IEEE Computational Intelligence Society

Annual Meeting of the IEEE Task Force on Process Mining

Monday August 31th, 2015, 16.00-18.00
University of Innsbruck,
Hörsaal 2 (Lecture Hall 2), School of Management (SOWI),
Universitätsstraße 15, 6020 Innsbruck, Austria

http://www.win.tue.nl/ieeetfpm/

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Process mining reception

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Agenda

16:00 – 16:05	Welcome
16:05 – 16:20	Overview of Activities 2014-2015 (Wil van der Aalst)
16:20 – 16:45	Best Process Mining Dissertation Award Ceremony (Chaired by Marcello La Rosa) The Best Process Mining Dissertation Award is a yearly award conferred by the IEEE Task Force on Process Mining to the author of an outstanding PhD thesis on business process intelligence. The winner of the first edition of this award will be announced during this meeting. - Conferral of the award - Presentation (15 minutes) by the award winner
16:45 – 17:00	Update and Overview of XES Standardization (Felix Mannhardt)
17:00 – 17:20	Discussion - ....
17:20 – 17:30	Planned Activities for 2015-2016
17.30	Closing
Evening	Reception – Seegrube Alpenlounge (for BPM participants)

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Namaste
مرحبا
Willkommen
Bem Vindo
Selamat Datang
Welcome
Namaste
Croeso
Bienvenue
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Bienvenidos
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Καλώς ήλθατε
Benvenuti

IEEE CIS Task Force on Process Mining

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- Process Mining Case Studies
- Process Mining Dissertation Award

More and more people, both in industry and academia, consider **process mining** (see the promotional video for an introduction) as one of the most important innovations in the field of business process management. It joins ideas of process modeling and analysis on the one hand and data mining and machine learning on the other. Therefore, the IEEE has established a **Task Force on Process Mining**. This Task Force is established in the context of the Data Mining Technical Committee (DMTC) of the Computational Intelligence Society (CIS) of the Institute of Electrical and Electronic Engineers, Inc. (IEEE).

The goal of this Task Force is to promote the research, development, education and understanding of process mining. More concretely, the goal is to:

- m
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- th
- the organization of Conferences/Workshop with IEEE CIS Technical Co-Sponsorship, and
- publications in the form of special issues in journals, books, articles (e.g., in the IEEE Computational Intelligence Magazine).

The goal of the PM Task Force is to promote the research, development, education and understanding of process mining.

Note that process mining includes (automated) **process discovery** (extracting process models from an event log), **conformance checking** (monitoring deviations by comparing model and log), **social network/organizational mining**, **automated construction of simulation models**, **case prediction**, and **history-based recommendations**.

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Organizations Supporting our Task Force (1/3)

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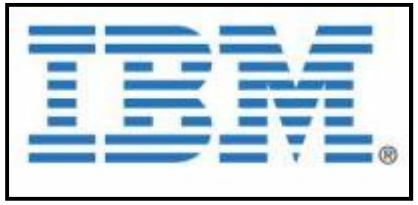
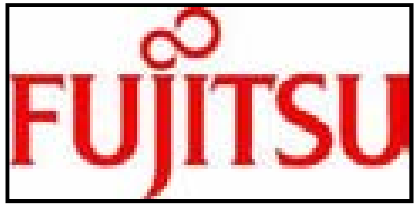
Organizations Supporting our Task Force (2/3)





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Organizations Supporting our Task Force (3/3)

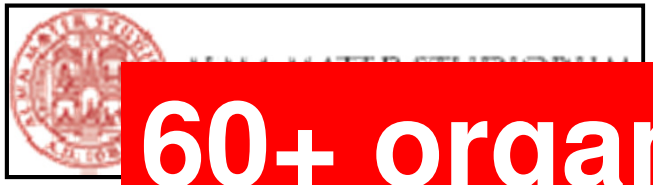
fluxicon

Cranfield UNIVERSITY

Excellentia BPM
Business Process Management Experts

Deloitte.

EHR WORK FLOW MINING



60+ organizations

NTNU
Norwegian University of Science and Technology

BPTrends
BUSINESS PROCESS TRENDS

BWI

BPM LATAM

bpi 3

architects for business & ict
ae

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Aalst, Wil van der	Accorsi, Rafael	Baier, Thomas
Bose, J. C.	Brand, Peter van den	Brandtjen, Ronald
Burattin, Andrea	Carmona, Josep	Castellanos, Malu
Charif, Yasmine	Chesani, Federico	Claes, Jan
Cook, Jonathan	Cunningham, Mitchell	Curbera, Francisco
de Leoni, Massimiliano	De Weerdt, Jochen	Depaire, Benoît
Di Ciccio, Claudio	Dongen, Boudewijn van	Dumas, Marlon
Fahland, Dirk	Ferreira, Diogo	Geffen, Frank van
Geffen, Frank van	Goel, Sukriti	Günther, Christian
Guzzo, Antonella	Hansen, John	Harmon, Paul
Heijden, Tijn van der	Hofstede, Arthur ter	Hoogland, John
Jans, Mieke	Jojgov, Georgi	Jones, Teresa
Jung, Jae-Yoon	Kalenkova, Anna	Kang, Young Sik
Kato, Koki	Kerremans, Marc	Khalaf, Rania
Klenk, Martin	Kuhn, Rudolf	Kumar, Akhil
La Rosa, Marcello	Lakshmanan, Geetika	Leeuwenkamp, Wim
Lehto, Teemu	Levy, Dafna	Liu, Yingbo

Only ask to become a member if you want to actively promote process mining as a topic/discipline beyond your own work and personal interests!

Sinur, Jim	Slominski, Aleksander	Soffer, Pnina
Song, Minseok	Sperduti, Alessandro	Stoel, Casper
Stroiński, Andrzej	Swenson, Keith	Talamo, Maurizio
Turato, Daniele	Turner, Chris	Vanderhaeghen, Dominik
Vanherle, Walter	Vanschoenwinkel, Bram	Vanthienen, Jan
Varvaressos, George	Verbeek, Eric	Verdonk, Marc
Vigo, Roberto	Wang, Jianmin	Weber, Barbara
Webster, Charles	Weffers, Harold	Weijters, Ton
Wen, Lijie	Westergaard, Michael	Wynn, Moe

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Overview of activities 2014-2015

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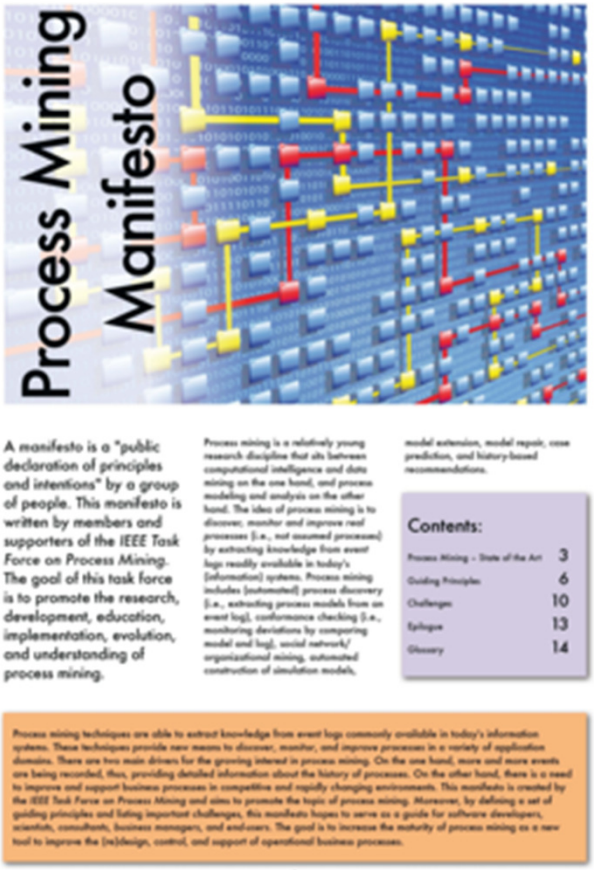
PM Manifesto now also in Thai

http://www.win.tue.nl/ieeetfpm/doku.php?id=shared:process_mining_manifesto



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Languages

(do we miss an obvious language?)

Translated by Wichian Premchaiswadi et al.

Discussion topic: Update of manifesto? Volunteers?

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coursera

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Institutions Wil

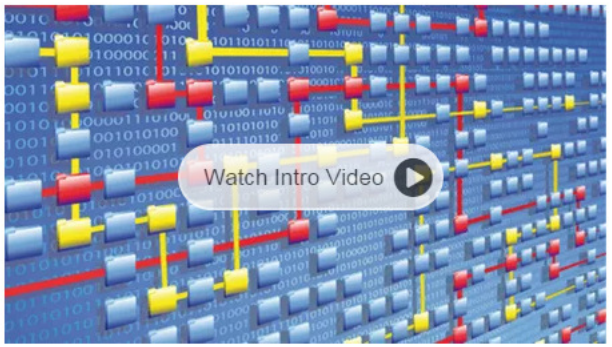
Edit Course Description Edit Session Descriptions Edit Session Materials

PM MOOC

TU/e Technische Universiteit Eindhoven University of Technology

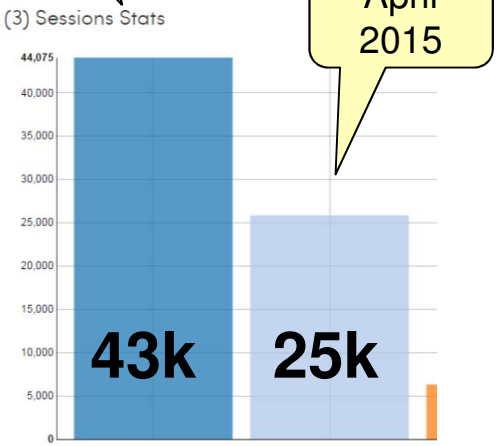
Process Mining: Data science in Action

Process mining is the missing link between model-based process analysis and data-oriented analysis techniques. Through concrete data sets and easy to use software the course provides data science knowledge that can be applied directly to analyze and improve processes in a variety of domains.



November 2014

April 2015



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About the Course

Data science is the profession of the future, because organizations that are unable to use (big) data in a smart way will not survive. It is not sufficient to focus on data storage and data analysis. The data scientist also needs to relate data to process analysis. **Process mining bridges the gap between traditional model-based process analysis (e.g., simulation and other business process management techniques) and data-centric analysis techniques such as machine learning and data mining.** Process mining seeks the confrontation between event data (i.e., observed behavior) and process models (hand-made or discovered automatically). This technology has become available only recently, but it can be applied to any type of operational processes (organizations and systems). Example applications include: analyzing treatment processes in hospitals, improving customer service processes in a multinational, understanding the browsing behavior of customers using a booking site, analyzing failures of a baggage handling system, and improving the user interface of an X-ray machine. All of these applications have in common that dynamic behavior needs to be related to process models. Hence, we refer to this as "data science in action".

