

À Descoberta dos Processos de Negócio

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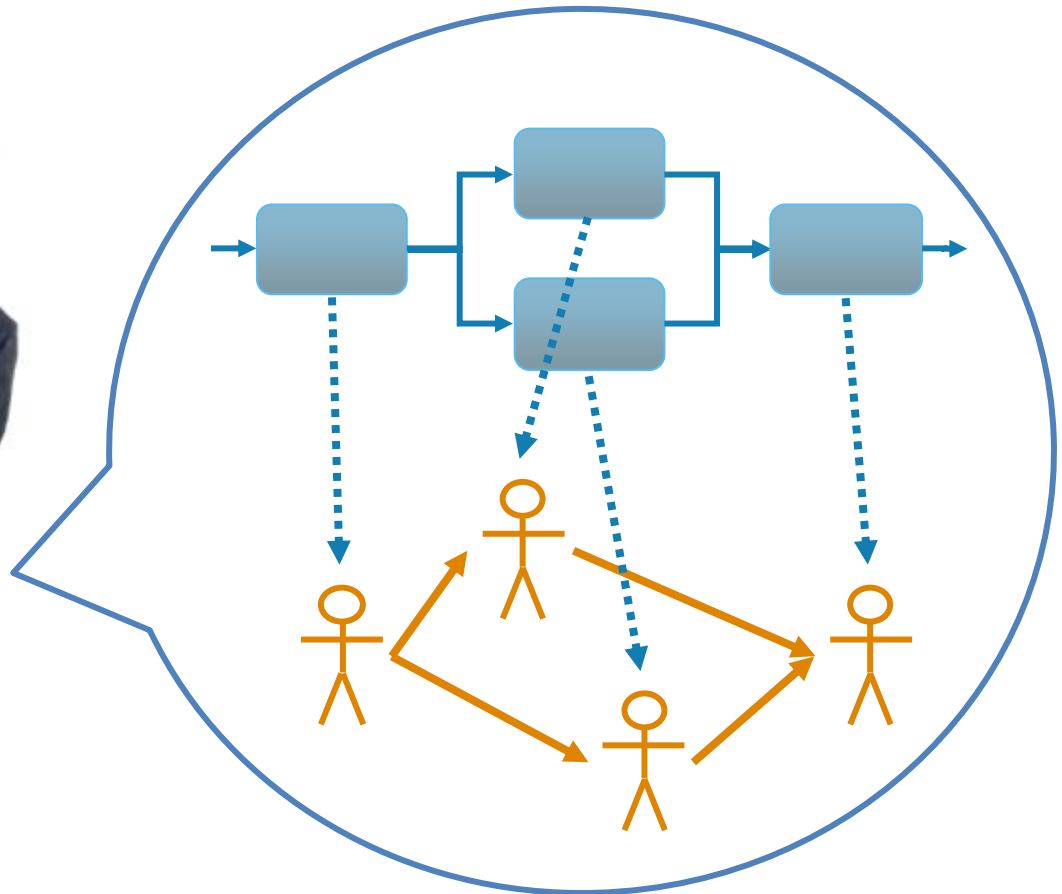
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INSTITUTO SUPERIOR TÉCNICO
Universidade Técnica de Lisboa

