Michal Rosik, GRADIENT ECM

International Workshop on Knowledge Management (11th IWKM)

"Big Data" Seminar, VŠM Bratislava, 20-21 October 2016

Speaking today

- Studied management at Comenius University, Slovakia
- Worked for Siemens as consultant and head of Microsoft Support Center
- 8 years in GRADIENT, last 4 years as product visionary for minit
- Passionate trail runner

Michal Rosik

Who we are and what we do?

… in few numbers

… in few numbers

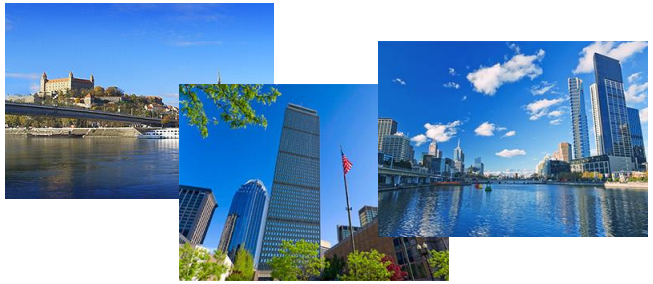
22 Years on market

3 Offices worldwide

2 Product lines

15 Awards received

Microsoft Partner
Gold Collaboration and Content
Gold Application Development
Silver Application Development
Silver Midmarket Solution Provider
Silver Data Platform
Silver Mobility



minit

GSCAN

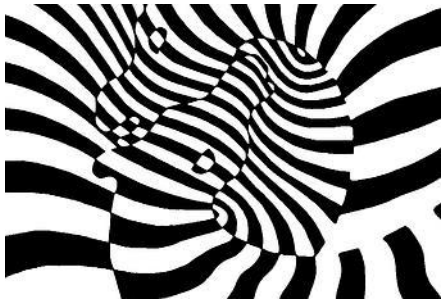
Microsoft
Industry Awards
Finalist 2015
Slovak Republic

Why Process Mining?

Consult me

Personnel Interviews - the old school way

Standard way and corresponding issues



Standard way and corresponding issues

Subjective

Standard way and corresponding issues

Limited view

Standard way and corresponding issues

Exceptions

Standard way and corresponding issues

Visibility

Everything is logged

Although you did not know

In modern times logs are produced by

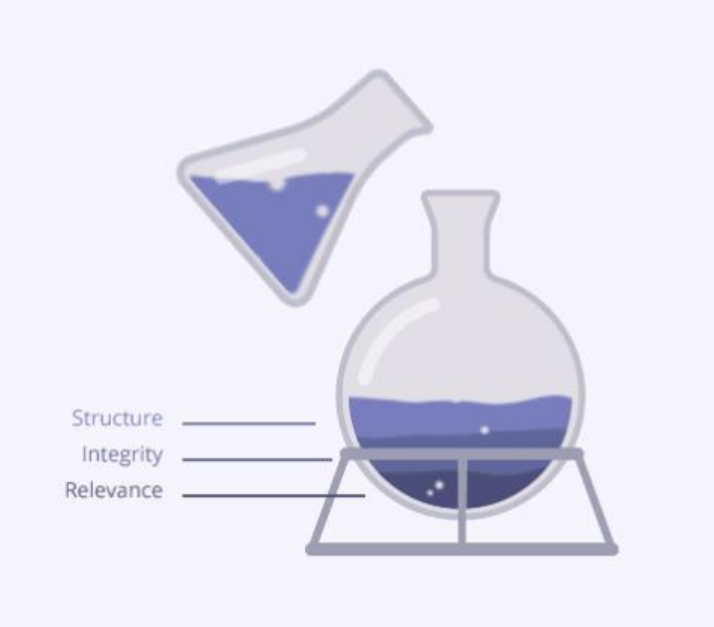
- Mobile Devices, Tablets, Smartphones
- LOB Information systems, ERPs, CRMs,
- BPM (workflow automation)
- Service/Call center systems,
- Surveillance/Attendance systems
- Email, IM
- Household Devices - Internet of Things

How does it all work?

Process Mining in a nutshell

Event Collection

Big Data whether via Mobile Devices, Smartphones, LOB Information Systems, ERP, CRM, Call Centres, and more can all be extracted to show what processes take place.



Log Creation

Events from data sources are mixed together but hold **data structure, data integrity, data relevance**.

A resulting log combines all relevant process events into a homogenous data file.