The course explains the key analysis techniques in process mining. Participants will learn various process discovery algorithms. These can be used to automatically learn process models from raw event data. Various other process analysis techniques that use event data will be presented. Moreover, the course will provide **easy-to-use software**, **real-life data sets**, and **practical skills** to **directly apply the theory** in a variety of application domains.

Course Syllabus

This course starts with an overview of approaches and technologies that use event data to support decision making and business process (re)design. Then the course

Sessions

October 7, 2015 - December 2, 2015

Starts in a month

Eligible for

Course Certificate
Statement of Accomplishment

Course at a Glance

8 weeks of study
4-6 hours/week
English

Certificate Available For Learners

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United States 24%
India 11%
China 5%
Netherlands 4%
United Kingdom 4%
Russian Federation 3%
Germany 3%
Spain 3%
Canada 3 %
Brazil 2%
France 2%
Australia 2%
Italy 1%
Poland 1%
Mexico 1%
Singapore 1%
Ukraine 1%
Taiwan 1%
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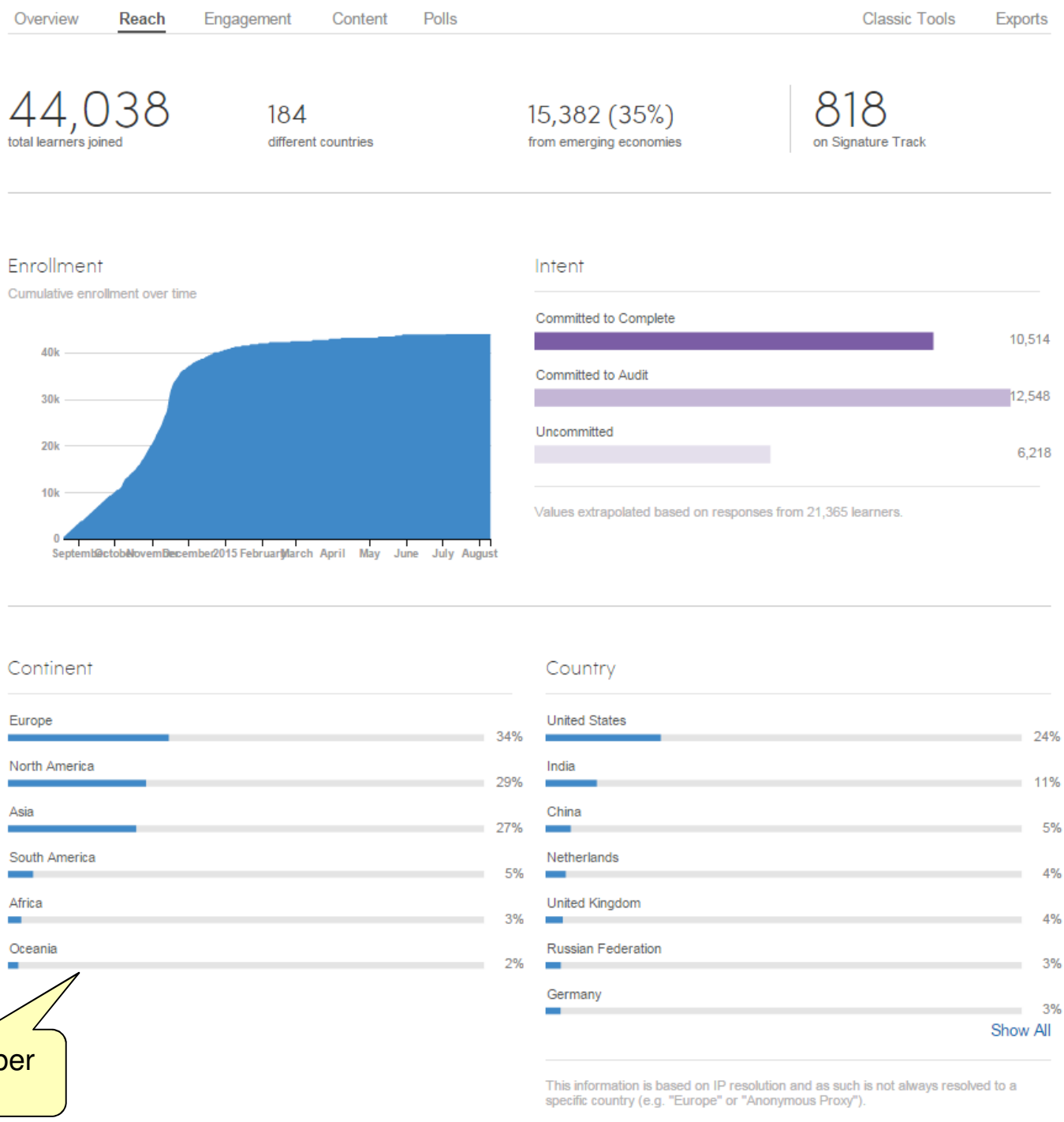

November 2014

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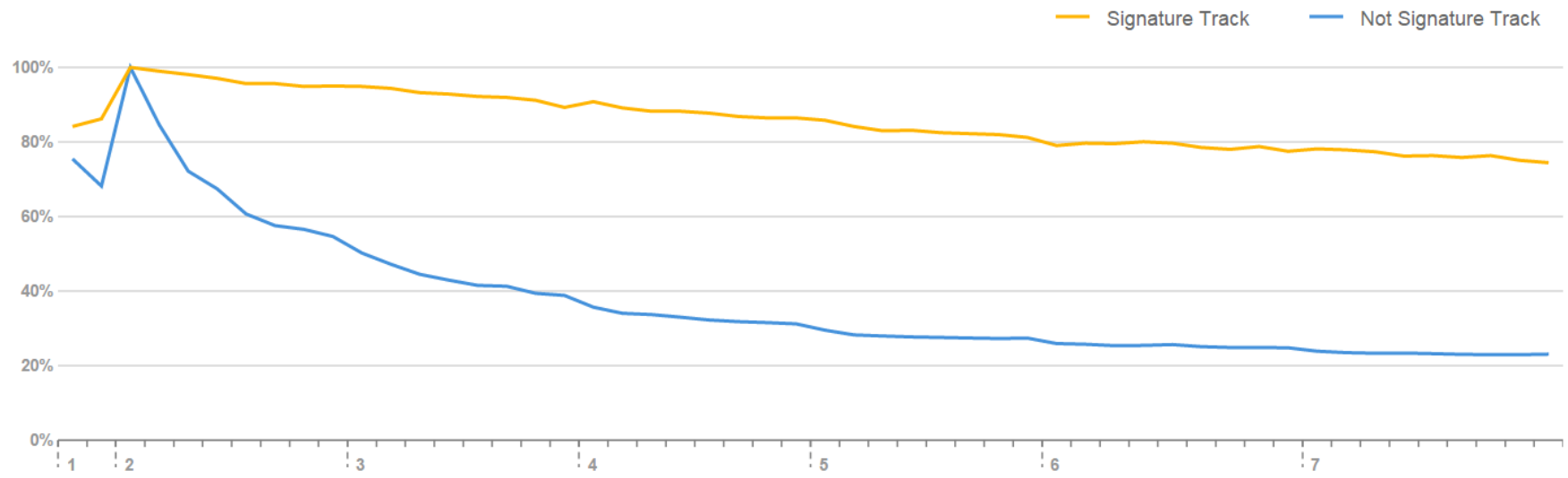
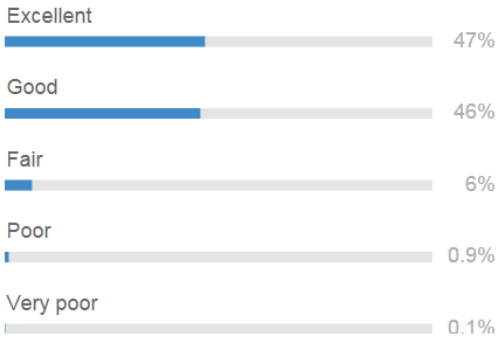
Lecture Activity

Number of learners viewing each lecture (% of maximum viewership)



November 2014

Rate the quality of the course materials (e.g., lectures, exercises, readings) in this course.



Now mining results with Patrick Mukala, Joos Buijs, and Maikel Leemans.

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United States 23%
India 11%
China 6%
Netherlands 4%
Germany 3%
United Kingdom 3%
Russian Federation 3%
Brazil 3%
Spain 3%
Canada 3%
France 2%
Australia 2%
Poland 1%
Taiwan 1%
Italy 1%
Ukraine 1%
Mexico 1%
Singapore 1%
Turkey 1%
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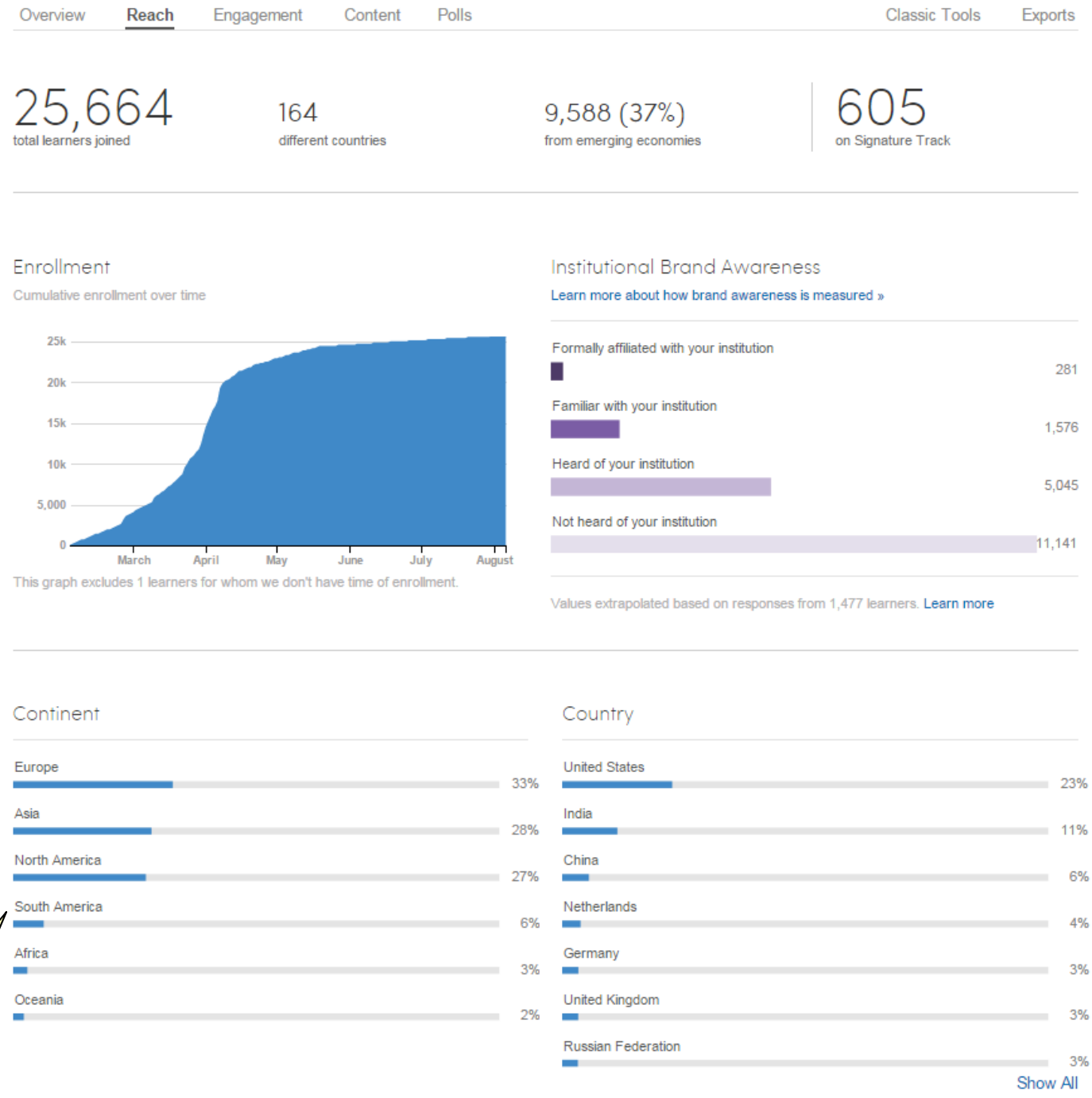