Processos

- Um plano para a organização

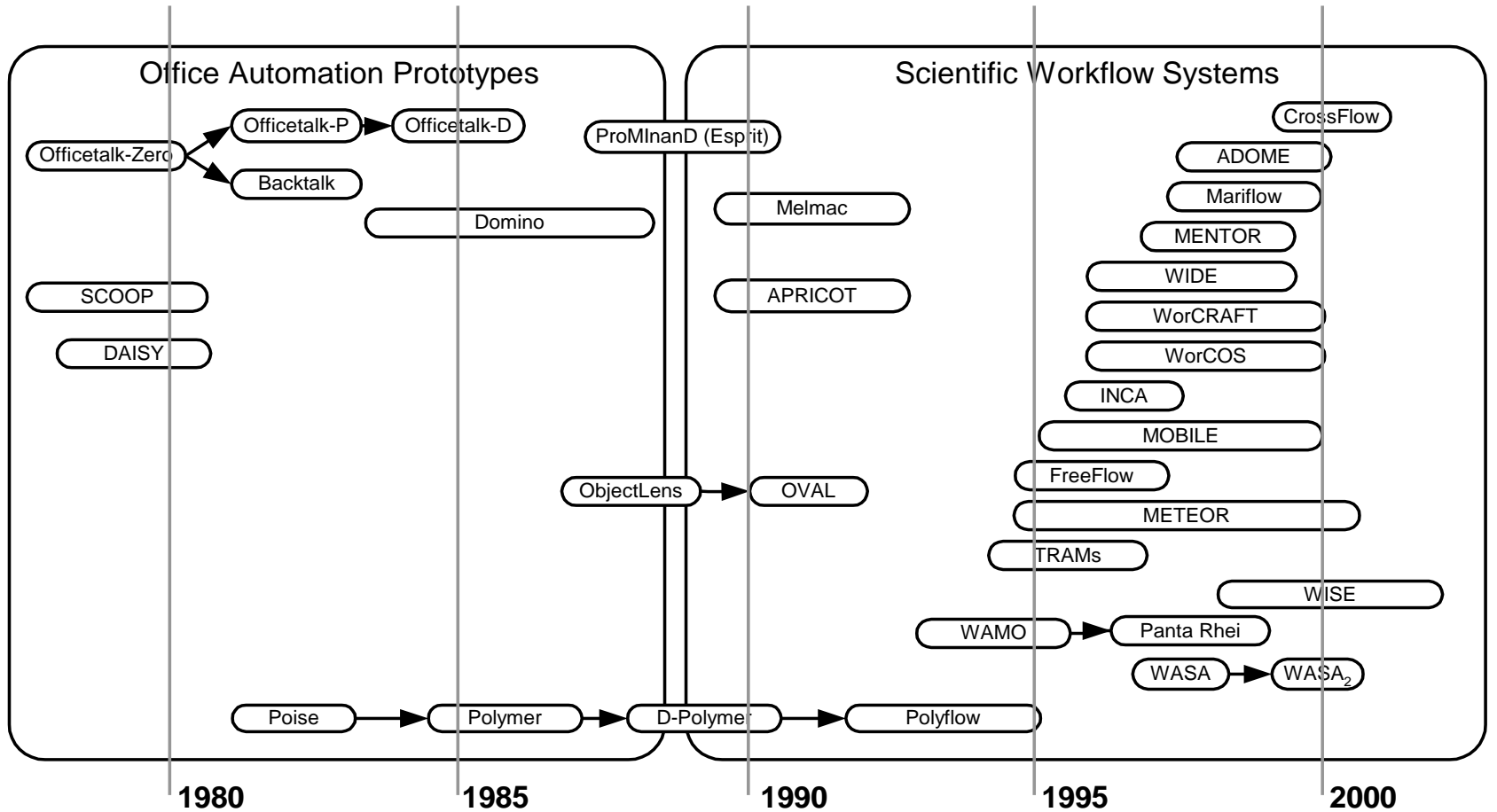


Processos

- Um quebra-cabeças