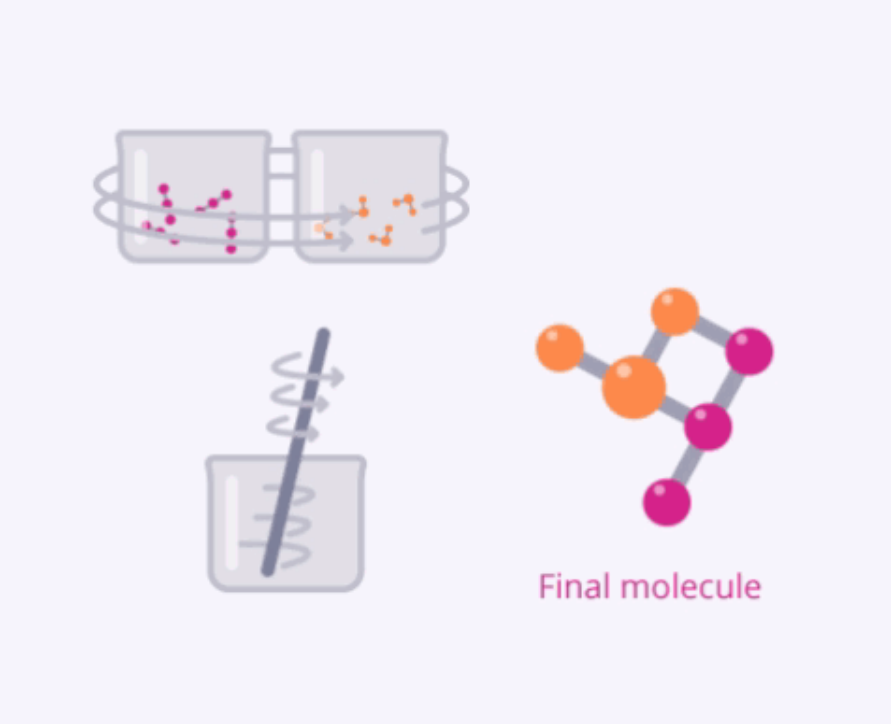
Terminology

	Case ID	ACTIVITY	TIMESTAMP	TIMESTAMP	RESOURCE	ATTRIBUTES	
	CaseID	Activity	StartTimestamp	EndTimestamp	Resource	ActivityFinalAction	CostCenterID
Instance 1	958680	Approving on specific level	12.11.2014 11:32:01	12.11.2014 11:32:10	Daphne Cash	Approved	21
	958680	Approving on specific level	12.11.2014 11:32:12	13.11.2014 16:31:49	Tad Day	Approved	21
	958680	Process order	13.11.2014 16:31:53	13.11.2014 19:53:32	Daphne Cash	OrderProcessed	21
	958680	Delivery confirmation	13.11.2014 19:53:38	10.12.2014 16:09:39	Jael Nichols	DeliveryCancelled	21
Instance 2	956461	Approving on specific level	23.10.2014 9:56:24	23.10.2014 9:58:38	Lara Obrien	Approved	35
	956461	Process order	23.10.2014 9:58:42	23.10.2014 10:04:12	Lara Obrien	OrderProcessed	35
	956461	Delivery confirmation	23.10.2014 10:04:21	28.10.2014 10:16:36	Lara Obrien	DeliveredCompletely	35
Instance 3	960076	Approving on specific level	24.11.2014 8:17:45	24.11.2014 9:20:46	Leila Sawyer	Approved	23
	960076	Approving on specific level	24.11.2014 9:20:49	24.11.2014 10:31:24	Noel Shields	Approved	23
	960076	Approving on specific level	24.11.2014 10:31:35	27.11.2014 14:40:24	Kane Wilder	Demand	23
	960076	Demand for information	27.11.2014 14:40:24	3.12.2014 13:55:54	Noel Shields	InformationSent	23
	960076	Approving on specific level	3.12.2014 13:55:57	8.12.2014 16:15:46	Kane Wilder	Approved	23
	960076	Process order	8.12.2014 16:15:54	8.12.2014 17:15:40	Zeus Hebert	OrderProcessed	23
	960076	Delivery confirmation	8.12.2014 17:15:42	8.12.2014 17:16:36	Zeus Hebert	DeliveredCompletely	23

