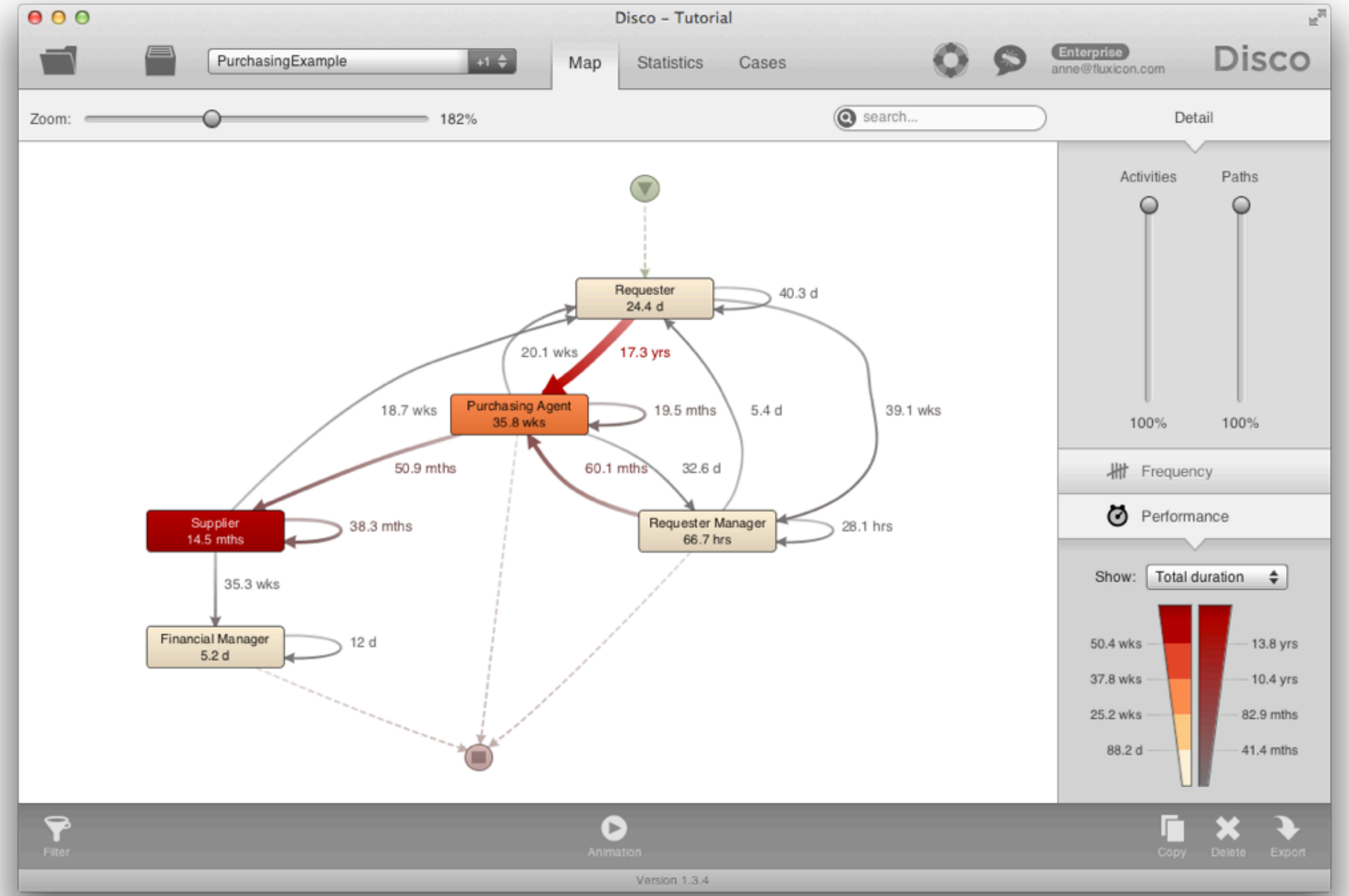
Disco – Tutorial
PurchasingExample
+1
Map
Statistics
Cases
Enterprise
anne@fluxicon.com
Disco
Zoom:
182%
search...
Detail
Activities
Paths
100%
100%
Requester
24.4 d
40.3 d
20.1 wks
17.3 yrs
Purchasing Agent
35.8 wks
18.7 wks
19.5 mths
5.4 d
39.1 wks
50.9 mths
60.1 mths
32.6 d
Supplier
14.5 mths
38.3 mths
Requester Manager
66.7 hrs
28.1 hrs
35.3 wks
Financial Manager
5.2 d
12 d
Frequency
Performance
Show:
Total duration
50.4 wks
37.8 wks
25.2 wks
88.2 d
13.8 yrs
10.4 yrs
82.9 mths
41.4 mths
Filter
Animation
Copy
Delete
Export
Version 1.3.4