para a organização

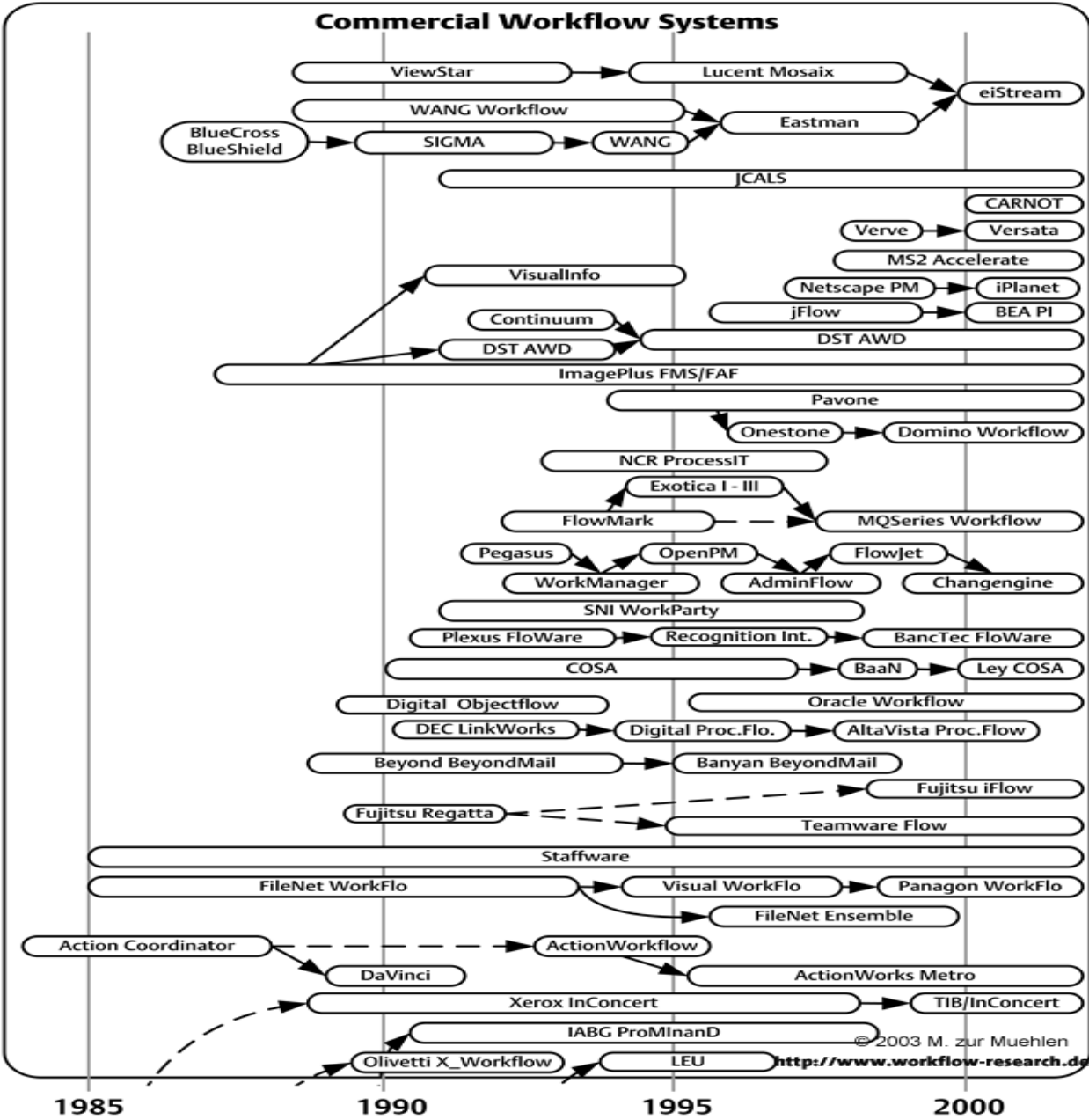


Sistemas de workflow



(M. zur Muehlen, 2003)