April 2015

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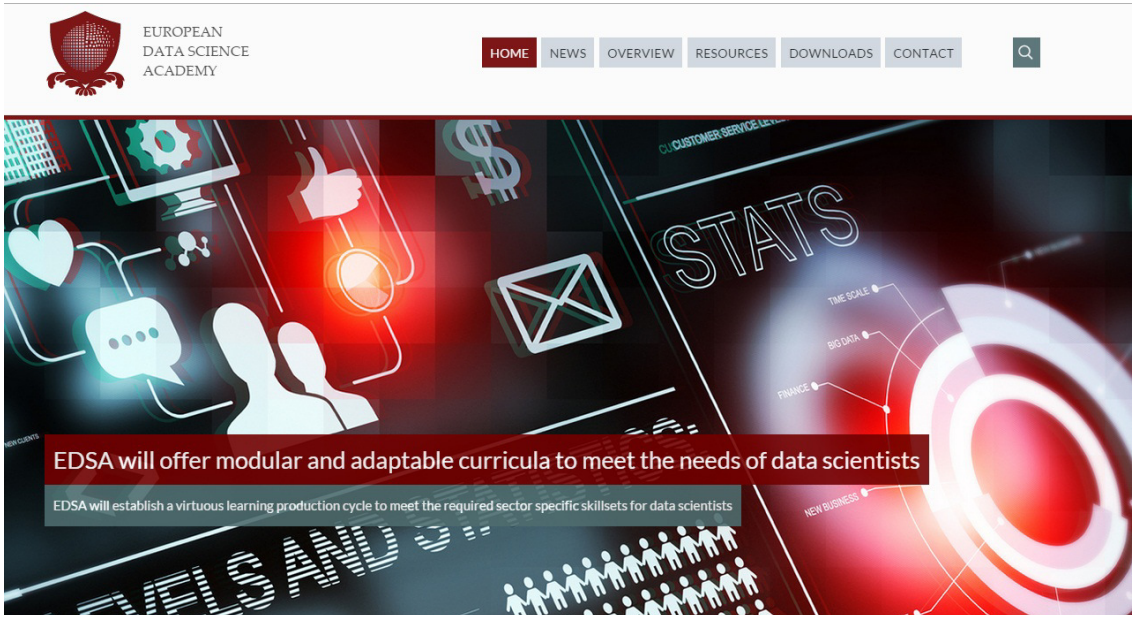
Next run: October 7, 2015

- Help to promote it!
- Use it (e.g., as part of a course)!
- More process mining MOOCs planned in context of the European Data Science Academy (EDSA)



Various PM Movies

IEEE CIS Task Force on Process Mining

Trace: • process_mining_manifesto • introduction_to_process_mining_turning_big_data_into_real_value • process_mining_movies

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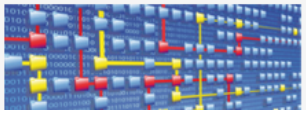


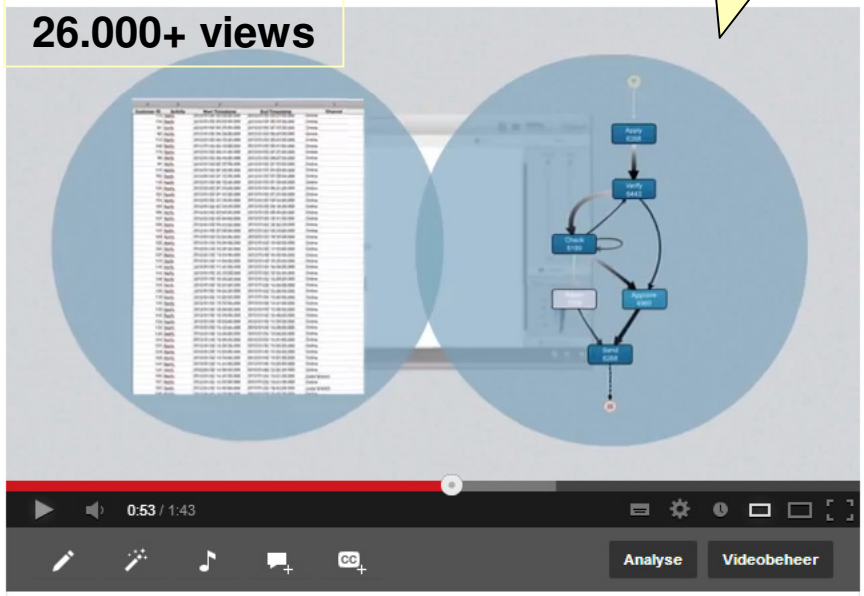
Process Mining Movies

- Introduction to Process Mining: Turning (Big) Data into Real Value
- Process Mining In A Nutshell (Fluxicon)
- Perceptive Process Mining
- Automated Business Process Discovery - QPR ProcessAnalyzer
- Overview of the Business Process Insight (BPI) platform of IBM (
- Fuzzy model animation
- Process Mining animations using BPM|one
- Interstage Automated Process Discovery demo
- Nomination of Process Mining Research at TU/e for ICT Regie Aw
- Presentations on http://fluxicon.com/camp/2012/ (Fluxicon)
- Prototyping Process Mining for SAP Order-To-Cash
- Process mining 20sec
- Process mining
- Introduction to Process Mining
- ProcessMining - Improve Revenue, Reduce Cost, Mitigate Risk
- Process Variants - Process Mining TV
- Process mining (Dutch, English subtitled)
- Perceptive Software & Alliander: Process Mining
- 15-min Video recording bpmNEXT presentation (Fluxicon)

Send links to your videos!

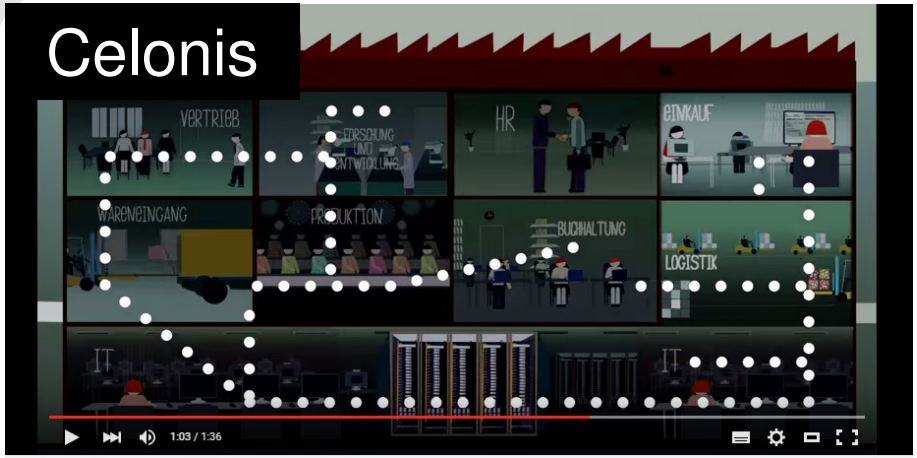
Help to promote it: put it on your website!