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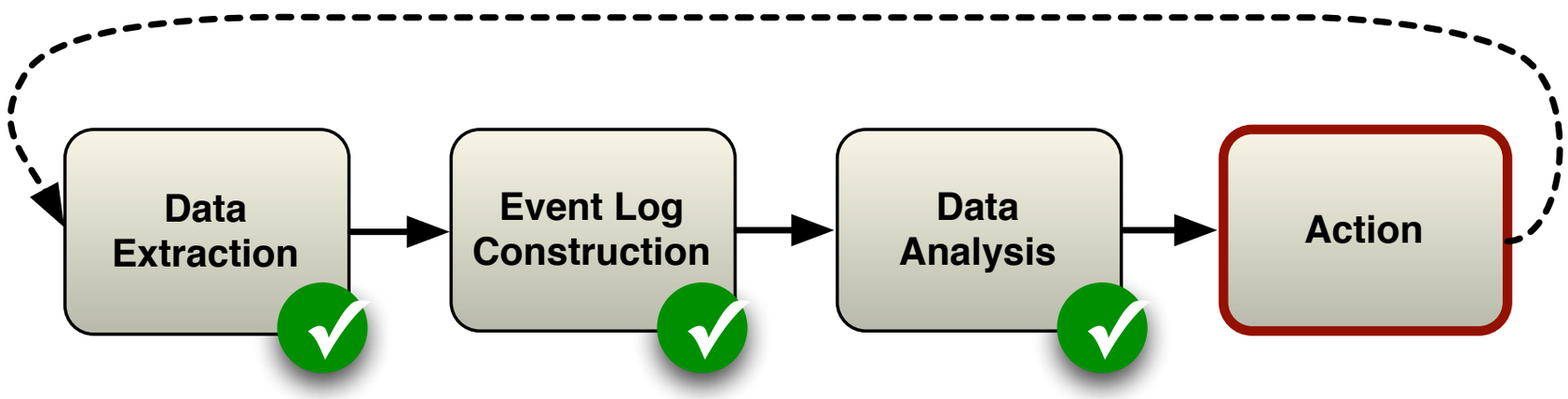
Close the loop

We learned how to discover a process model and found opportunities to improve the process