Events

Process Distillation

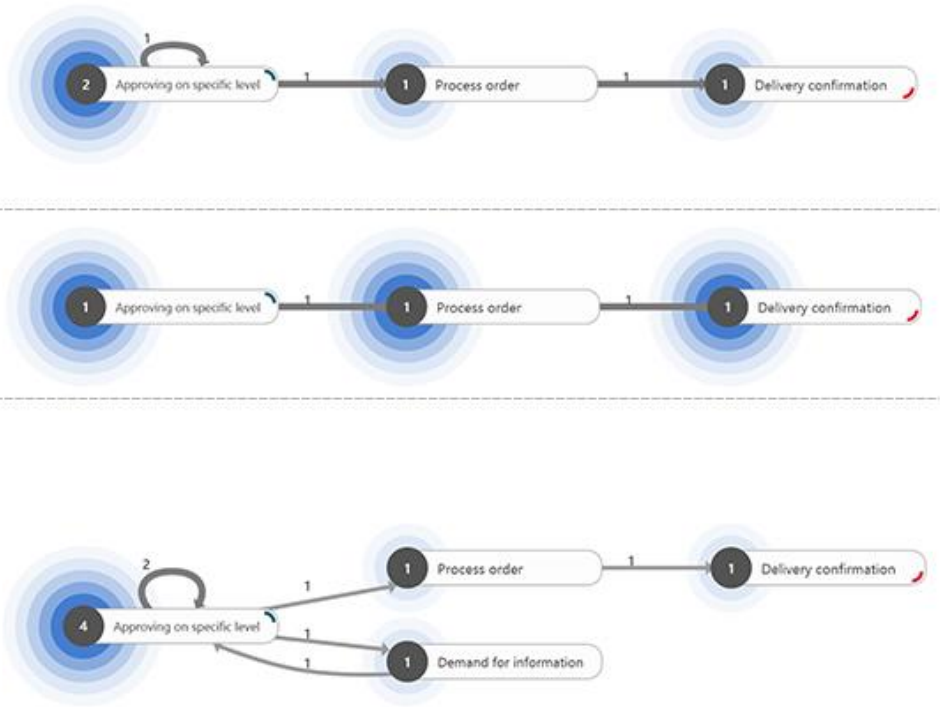
Process mining algorithms combine events, analyze their chronological order, correlations, frequency and performance, creating unique variations of your business process instances.

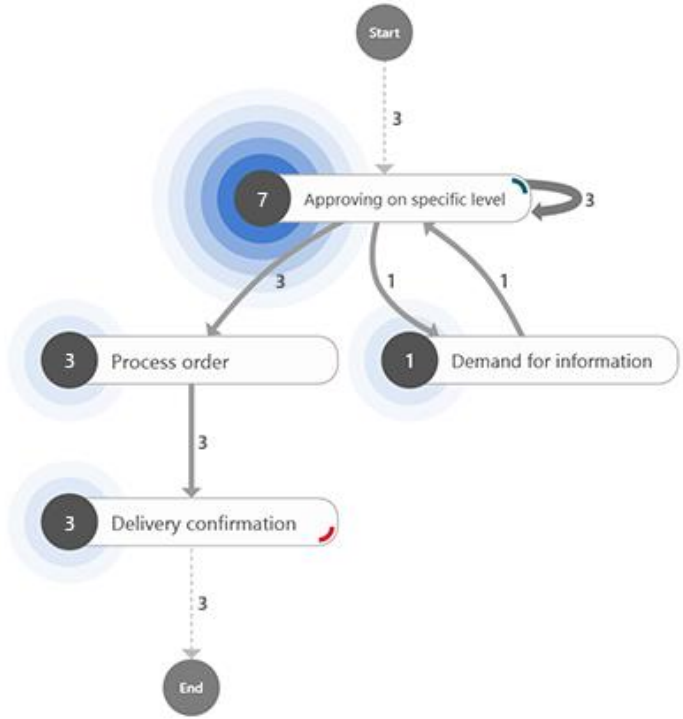


Synthesis

Manipulate, decompose and synthesize again and again until you get the right compound.

	Case ID	ACTIVITY
	CaseID	Activity
Instance 1	958680	Approving on specific level
	958680	Approving on specific level
	958680	Process order
	958680	Delivery confirmation
Instance 2	956461	Approving on specific level
	956461	Process order
	956461	Delivery confirmation
Instance 3	960076	Approving on specific level
	960076	Approving on specific level
	960076	Approving on specific level
	960076	Demand for information
	960076	Approving on specific level
	960076	Process order
	960076	Delivery confirmation