26.000+ views



https://www.youtube.com/watch?v=7oat7MatU_U

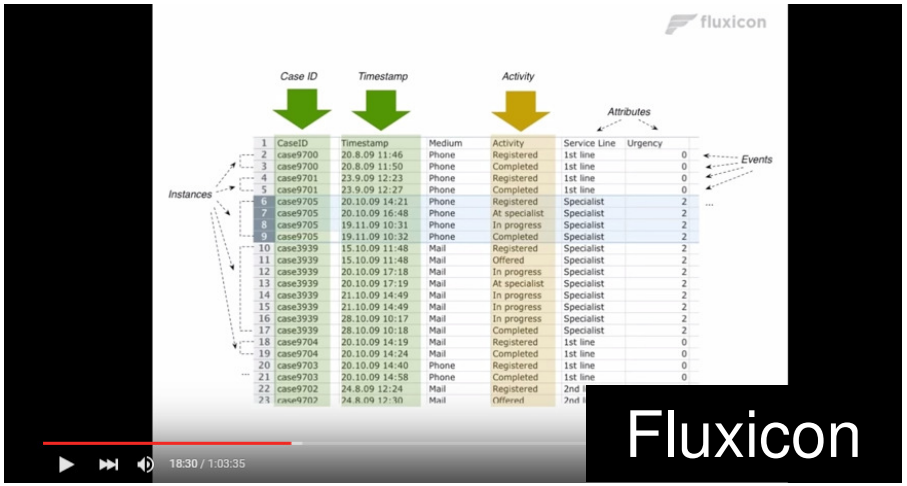
Examples of PM Movies



https://www.youtube.com/watch?v=eUOutoXp75U

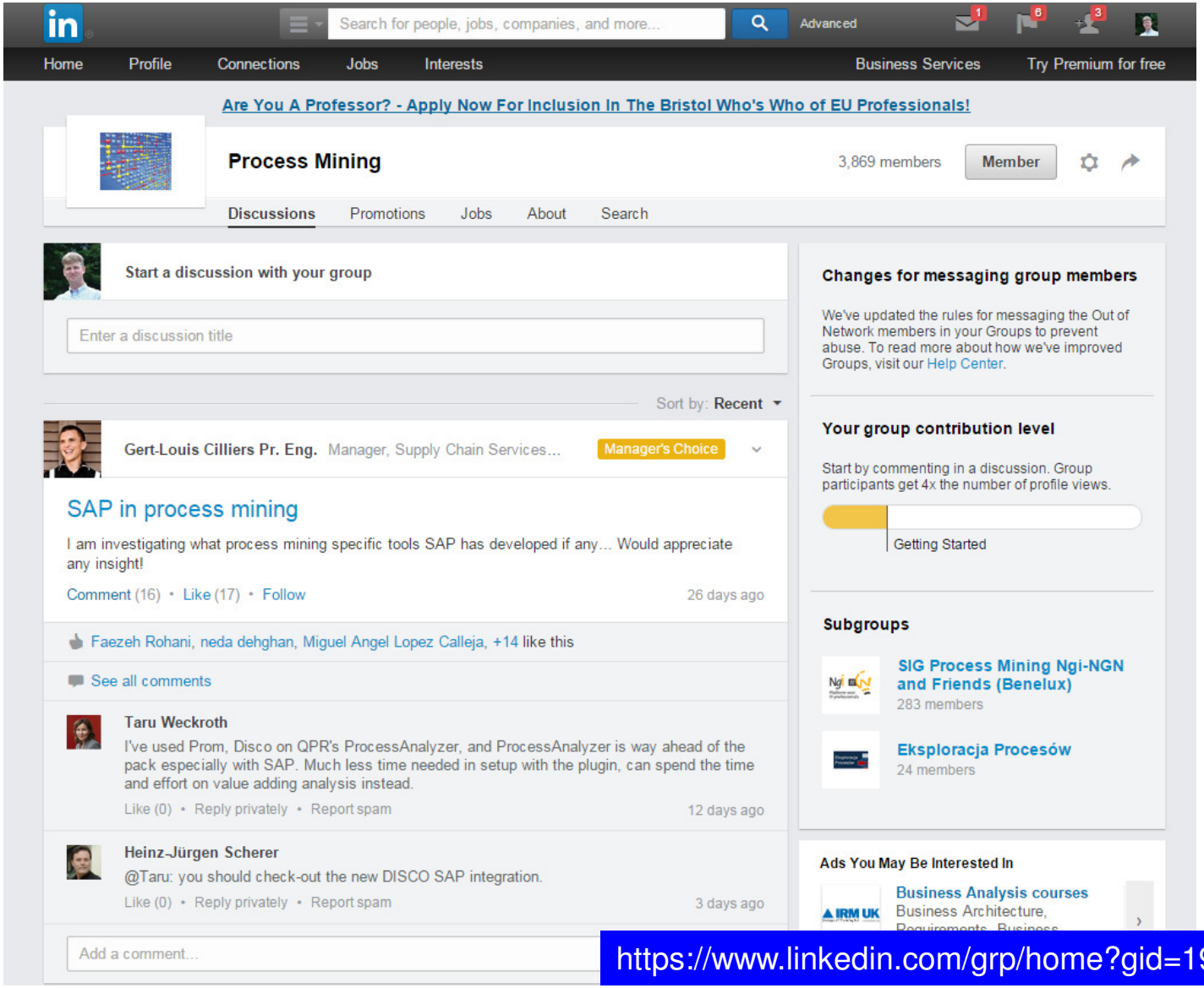
https://www.youtube.com/watch?v=D0jaUMOU31I

https://www.youtube.com/watch?v=nKy2Sx2WYRE



https://www.youtube.com/watch?v=KCpY90T3rQk

LinkedIn Group on PM
(input by George Varvaressos)

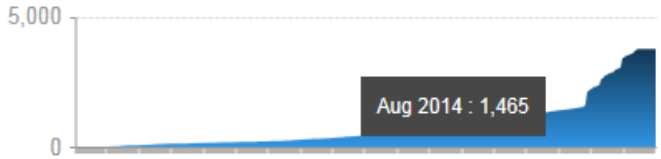


https://www.linkedin.com/grp/home?gid=1915049

LinkedIn Group on PM

Incredible growth: more than doubled since last meeting

TOTAL MEMBERS



MEMBERS

2400 joined in the last year

3,867

Like any community, a LinkedIn group might be close-knit or vast, brand new or already thriving. Explore this group to see if it's right for you.

NEW MEMBERS

469 joined on 17 Nov 2014 (first run MOOC)

NEW MEMBERS

346 joined on 6 April 2015 (second run MOOC)

LinkedIn Group on PM

Good:

- In the last 12 months there has been a lot more activity
- More contributors from a variety of different fields
- More discussions and comments

But:

- How to increase the number of members even more?
- How to get researchers to post studies?
- How to get more members posting comments?
- Ideas for synergy (TF and group)?

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18 Case studies












Too little activity: Send more case studies!

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Data Sets

Send more (ask Boudewijn van Dongen) !

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Trace: • start • process_mining_case_studies • process_mining_logs

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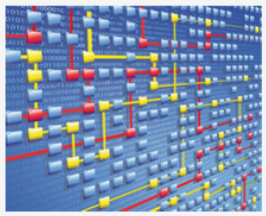

Process Mining Event Logs

Incident management log

This is an event log from Volvo IT Belgium. The log contains events from an incident and problem management system called VINST.

Origin	BPI Challenge 2013
DOI	10.4121/uuid:500573e6-accc-4b0c-9576-aa5468b10cee
Download link	http://dx.doi.or

Incident management log, open pr

DOI	10.4121/uuid:3
Download link	http://dx.doi.or

Incident management log, closed p

DOI	10.4121/uuid:c
Download link	http://dx.doi.or

Event log of a loan application

This is a real-life log, taken from a Dutch Fir
anonymization, the log contains all data as
process for a personal loan or overdraft wit
attribute AMOUNT_REQ, which is global, i.e.
The first letter of each task name identifies
whole, on selections of the whole process

Origin	BPI Challenge 2
DOI	10.4121/uuid:3

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» Search in "info"

TUDelft
TU/e
UNIVERSITEIT TWENTE.

Dataset | BPI Challenge 2015

Link/cite as doi:10.4121/uuid:31a308ef-c844-48da-948c-305d167a0ec1 | show link code | full citation

title	BPI Challenge 2015
creator	*B.F. van Dongen*
contributor	Eindhoven University of Technology
date accepted	2015-05-01
date created	2009-11-18 through 2015-03-05
date published	2015
description	This data is provided by five Dutch municipalities. The data contains all building permit applications over a period of approximately four years. There are many different activities present, denoted by both codes (attribute concept:name) and labels, both in Dutch (attribute taskNameNL) and in English (attribute taskNameEN). The cases in the log contain information on the main application as well as objection procedures in various stages. Furthermore, information is available about the resource that carried out the task and on the cost of the application (attribute SUMleges). The processes in the five municipalities should be identical, but may differ slightly. Especially when changes are made to procedures, rules or regulations the time at which these changes are pushed into the five municipalities may differ. Of course, over the four year period, the underlying processes have changed. The municipalities have a number of questions, namely: What are the roles of the people involved in the various stages of the process and how do these roles differ across municipalities? What are the possible points for improvement on the organizational structure for each of the municipalities? The employees of two of the five municipalities have physically moved into the same location recently. Did this lead to a change in the processes and if so, what is different? Some of the procedures will be outsourced from 2018, i.e. they will be removed from the process and the applicant needs to have these activities performed by an external party before submitting the application. What will be the effect of this on the organizational structures in the five municipalities? Where are differences in throughput times between the municipalities and how can these be explained? What are the differences in control flow between the municipalities? There are five different log files available in this collection. Events are labeled with both a code and a Dutch and English label. Each activity code consists of three parts: two digits, a variable number of characters, and then three digits. The first two digits as well as the characters indicate the subprocess the activity belongs to. For instance '01_HOOFD_xxx' indicates the main process and '01_BB_xxx' indicates the 'objections and complaints' ('Beroep en Bezwaar' in Dutch) subprocess. The last three digits hint on the order in which activities are executed, where the first digit often indicates a phase within a process. Each trace and each event, contain several data attributes that can be used for various checks and predictions. Furthermore, some employees may have performed tasks for different municipalities, i.e. if the employee number is the same, it is safe to assume the same person is being identified.
language	nl
publisher	Eindhoven University of Technology
subject	BPI Challenge 2015
subject	Business Process Intelligence (BPI)
▲ in collection	Real life Event Logs
related publication	11th International Workshop on Business Process Intelligence 2015
▼ has part	BPI Challenge 2015 Municipality 1 DATA BPIC15_1.xes
▼ has part	BPI Challenge 2015 Municipality 2 DATA BPIC15_2.xes
▼ has part	BPI Challenge 2015 Municipality 3 DATA BPIC15_3.xes
▼ has part	BPI Challenge 2015 Municipality 4 DATA BPIC15_4.xes
▼ has part	BPI Challenge 2015 Municipality 5 DATA BPIC15_5.xes

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Some new logs

- B.F. van Dongen (2015) **BPI Challenge 2015**. Eindhoven University of Technology. Dataset. http://dx.doi.org/10.4121/uuid:31a308ef-c844-48da-948c-305d167a0ec1
- Buijs, J.C.A.M. (2014) **Environmental permit application process ('WABO'), CoSeLoG project**. Eindhoven University of Technology. Dataset. http://dx.doi.org/10.4121/uuid:26aba40d-8b2d-435b-b5af-6d4bfbd7a270
- Buijs, J.C.A.M. (2014) **Receipt phase of an environmental permit application process ('WABO'), CoSeLoG project**. Eindhoven University of Technology. Dataset. http://dx.doi.org/10.4121/uuid:a07386a5-7be3-4367-9535-70bc9e77dbe6
- de Leoni, M. (Massimiliano); Mannhardt, F. (Felix) (2015) **Road Traffic Fine Management Process**. Eindhoven University of Technology. Dataset. http://dx.doi.org/10.4121/uuid:270fd440-1057-4fb9-89a9-b699b47990f5

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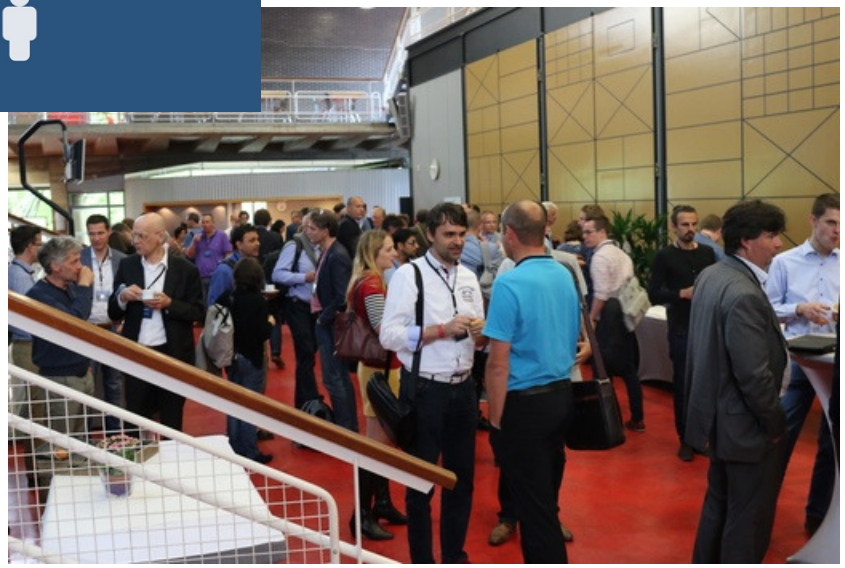
Process Mining Camp 2015

(Fluxicon, Eindhoven, June 2015)



On 15 June, Fluxicon organized the annual process mining community meeting 'Process Mining Camp' for the fourth time. **173 campers from 17 different countries** came together to share their experiences, challenges, and success stories about process mining.