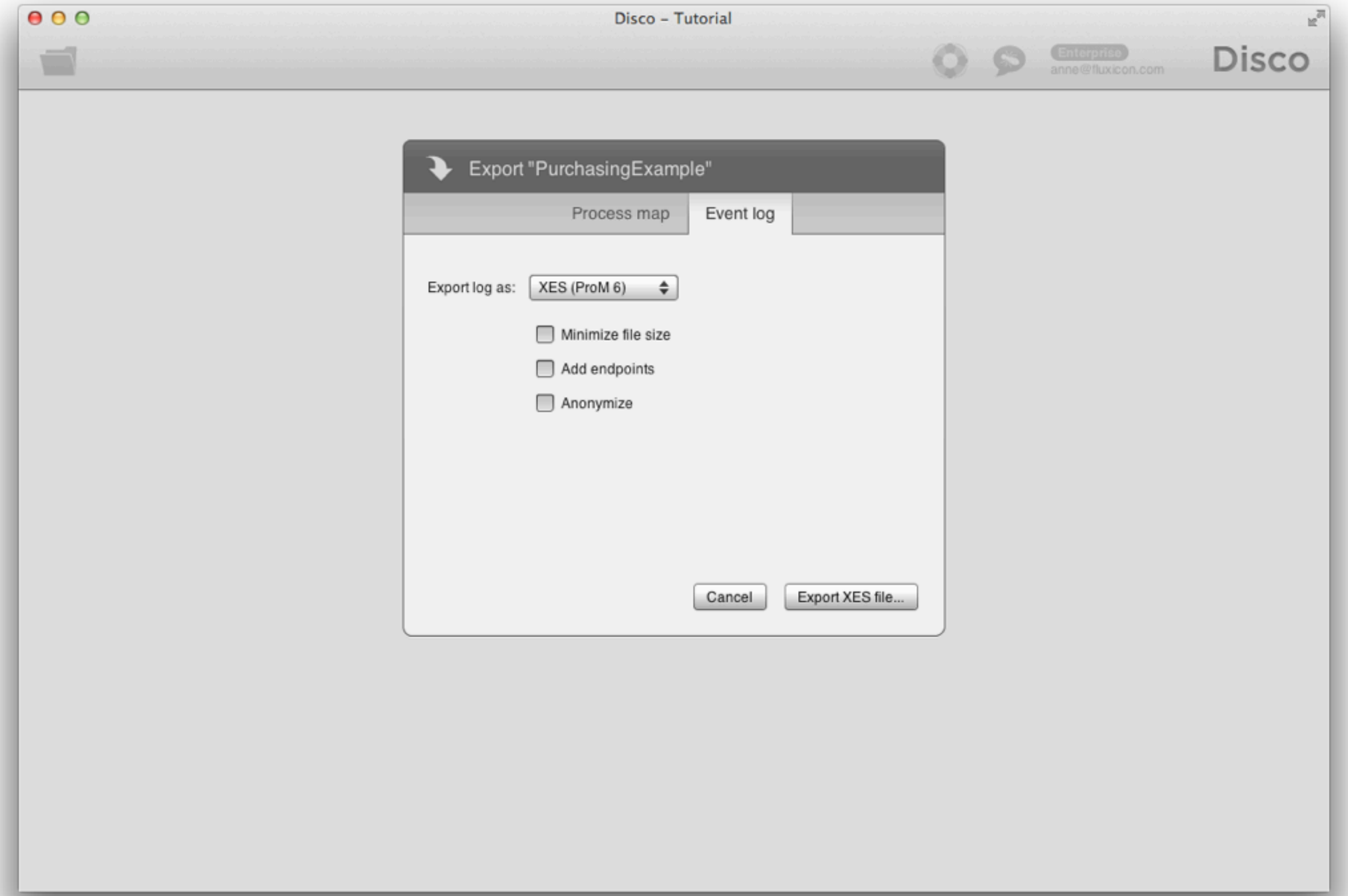
Now: Take action and verify results



Bonus

1. Import data again and configure both ‘Activity’ and ‘Role’ column as ‘Activity’
   - Can you see what happens now?

2. Export XES file and analyze further in ProM
   - Download ProM from http://promtools.org/


Disco – Tutorial
Enterprise
anne@fluxicon.com
Disco
Export "PurchasingExample"
Process map
Event log
Export log as:
XES (ProM 6)
Minimize file size
Add endpoints
Anonymize
Cancel
Export XES file...

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ProM UITopia

ProM 6

designed by fluxicon

Social Network (HoW)

Create new...

Layout

KKLayout

Ranking

Degree

Mouse Mode

TRANSFORMING

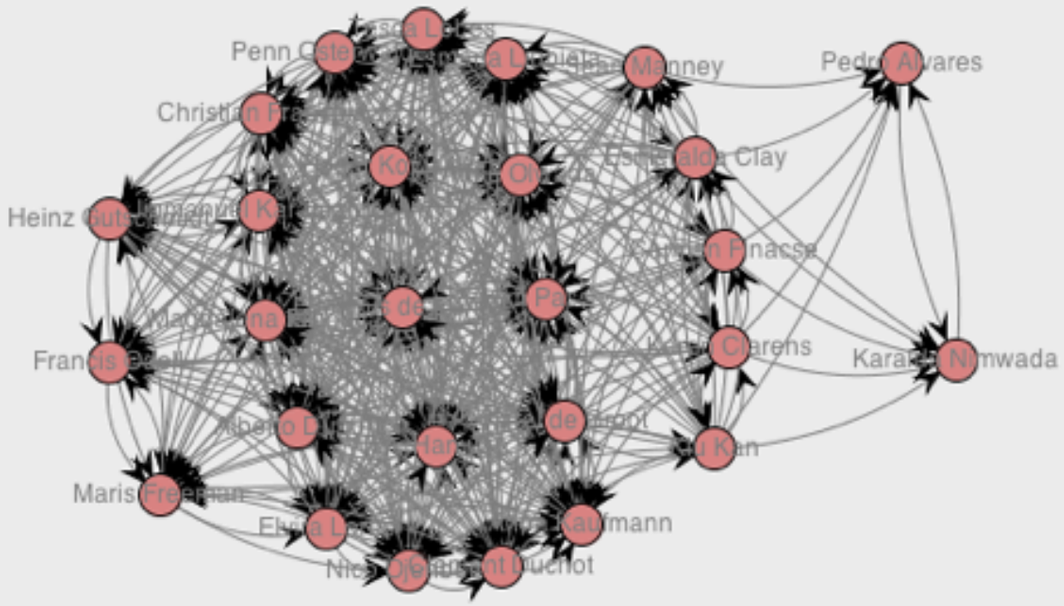
Edges removed for clust

View options

- [ ] shape by degree
- [ ] size by ranking
- [ ] stretch by degree ratio
- [x] show vertex names
- [ ] show edge weight values
- [x] show edge
- [ ] stroke highlight on selection

( ) Group Clusters

( ) Hyperbolic View



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Outline

1. Example Scenario
2. Roadmap
3. Hands-on Session
4. **Take-away Points**

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Take-away Points

Real processes are often more complex than you would expect

There is no one “right” model: You can take multiple views on the same data

Process mining is an explorative, interactive activity