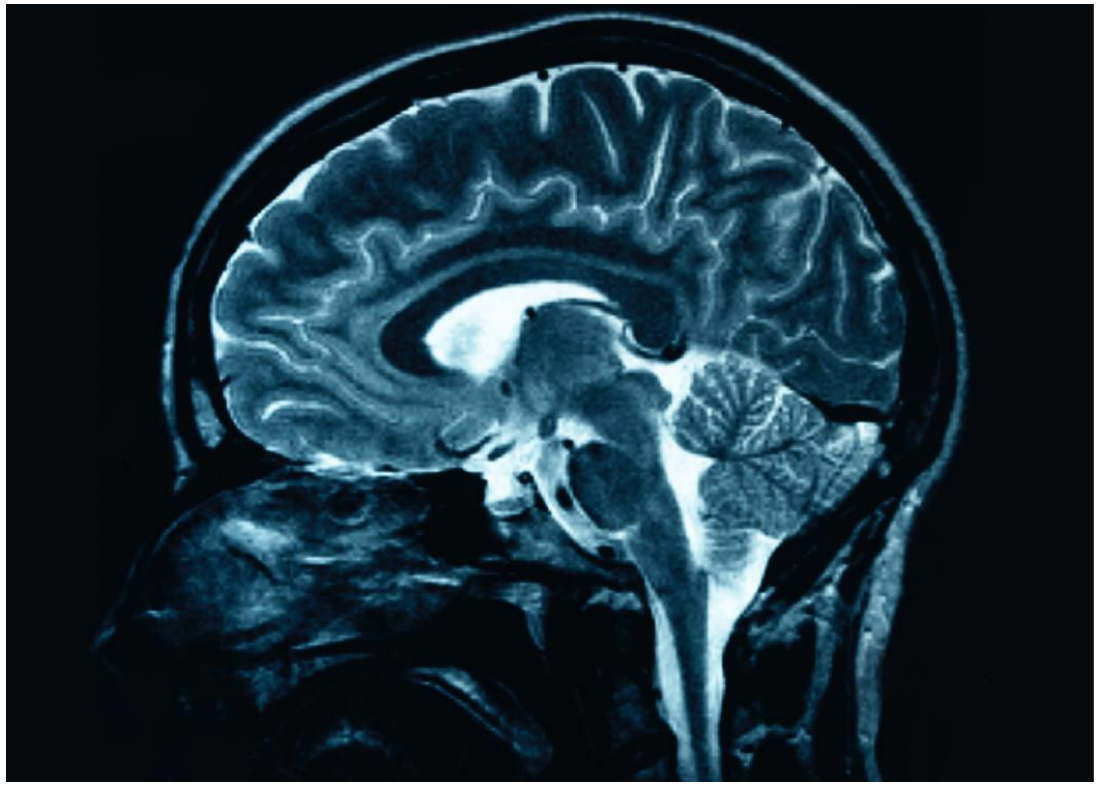


Process insight in a minute

… in **minit**

Process Discovery

- Analyze your IT and business logs and convert them into the **reality**
- **Process mapping** - show how the business processes in your company **really flow**
- Show the **AS-IS essence of the processes** down to the real Backbone



Process Diagnostics

- Immediately spot the **symptoms of inefficiency and problems**
- Identify the **bottlenecks**, **optimizations points** and **conflicts**
- Accelerate **process improvement** by using a measure-first approach
- Simplify, filter, magnify and **prescribe the right cure**

Process Compliance

- **Process Auditing** - regularly **check** the progress to identify non-compliant process execution or frauds
- Elimination of **exceptions, rework and waste** through monthly reconstruction of process execution
- Constantly **compare** reality to the discovered models

Personalized University

Is process discovery on event log data able to
help students achieve better results?

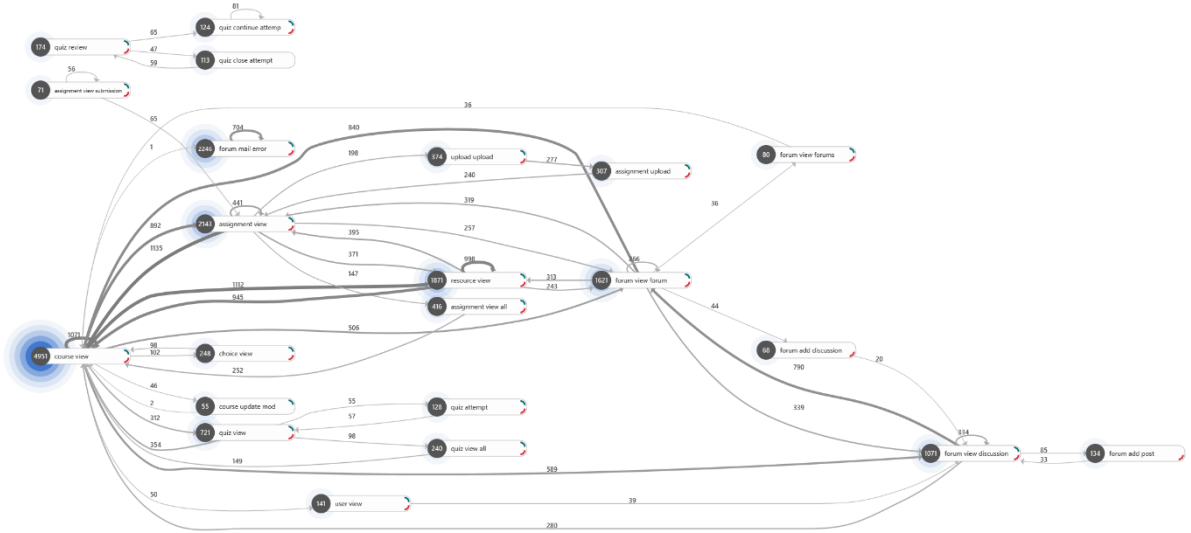
Phase 1 – Overview

Low height flight over moodle data

Overview

- Available data
  - Export from moodle
  - Selected subset
  - 29.9.2015 – 20.4.2016
  - ~41k events
  - 62 different activities
  - 142 resources
- Issues
  - What delimits a session?
  - Granularity of activities?
  - POV
    - 1 person / whole timeframe
    - Session based