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Camp Impressions

PROCESS MINING CAMP 2015

15 June 2015, Eindhoven

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Camp Impressions

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ATAED 2015
(June 2015, Brussels)

Call for papers

Algorithms & Theories for the Analysis of Event Data (ATAED'2015)

Brussels, Belgium, June 22–23, 2015

The workshop **Algorithms & Theories for the Analysis of Event Data (ATAED'2015)** is a satellite event of both the 36th International Conference on Application and Theory of Petri Nets and Concurrency (**Petri nets 2015**) and the 14th International Conference on Application of Concurrency to System Design (**ACSD 2015**). The workshop aims to attract papers related to Process Mining, Region Theory and other synthesis techniques. These techniques have in common that "lower level" behavioral descriptions (event logs, partial orders, transition systems, etc.) are used to create "higher level" process models (e.g., various classes of Petri nets, BPMN, or UML activity diagrams).

Recent developments in process mining make it possible to analyze event data, thereby focusing on behavior rather than correlations and simplistic performance indicators. For example, event logs can be used to automatically learn end-to-end process models based on historic event data. Next to the automated discovery of the real underlying process, there are process mining techniques to analyze bottlenecks, to uncover hidden inefficiencies, to check compliance, to explain deviations, to predict performance, and to guide users towards "better" processes. ATAED'2015 solicits papers related to process mining algorithms and theories. However, the scope is not limited to this. On the one hand, other types of "lower level" behavioral descriptions may be used (next to event logs), e.g., transition systems, partially ordered runs, sequence charts, and markov chains. On the other hand, also related problems (next to process mining) may be addressed, e.g., hardware synthesis, visualization of concurrent system behavior, synthesis of controllers, an
al
mo

Proceedings: http://ceur-ws.org/Vol-1371/

The program committee invites submission of full papers (up to 15 pages) and of short papers (up to 5 pages). Papers should be submitted as pdf-files using the Springer LNCS-format (http://www.springer.de/comp/lncs/authors.html). Papers need to be submitted via Easychair.

Topics

Possible topics of the solicited papers are:

- theory and applications of process mining
- automated business process model discovery
- conformance checking, alignments, and replay algorithms
- extensions and applications of region theory in different fields
- business process intelligence and other data-driven process oriented approaches
- techniques combining formal methods with data science approaches
- algorithms, theories, and tools for region theory and other forms of synthesis
- case studies and empirical investigations using event data

Important Dates

- Deadline for papers: May 10th, 2015
- Notification of paper acceptance: June 1st, 2015
- Deadline for final contributions: June 10, 2015
- Workshop: June 22-23, 2015

History of the workshop

The workshop can be viewed as a succession of the Applications of Region Theory (ART) workshop series:

- Applications of Region Theory (ART) 2013, Barcelona, Spain
- Applications of Region Theory (ART) 2011, Newcastle upon Tyne, UK
- Applications of Region Theory (ART) 2010, Braga, Portugal

Regions have been defined about 20 years ago by Ehrenfeucht and Rozenberg as sets of nodes of a finite transition system that correspond to potential conditions that enable or disable transition occurrences in a corresponding elementary net system. Initially, region theory focused on synthesis approaches where the transition system and resulting Petri net are equivalent (e.g., bisimilar). In recent years, various forms of region-based ideas (language-based and state-based variants) have been applied in the context of process mining. Here, there is only example behavior and, as a result, classical techniques fail to work. One needs to deal with new problems such as noise and incompleteness. Hence, there are many theoretical challenges with a high practical relevance. This workshop is not limited to region-based approaches. In fact all techniques that aim at learning or checking concurrent behavior from transition systems, runs, or event logs are welcome. The workshop is supported by the IEEE Task Force on Process Mining.

For more information, visit:
http://wiki.fernuni-hagen.de/art/index.php/Algorithms_%26_Theories_for_the_Analysis_of_Event_Data_(ATAED)_2015

IEEE task force on process mining

IEEE

CIDM 2014

(Florida, December 2014)

Call for Papers

Special Session on

Business Process Analytics, Process Mining and Process Big Data

at the 2014 IEEE Symposium on Computational Intelligence and Data Mining (CIDM)

December 9-12, 2014, Orlando, Florida

Organizers

Andrea Burattin, *University of Padua, Italy*
Fabrizio M. Maggi, *University of Tartu, Estonia*
Marcello Leida, *Etisalat BT Innovation Centre, UAE*

w live in a time where the amount of data
d daily goes easily beyond the storage and
sing capabilities of nowadays systems: or-
ganizations, governments but also individuals generate large amounts of data at a rate that has started to overwhelm the ability to timely extract useful knowledge from it. Nevertheless the strategic importance of the knowledge hidden in

(CIDM 2014). The goal of this special session is to allow experts in the area of process mining and (big) data analysis to share new techniques, applications and case studies. Therefore, submissions of papers on new process mining techniques, ap-

CIDM 2015

6th IEEE Symposium on Computational Intelligence and Data Mining (CIDM 2015)

Call for Papers

Special Session on
Process Mining

at the 2015 IEEE Symposium on Computational Intelligence and Data Mining (CIDM)

December 7-10, 2015, Cape Town, South Africa

Organizers

Andrea Burattin, *University of Innsbruck, Austria*
Fabrizio M. Maggi, *University of Tartu, Estonia*
Chiara Di Francescomarino, *FBK, Italy*

vertheless, the strategic importance of the knowledge
lden in these data is paramount for effective decision
king and need to be extracted quickly in order to
fectively react to dynamic situations. Efficient stream
ocessing approaches for real time analysis are crucial
enabling the predictive capabilities required by

http://cidm2015.processmining.it/

WCCI 2014
(Beijing July 2014)

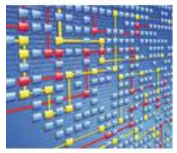
Special Session on Process Mining at
the 2014 IEEE Congress on Evolutionary Computation (IEEE CEC 2014)

hosted by
IEEE World Congress on Computational Intelligence (IEEE WCCI 2014)
Beijing, China, 6-11 July 2014

Call for Papers

Home
Call for Papers
Organizers
Technical Program
Paper Submission

Sponsored by



IEEE Task Force on Process Mining

Download it in textual format

The IEEE Task Force on Process Mining is organizing a Special Session on Process Mining at the 2014 IEEE Congress on Evolutionary Computation (IEEE CEC 2014).

Process mining is a relatively young research discipline that sits between computational intelligence and data mining on the one hand and process modeling and analysis on the other hand. The idea of process mining is to discover, monitor and improve real processes (i.e., not assumed processes) by extracting knowledge from event logs readily available in today's systems. Process mining provides an important bridge between data mining and business process modeling and analysis. Process mining research started in the late nineties. At that time, there was little event data available and the process mining techniques were extremely naive and hence unusable. Over the last decade, larger amounts of event data have become available and process mining techniques have matured. Moreover, process mining algorithms have been implemented in various academic and commercial systems. Today, there is an active group of researchers working on process mining and it has become one of the "hot topics" in BPM research. Moreover, there is a huge interest from industry in process mining. More and more software vendors started adding process mining functionality to their tools.

The aim of this special session on process mining is to increase the awareness of the community of computational intelligence and, particularly in evolutionary computation, on the issues and current solutions around process mining. The topics of interest include, but are not limited to:

- Process Mining
- Business Process Intelligence
- Automated Business Process Discovery
- Decision and Rule Mining
- Visual Analytics in Process Mining
- Business Process Conformance Checking
- Application of Computational Intelligence to Process Minir
- Case studies

The accepted papers will be published in the IEEE CEC confere
libraries

- Dr. Massimiliano de Leoni, Department of Mathematics, University of Padua and Faculty of Mathematics and Computer Science, Eindhoven University of Technology.
- Dr. Luciano García-Bañuelos, Institute of Computer Science University of Tartu, Estonia.
- Dr. Minseok Song, School of Technology Management, Ulsan National Institute of Science and Technology, South Korea
- Dr. Lijie Wen, School of Software, Tsinghua University, P.R. China

IEEE Computational Intelligence Society

Special issue IEEE TSC

IEEE TRANSACTIONS ON SERVICES COMPUTING

SI "PROCESSES MEET BIG DATA"

I. AIMS AND SCOPE

The aim of process mining is to discover, monitor and improve business processes by extracting knowledge from event logs readily available in today's information systems. Process monitoring and analysis has enjoyed a tremendous growth and a rapid development at both conceptual and algorithmic levels. In particular, there have been successful realizations of process monitoring systems in many application areas, including manufacturing, e-health and e-government. Today, the current trend toward large-scale collaborative processes featuring thousands of elementary activities per minute is generating a number of new research issues. When large-scale processes are executed on (cloud-based) service-oriented environments or even on the global Net, elementary activities can be mapped to fine or coarse-grained protocol events and process logs increasingly come to show all typical properties of "big data": wide physical distribution, diversity of formats, non-standard data models, heterogeneous semantics. Computing metrics over such "big logs" also requires to handle security and privacy concerns of many participants, and even to deal with non-uniform trustworthiness of log entries. New techniques are therefore required for designing, validating and deploying process metrics in this scenario, as well as for effectively dash-boarding the processes' performance indicators.

This special issue of IEEE Transaction on Service-Oriented Computing is intended to create an international forum for presenting innovative developments of process monitoring and analysis over service-oriented architectures, aimed at handling "big logs" and use them effectively for discovery, dash-boarding and mining. The ultimate objective is to identify the promising research avenues, report the main results and promote the visibility and relevance of this area.

II. TOPICS COVERED INCLUDE

- *Process monitoring on SOA and clouds*
- *Validation and benchmarking of process monitoring*
- *Efficiently mining rare patterns in "big logs"*
- *Scalable techniques for distributed process monitoring*
- *Monitoring and analysis of cloud-based processes*
- *Architectures and data models for synthesizing and handling "big logs*
- *Securing log data*
- *Privacy-aware computation of process metrics*
- *Log obfuscation and access control*
- *Practical systems and tools for big log analysis and log dashboards*
- *Applications combining process management and big data, e.g. audits*

III. IMPORTANT DATES

January 30, 2014: Submission deadline
March 30, 2014: Notification of the first-round review
April 30, 2014: Revised submission due
June 15, 2014: Final notice of acceptance/reject

IV. SUBMISSION GUIDELINES

Manuscripts should be prepared according to the instruction of the "Information for Authors" section of the journal. Submissions should be done through the IEEE TSC journal website. Submitted manuscripts will be thoroughly reviewed using the standard procedure followed for regular IEEE TSC submissions.