Results

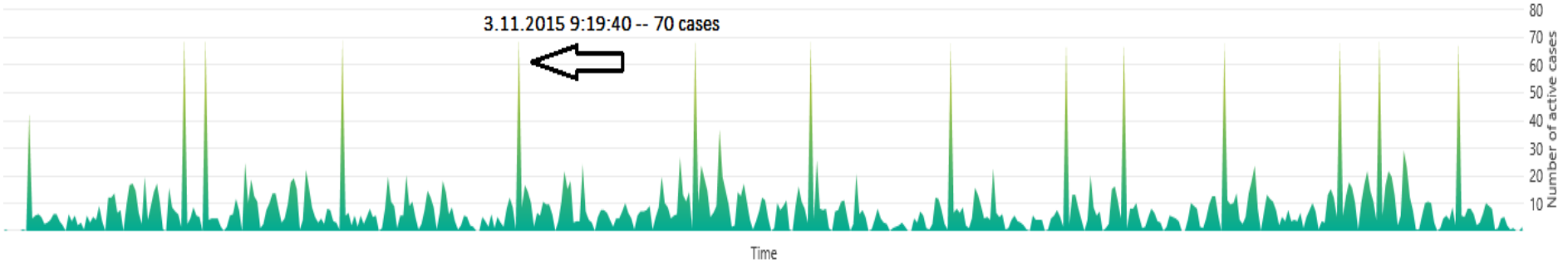


Info

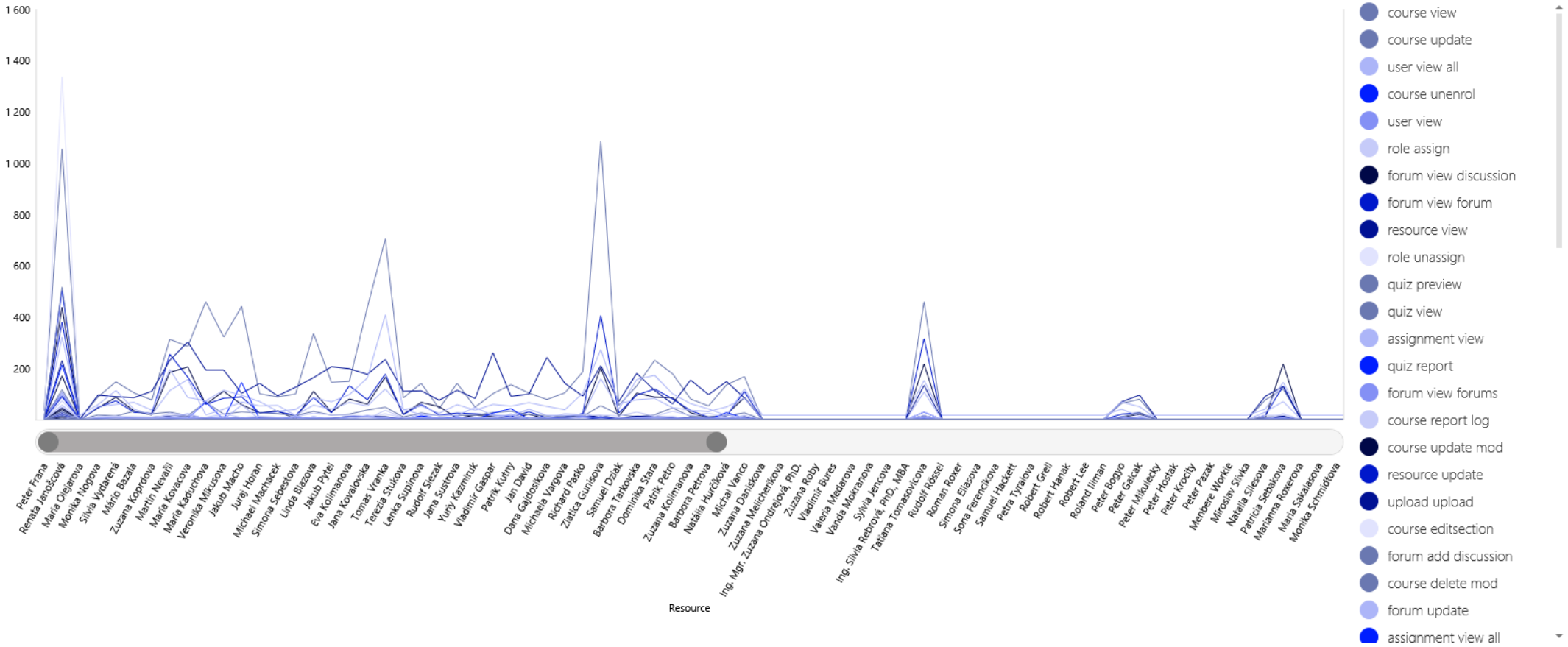
2. ZADANIE	175	70%
AKTIVITA 2 (denní študenti)	48	19%
1. ZADANIE	24	10%
AKTIVITA 1 (denní študenti)	4	2%

Info

PRÍKLAD č.1	34	17%
PRÍKLAD č.2	30	15%
V 4. týždni NEZABUDNITE! - v utorok - uče	23	11%
Príklad 2	20	10%
Príkald 1	18	9%
PRÍKLAD č.3	11	5%



Results


1 600
1 400
1 200
1 000
800
600
400
200
Peter Frana
Renata Janošcová
Maria Olejarova
Monika Nogova
Silvia Vydarená
Mário Bazala
Zuzana Koprdova
Martin Nevařil
Maria Kovacova
Maria Kaduchova
Veronika Mikusova
Jakub Macho
Juraj Horan
Michael Machacek
Simona Sebestova
Linda Blazova
Jakub Pytel
Eva Kolmanova
Jana Kovalovska
Tomas Vranka
Terezia Stukova
Lenka Supinova
Rudolf Slezak
Jana Sustrova
Yuriy Kazmiruk
Vladimir Gaspar
Patrik Kutny
Jan David
Dana Gajdosikova
Michaela Vargova
Richard Pasko
Zlatica Gunisova
Samuel Dziak
Barbora Tarkovska
Dominika Stara
Patrik Petro
Zuzana Kolmanova
Barbora Petrova
Natália Hurčíková
Michal Vanco
Zuzana Daniskova
Zuzana Melicherikova
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Zuzana Roby
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Sona Ferencikova
Samuel Hackett
Petra Tyralova
Robert Greil
Robert Hanak
Robert Lee
Roland Illman
Peter Bogyo
Peter Gaicak
Peter Mikulecky
Peter Hostak
Peter Krocity
Peter Pazak
Menbere Workie
Miroslav Slivka
Natália Siesova
Patrícia Sebaková
Marianna Roxerova
Mária Sakalasova
Monika Schmidtova
Resource
course view
course update
user view all
course unenrol
user view
role assign
forum view discussion
forum view forum
resource view
role unassign
quiz preview
quiz view
assignment view
quiz report
forum view forums
course report log
course update mod
resource update
upload upload
course editsection
forum add discussion
course delete mod
forum update
assignment view all

Questions

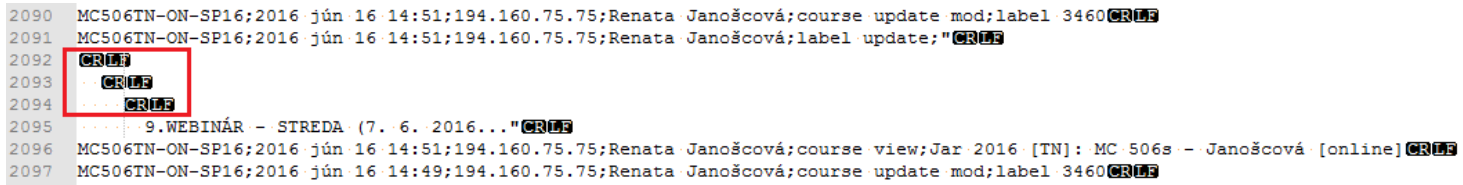
- Can we focus on a specific study field?
- Are we able to enrich the data with final grades and thus distinguish students?
- Are we able to distinguish the process variants and habits of best performers?
- And what about comparisons to low performers?
- Would it be possible to learn from the best and guide newcomers to achieve better final grades?