V. GUEST EDITORS

Rafael Accorsi (U of Freiburg, DE)
Wil M.P. van der Aalst (TU Eindhoven, NL)
Ernesto Damiani (U of Milan, IT)

http://www.dagstuhl.de/13481


Report from Dagstuhl Seminar 13481
Unleashing Operational Process Mining
Edited by
Rafael Accorsi[1], Ernesto Damiani[2], and Wil van der Aalst[3]
Abstract
1 Executive Summary
Rafael Accorsi
Ernesto Damiani
Wil van der Aalst

27 submissions
final stage of reviewing
+/-7 papers expected

IEEE

IEEE TRANSACTIONS ON SERVICES COMPUTING

FOREMOST RESEARCH AND DEVELOPMENT IN THE FIELD OF SERVICES COMPUTING

BPI+BPIC 2005-2015

- Business Processing Intelligence (BPI) workshop and the Business Processing Intelligence Challenge (BPIC)
  - 2015: Innsbruck
  - 2014: Eindhoven
  - 2013: Beijing
  - 2012: Tallinn
  - 2011: Clermont-Ferrand
  - …

BPI 2015

IEEE Computational Intelligence Society

Winners 2015


Best Process Mining
Dissertation Award

IEEE
task force on
process mining

BPM 2015
Innsbruck, Austria

IEEE taskforce on process mining

Best Dissertation in Process Mining 2015

Queensland University of Technology

UNIVERSITÀ DELLA CALABRIA
DIMES - Dipartimento di INGEGNERIA INFORMATICA MODELLISTICA, ELETTRONICA E SISTEMISTICA

TU/e Technische Universiteit Eindhoven University of Technology
Where innovation starts

The Call

- theses **defended** in **2013-2014**
- **4 excellent submissions**
- reviewed by
  - Antonella **Guzzo**
    University of Calabria (co-chair)
  - Marcello **La Rosa**
    QUT (co-chair)
  - Paola **Mello**
    University of Bologna
  - Stefanie **Rinderle-Ma**
    University of Vienna

Call for Nominations for

Best Process Mining Dissertation Award 2015

Organized by
Dirk Fahland, Eindhoven University of Technology, The Netherlands
Antonella Guzzo, University of Calabria, Italy
Marcello La Rosa, Queensland University of Technology, Australia

for the
IEEE Task Force on Process Mining

The Process Mining Dissertation Award is awarded by the IEEE Task Force on Proces
Mining to an outstanding PhD thesis focused on the area of business process
intelligence. The award is particularly dedicated to works contributing to **research**
the area of process mining and/or the **innovative use of process mining techniqu**
for solving practically relevant problems.

With this award, the IEEE Task Force on Process Mining wants to draw attention
excellent works by young researchers and promote the research area as a whol

The Best Process Mining Dissertation Award will be conferred by the IEEE Task
on Process Mining to the winner during the meeting of the IEEE Task Force at
13th Int. Conference on Business Process Management in Innsbruck, Austria o
August 2015. As part of this event, the recipient will be invited to give a prese
on the main results of the thesis in a form suitable for the event and audienc

The selected thesis will also be recommended for publication as a monogra
LNBIP series published by Springer. Further, the Dissertation Award will be
accompanied by a monetary prize of 1,000 EUR.

Section criteria

- Significance and innovation
- Technical depth:
  - conceptualization
  - formalization
  - implementation
  - evaluation
- Potential impact on academia and practice
- Quality of presentation
- Quality and number of publications
- Citations

And the winner is...

Jorge Munoz-Gama

for this PhD thesis

Conformance Checking and Diagnosis in Process Mining

What the reviewers said…

…The thesis features **significant contributions**.…

…quickly became a **reference** in the field…

…all techniques are **quite robust** and **effective** in practice…

…**high technical depth**…
…**implemented** and **evaluated**…

…The publication throughput and quality are **outstanding**…


BEST DISSERTATION IN
PROCESS MINING 2015
Jorge Munoz-Gama
CONFORMANCE CHECKING AND DIAGNOSIS
IN PROCESS MINING

Call for Nominations 2016

IEEE
task force on
process mining

- thesis **defended in 2014-2015**
- written in **English**

- supervisors nominate until **1st May 2016**
  (see http://tinyurl.com/pm-phd-award)
- organized by Dirk Fahland, Antonella Guzzo, Marcello La Rosa

- interested in sponsoring? contact Dirk at d.fahland@tue.nl

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XES Standard

Felix Mannhardt, Eric Verbeek

IEEE

Standardization Process

1. Find Sponsor: July 13th, 2014
   – Webinar on XES: June 20th, 2014

Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project
   - Sponsor submits PAR: February 11th, 2015
   - IEEE SA accepts PAR: March 26th, 2015

Active Project

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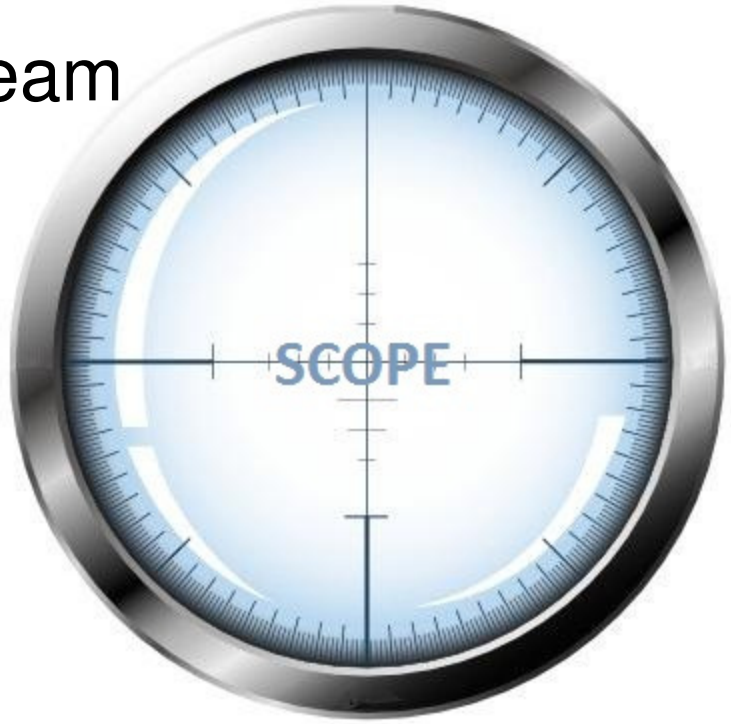
Project Scope

- Defines a grammar for event logs and event streams
- Includes two XML Schema's
  - XES event log/stream
  - Extension of such a log/stream
- Includes basic extensions



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Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project
   - Sponsor submits PAR: February 11th, 2015
   - IEEE SA accepts PAR: March 26th, 2015

Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations
   - Form Working Group: August 22nd, 2015

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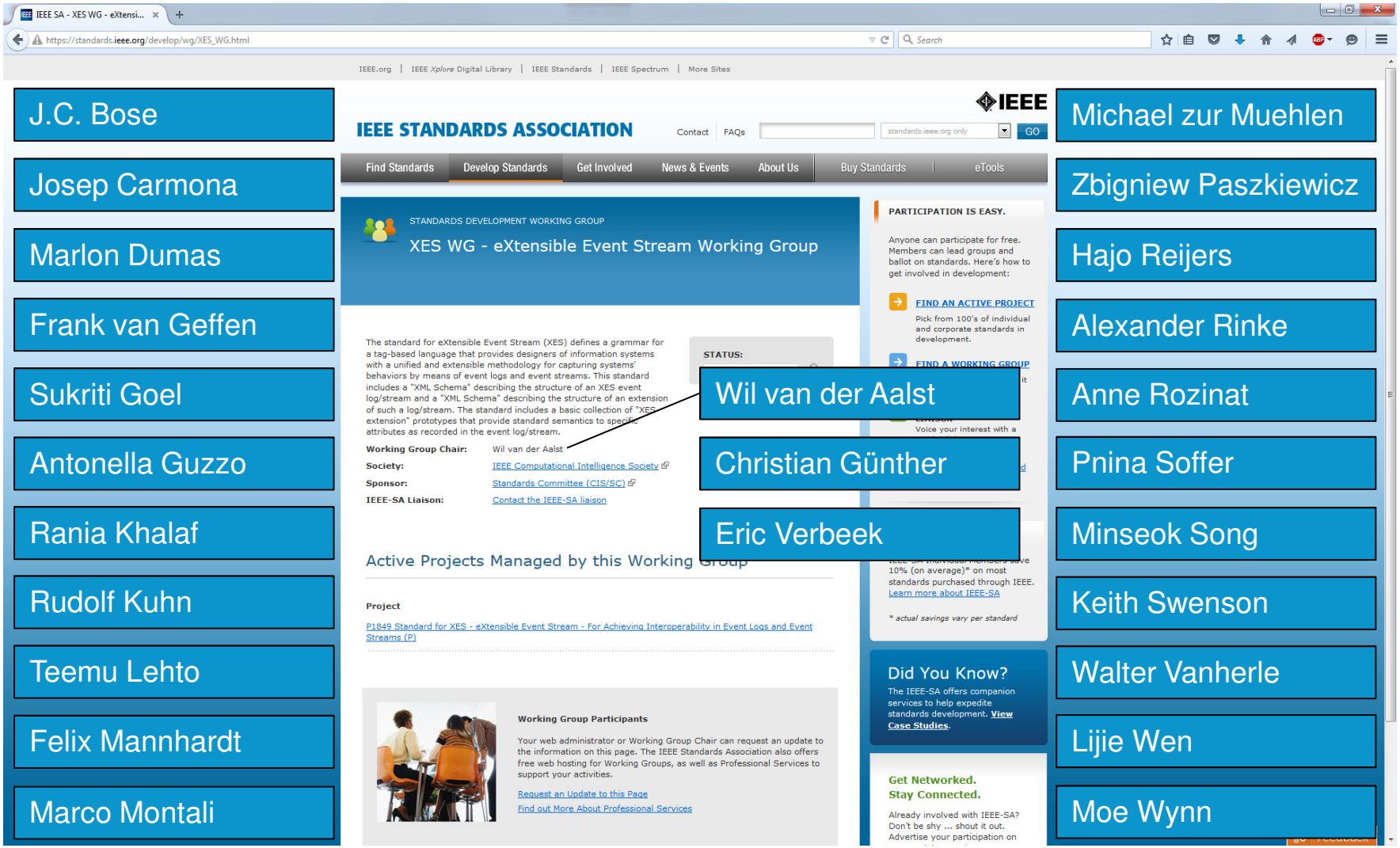
Working Group



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Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations
   - Form Working Group: August 22nd, 2015