Phase 2 – Deep Insight

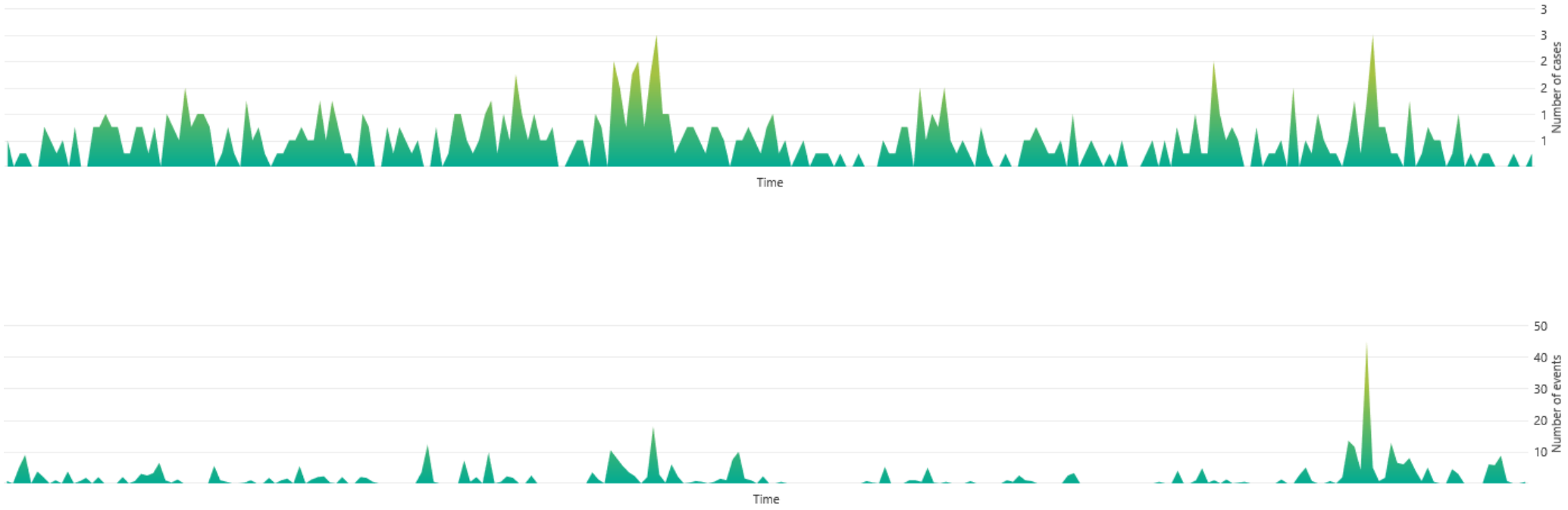
Drill-down into online study field based on focused questions

Pre-processing

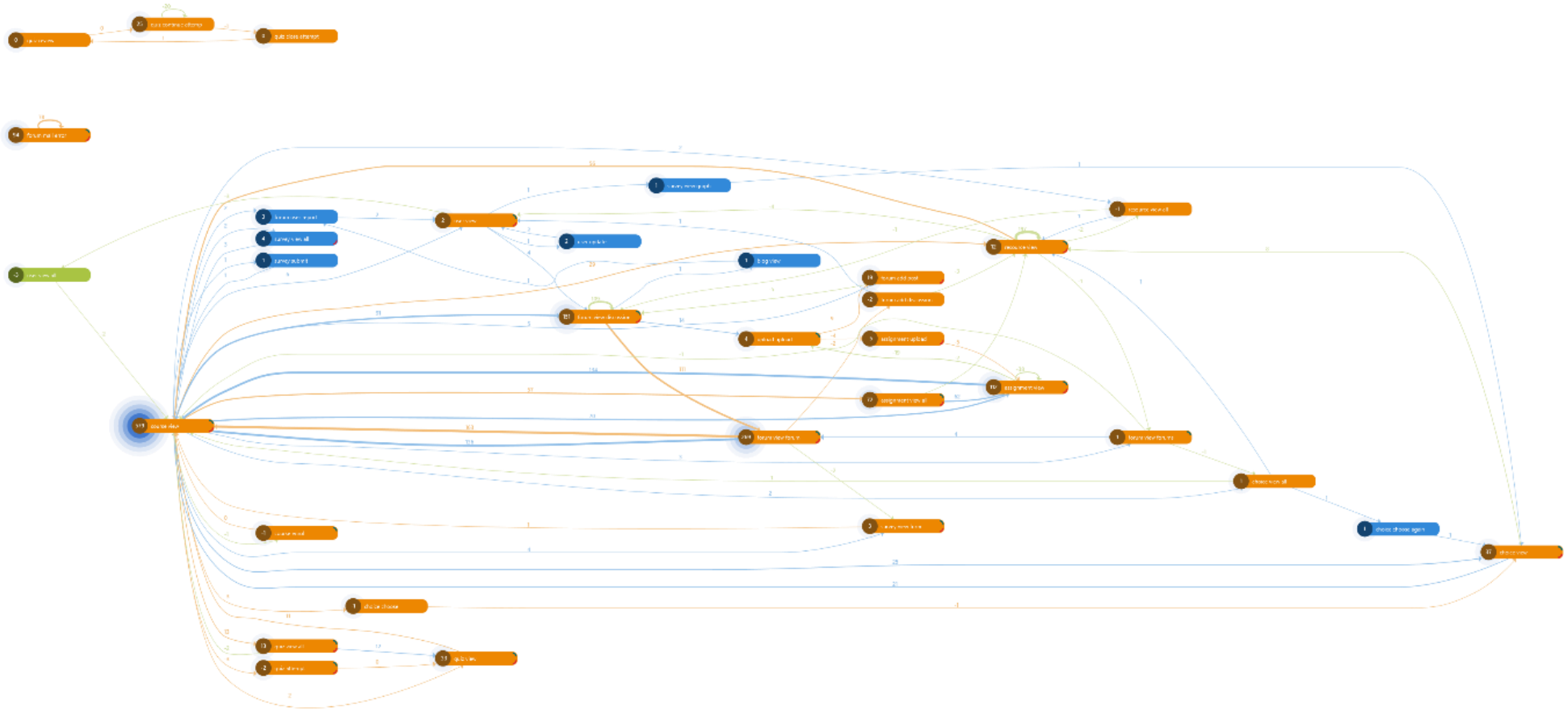
- Data cleaning
- Dataset filtering
- Clustering based on final grade
  - Group 0
    - value 0
  - Group 1
    - value (1,2>
  - Group 2
    - value (2,3>
  - Group 3
    - value (3,4>
  - Group 4
    - value (4)