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Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations
   - Form Working Group: August 22nd, 2015 ✓
   - Policies & Procedures: In progress

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Policies & Procedures

- Formal document
  - Submitted, waiting for approval from sponsor
- Chair, Vice Chair, Secretary, no Treasurer
  - Wil van der Aalst, Christian Günther, Eric Verbeek
- Chair appoints other officers
- Membership is open
- Two-thirds majority

Standardization Process

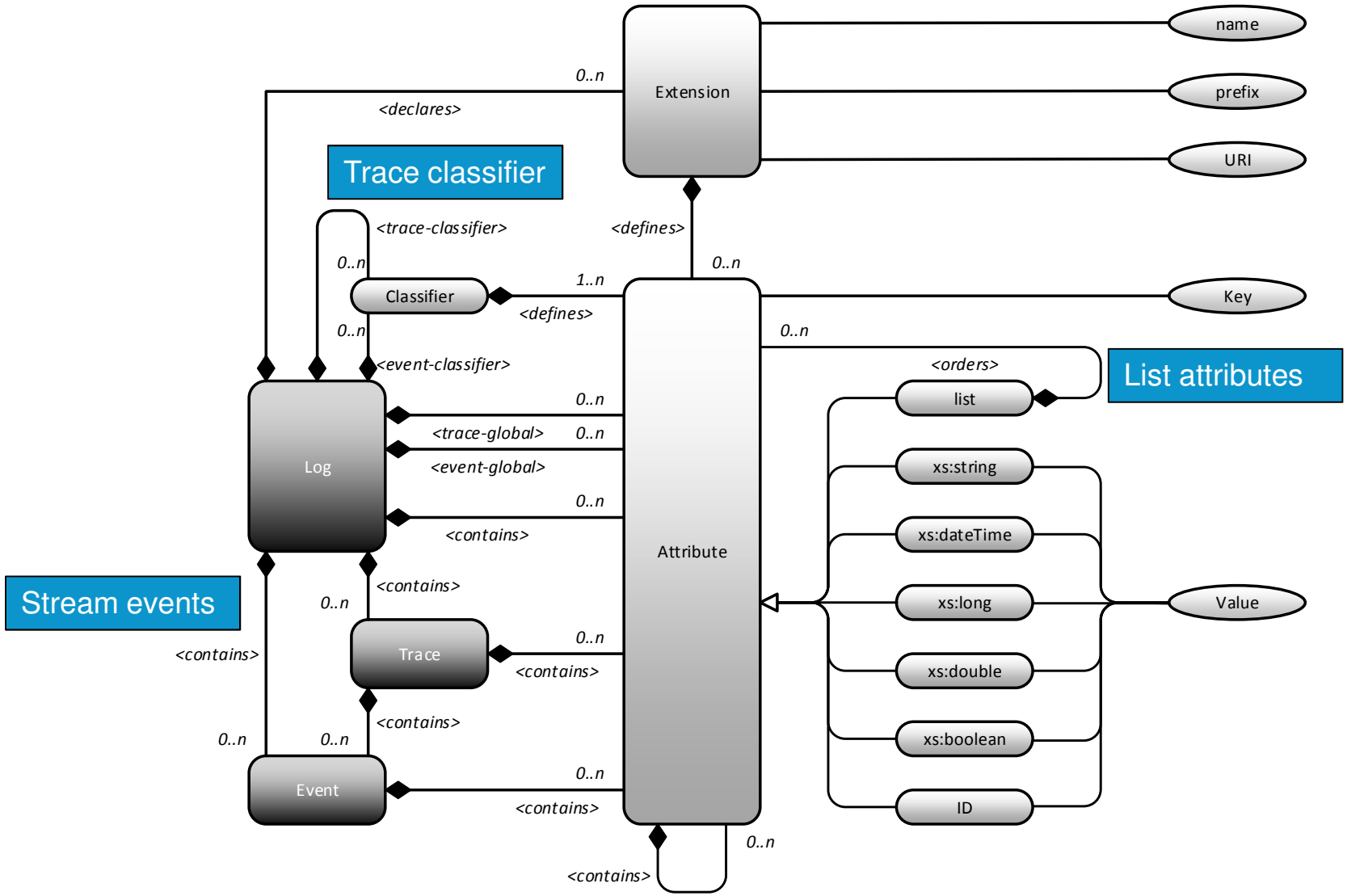
1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations
   - Form Working Group: August 22nd, 2015 ✓
   - Policies & Procedures: In progress

Standardization Process

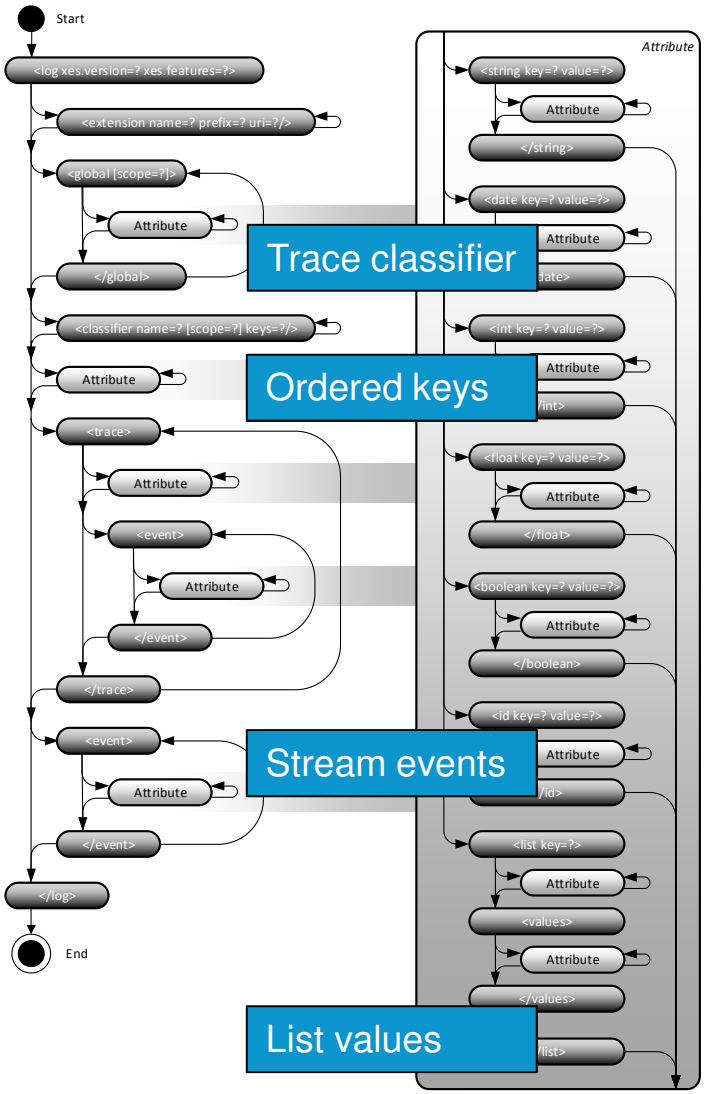
1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations ⌛
4. Draft Development
   - In progress, Revision 7

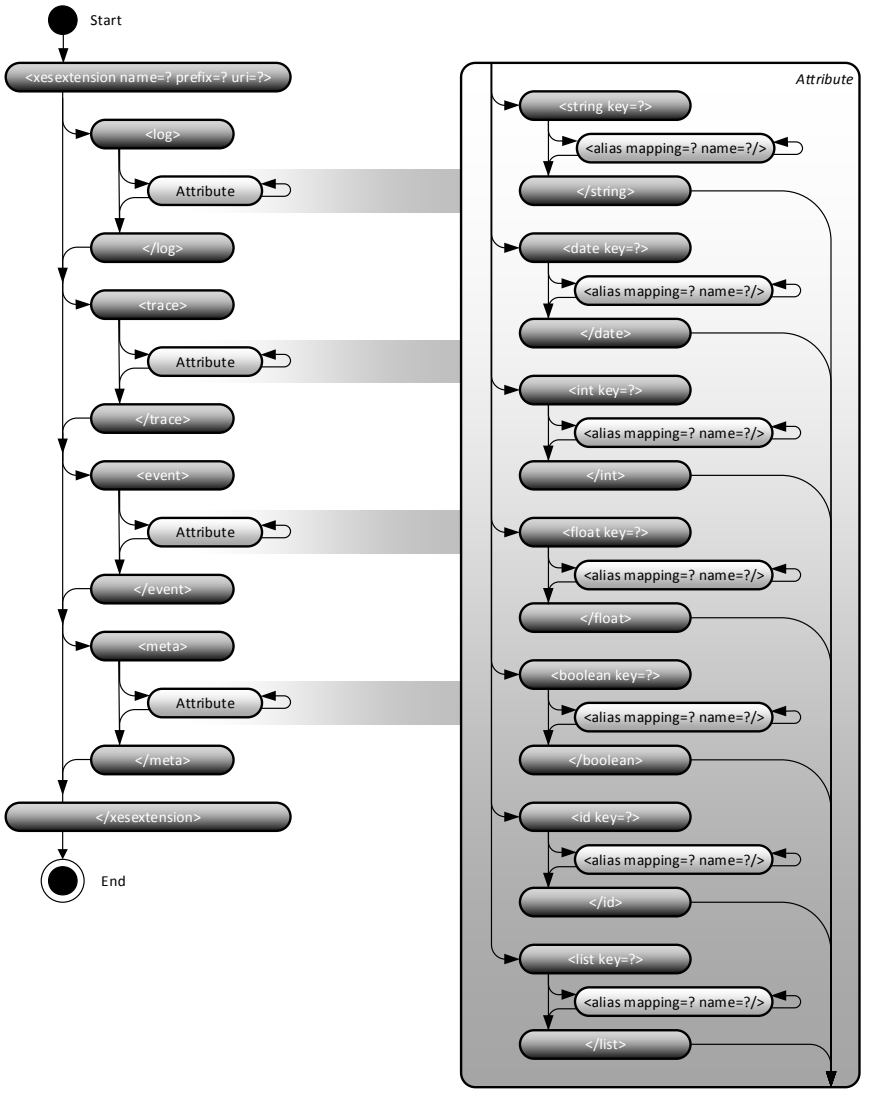
http://www.win.tue.nl/ieeetfpm/lib/exe/fetch.php?media=shared:downloads:xes-r7.pdf

Metadata Structure

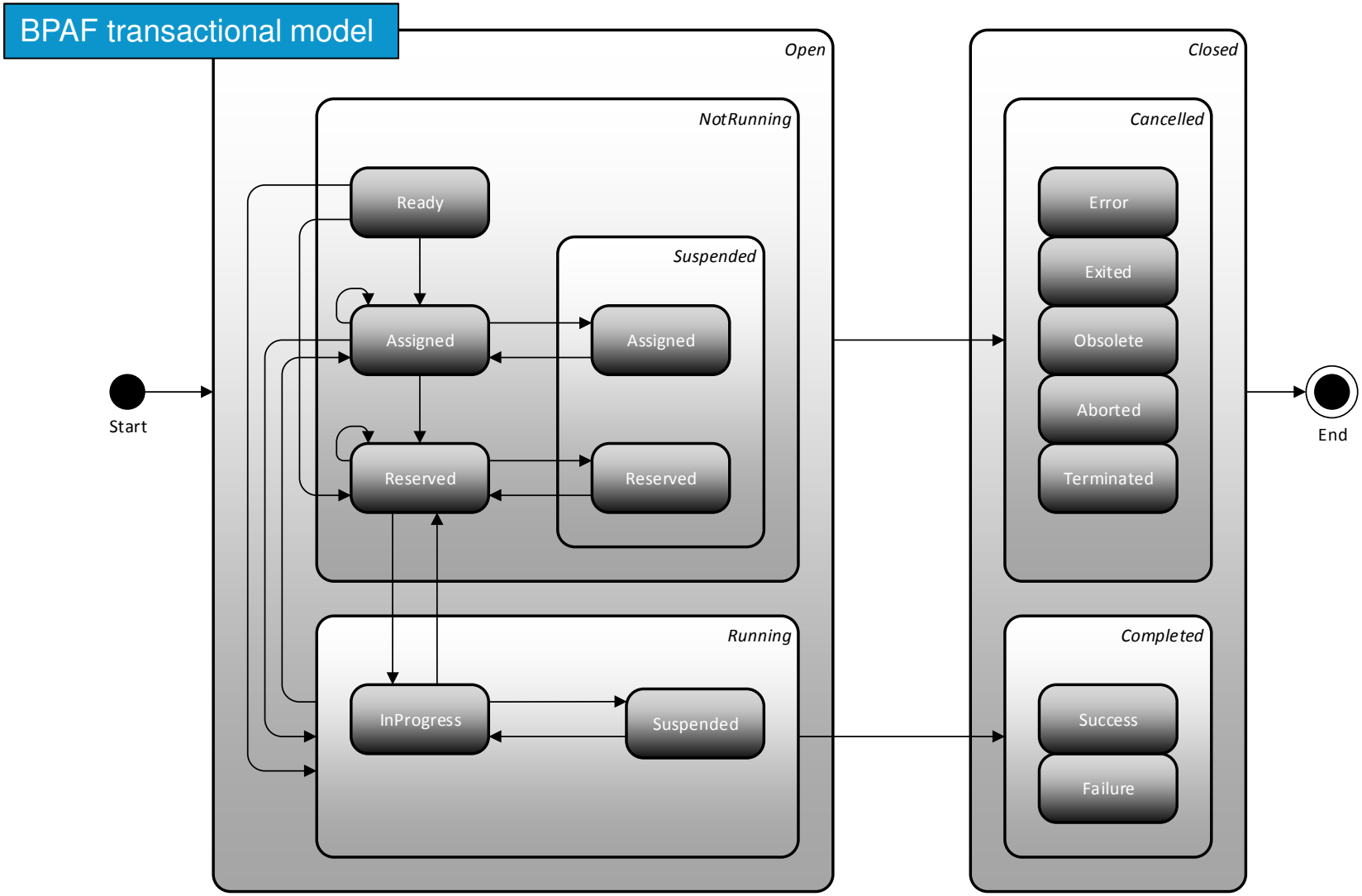


XML Serialization





Lifecycle Extension



Planning

- September 2015
- October 2015
- November 2015
- December 2015
- …
- December 2016

- 1st comment round
- 2nd comment round
- Approval round
- First draft Proposal
- …
- Accepted Proposal

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Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations ⌛
4. Draft Development
   - In progress, Revision 7

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Standardization Process

1. Find Sponsor: July 13th, 2014 ✓
2. Initiating the Project ✓
3. Working Group Operations ⌛
4. Draft Development ⌛
5. Sponsor Balloting
   - Expected December 2015
6. Final Approval & Publication
7. Maintaining the Standard

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XES Tools

- AProMore
- Celonis
- Disco
- Lean Document Prod.
- ProM
- minit
- QPR
- RapidProM
- Rialto PI
- YAWL
- Any more?

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XES Extensions

- Concept
- Lifecycle
- Organizational
- Time
- Semantic
- ID
- Cost
- Alignment
- Any more?

- Standard
- Moe Wynn
- Felix Mannhardt
- Any more?

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XES Usage

Event Logs

- 3TU.Datacentrum
- BPI Challenge logs
- Any more?

Advanced Tools

- Dotted Chart
- Inductive Miner
- Data Aware Miner
- Data Aware Replayer
- Any more?

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Extensible Event Stream

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Discussion

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From last year's meeting

Established: Working group on legal/ethical aspects of process mining

- In a first kick-off meeting in June 2015, Frank van Geffen, Anne Rozinat, and Léonard Studer reviewed and organized the materials on the topic of legal/ethical aspects of process mining from various sources / with input from various other people.
- The initiative will be continued after the summer. Interested parties can contact Anne Rozinat (anne@fluxicon.com) to be updated about developments and provide further input.

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Data Sets & Case Studies

- What data sets are you using?
- Are they public?
- Many unknown successful projects (cf. ProcessGold, Fluxicon, Celonis, QPR, Perceptive, etc.). How to make this better visible?

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Process Mining Manifesto

- What languages are we missing?
- Manifesto was released in 2011. Is it time to make an update?
  - What are the new challenges?
  - What are the new insights?
  - New angle on process mining?
- Who would like to take the initiative?

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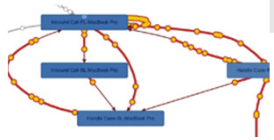
Process Mining Software

- Should we add tool information to the website (index)?
- What features should be listed?
- If we add this, any volunteers to maintain this? (sync. with other sources such as wikipedia, paper, XES?)

ARIS Process Performance Manager

celonis process mining

XMPRO GET BETTER AT GETTING WORK DONE



Disco by Fluxicon.

StereoLogic

perceptivesoftware a Lexmark company

QPR Quality. Processes. Results.

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FUJITSU

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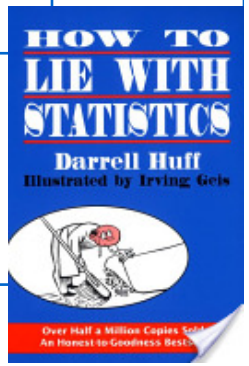
Data Quality

	case	event	belongs to	c attribute	position	activity name	timestamp	resource	e attribute
missing data	In reality a case has been executed but it has not been recorded in the log	Events are missing within the trace although they occurred in reality.	Association between events and cases is lost (correlation problem)	Case attribute was not recorded.	Ordering of events in the trace is lost.	Activity names of events are missing.	Timestamps of events are missing.	Resources that executed an activity have not been recorded.	Event attribute was not recorded.
incorrect data	Some cases in the log belong to a different process.	Events that were not actually executed for some cases are logged	Association between events and cases are logged incorrectly.	Values corresponding to case attributes are logged incorrectly.	Order is mixed up.	Wrong activity names are recorded.	Incorrect timestamps.	Incorrect resource assigned to event.	Attributes of events are recorded incorrectly.
imprecise data			Difficult to correlate events to specific cases (too coarse).	Provided value is too coarse, e.g., city but no address.	For example concurrent events may have become been totally ordered.	Activity names are too coarse.	Days rather than minutes or seconds. Hence, precise order cannot be derived.	Just role or department is recorded.	Provided value is too coarse.
irrelevant data	Irrelevant cases are included and cannot be removed easily.	Events may be irrelevant and difficult to remove							

How to ensure the correctness of data?
How to avoid misuse of process mining?



Bose, R.P.J.C.; Mans, R.S.; van der Aalst, W.M.P., "Wanna improve process mining results?," ***Computational Intelligence and Data Mining (CIDM 2013)*** , doi: 10.1109/CIDM.2013.6597227

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Opportunities?

- Process Mining and Big Data
- Process Mining and Data Science
- Process Mining and Customer Journey
- Process Mining and Industry 4.0?
- Process Mining and Internet of Things?
- Process Mining and Quantified Self?
- Process Mining and Smart XXXX?
- Domain-specific Process Mining
  - Healthcare
  - …

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Planned Activities for 2015-2016

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Continued Activities

(assumption)

- BPI workshop (co-located with BPM 2016 in Rio)
- BPI challenge (co-located with BPM 2016 in Rio)
- Best Process Mining Dissertation Award
- Algorithms & Theories for the Analysis of Event Data (ATAED 2016, Toruń, Poland)
- Process Mining Camp (Fluxicon)
- XES standardization
- Dutch Special Interest Group Process Mining (Ngi-Ngn), e.g. “Process Mining Bazaar” (14 October 2015, Amsterdam)
- …

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Volunteers needed!

- Process Mining Session at the IEEE World Congress on Computational Intelligence (WCCI 2016), Vancouver, Canada, July 2016
  (see http://www.wcci2016.org/spsessions.php, proposals due by 15 November 2015)
- Process Mining Session at the IEEE Symposium on Computational Intelligence and Data Mining (CIDM) / IEEE Symposium Series on Computational Intelligence (SSCI 2016), Greece, December 2016.

Calendar (volunteer)?
Geographic and temporal distribution?

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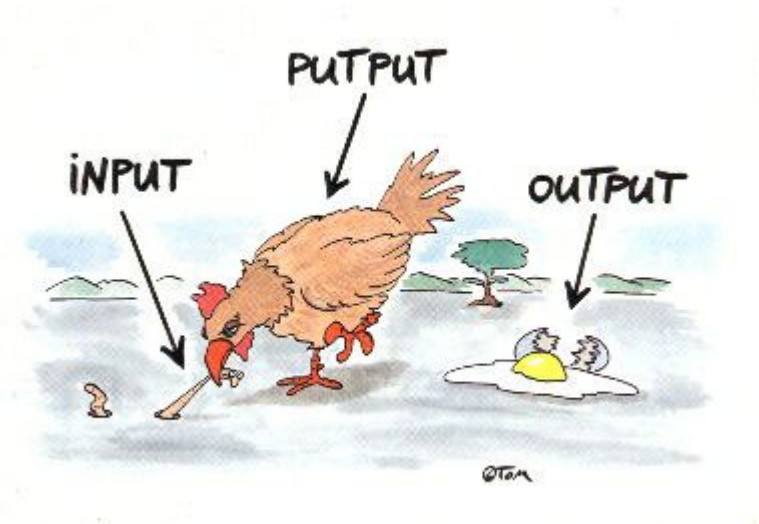
Input Needed

- Additional Use Cases
- Additional Public Data Sets
- Additional MOOCs, books, etc. for end-users



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new initiatives

W: www.vdaalst.com
T: @wvdaalst
E: w.m.p.v.d.aalst@tue.nl

any ideas?

Closing

Next: Reception @ Innsbrucker Nordkette