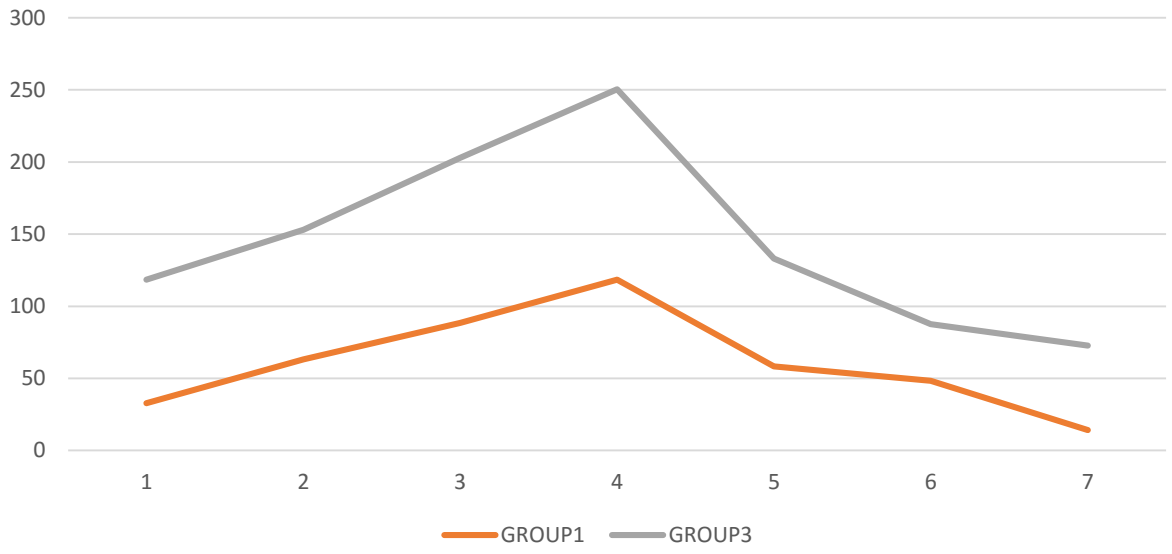
Activity comparison

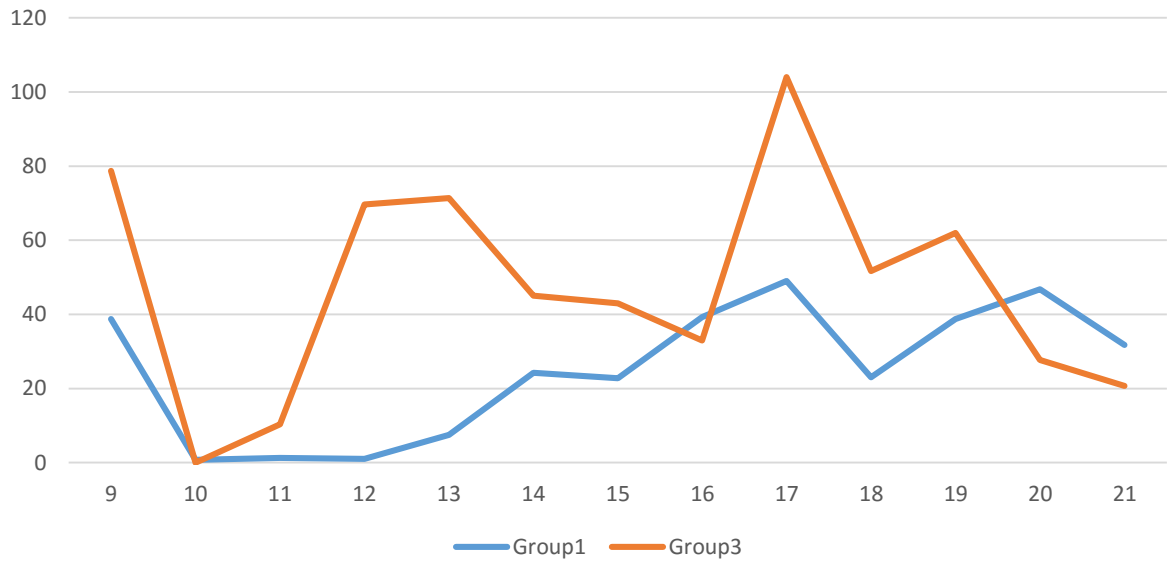


Process comparison



Activity distribution comparison





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