Commercial Workflow Systems



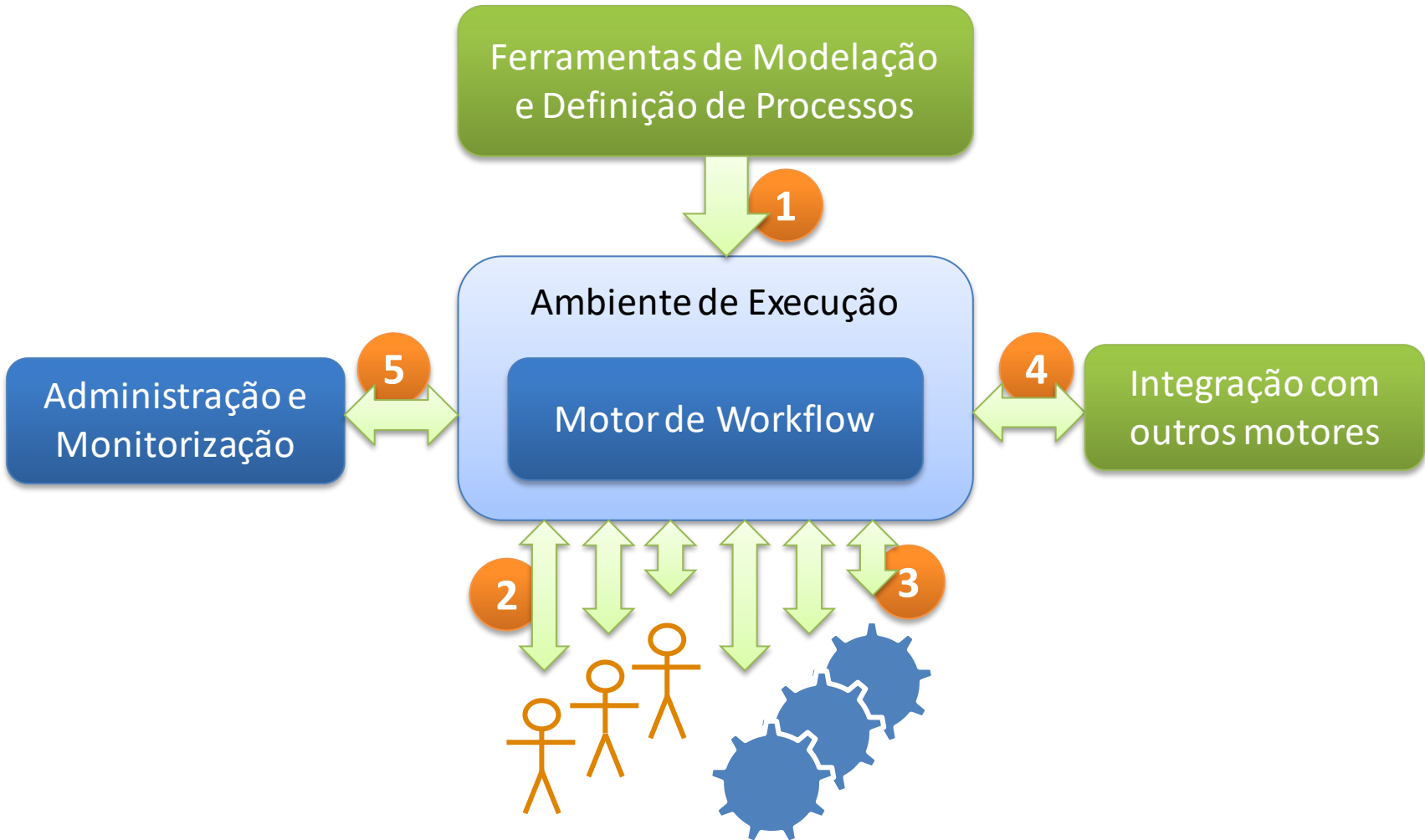
1985

1990

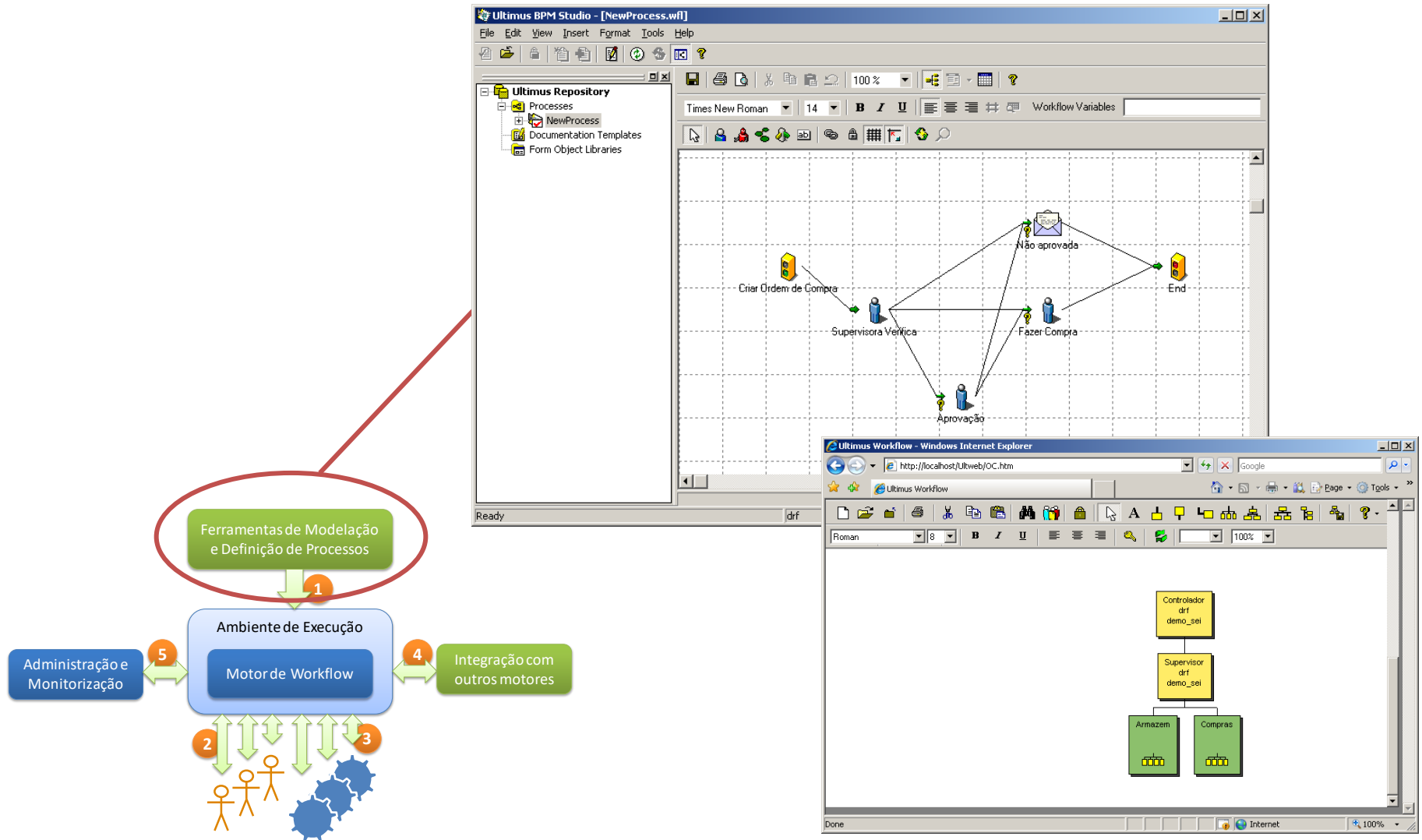
1995

2000

Sistemas de workflow



Sistemas de workflow



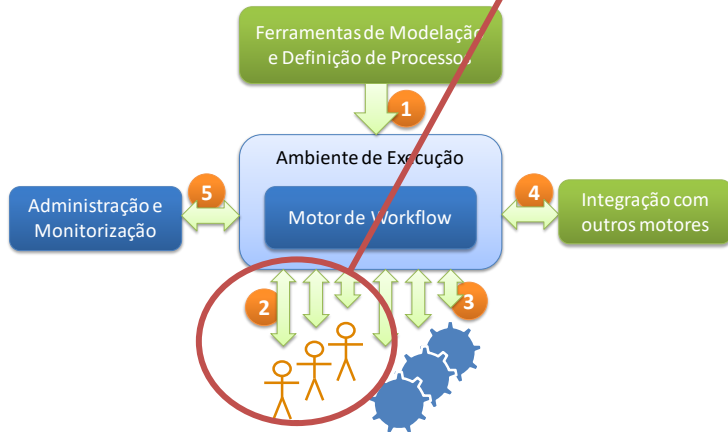
Sistemas de workflow

The screenshot displays the Ultimus Workflow web application. The main window, titled "Ultimus Workflow - Windows Internet Explorer", shows a navigation menu with "Iniciar", "Caixa de Entrada", "Completas", and "Arquivo". Below the menu is a table of process instances:

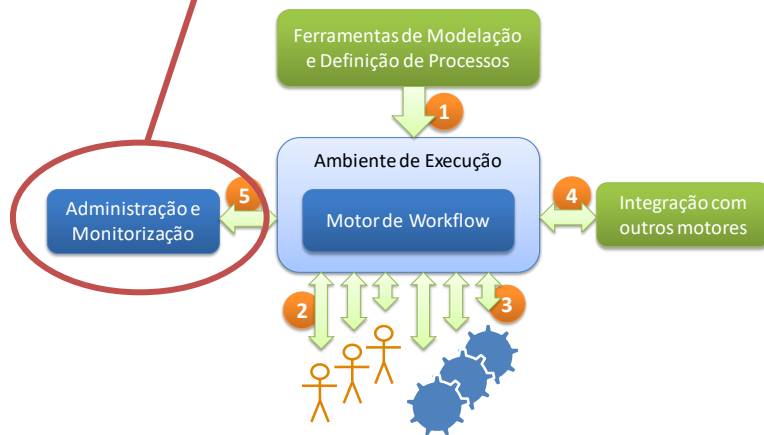
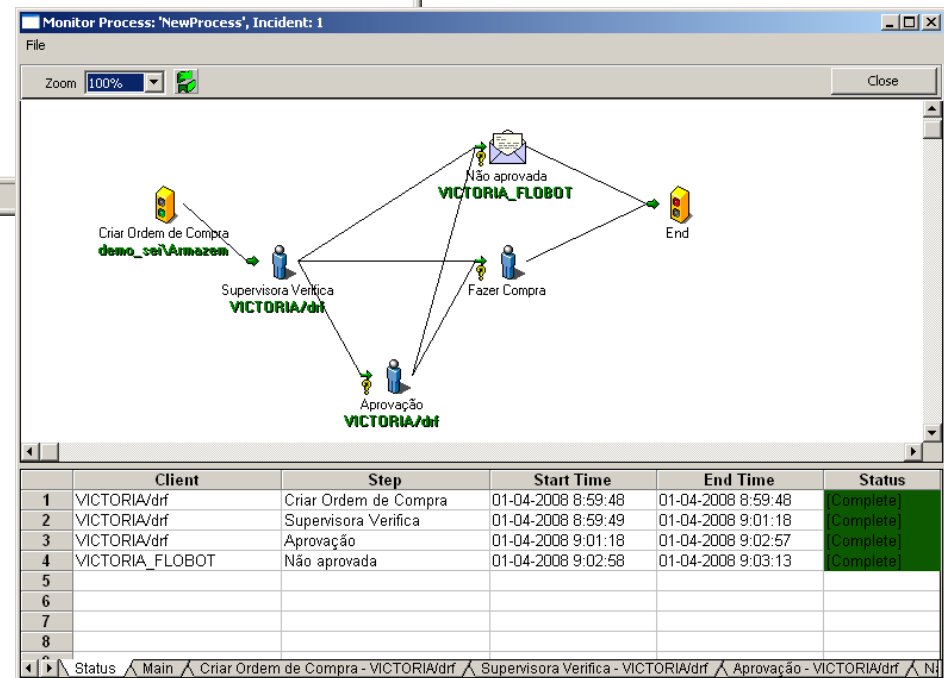
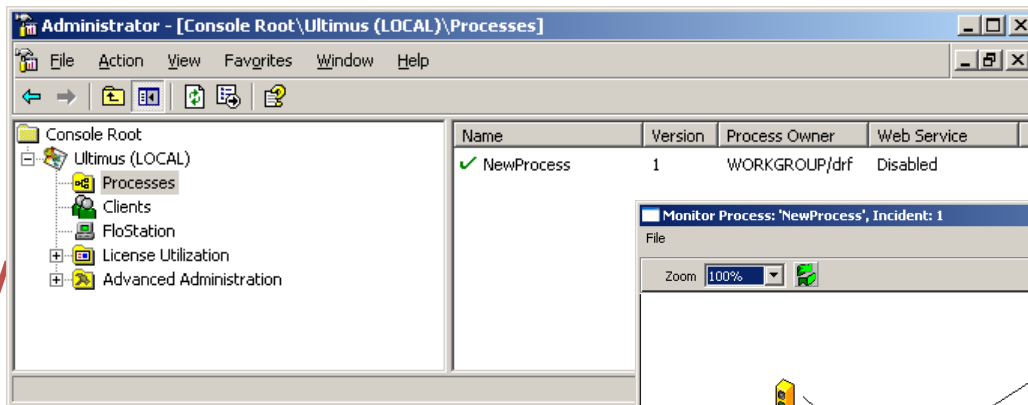
Nome do Processo	Sumário	Incidente n°	Passo	Prioridade	"Intervalo"	Cliente
✓ NewProcess		1	Aprovação	9		drf
✓ NewProcess		1	Supervisora Ver...	9		drf
✓ NewProcess		1	Criar Ordem de ...	9		drf

The secondary window, titled "NewProcess, 0: Criar Ordem de Compra - Windows Internet Explorer", shows a form for creating a purchase order with the following fields:

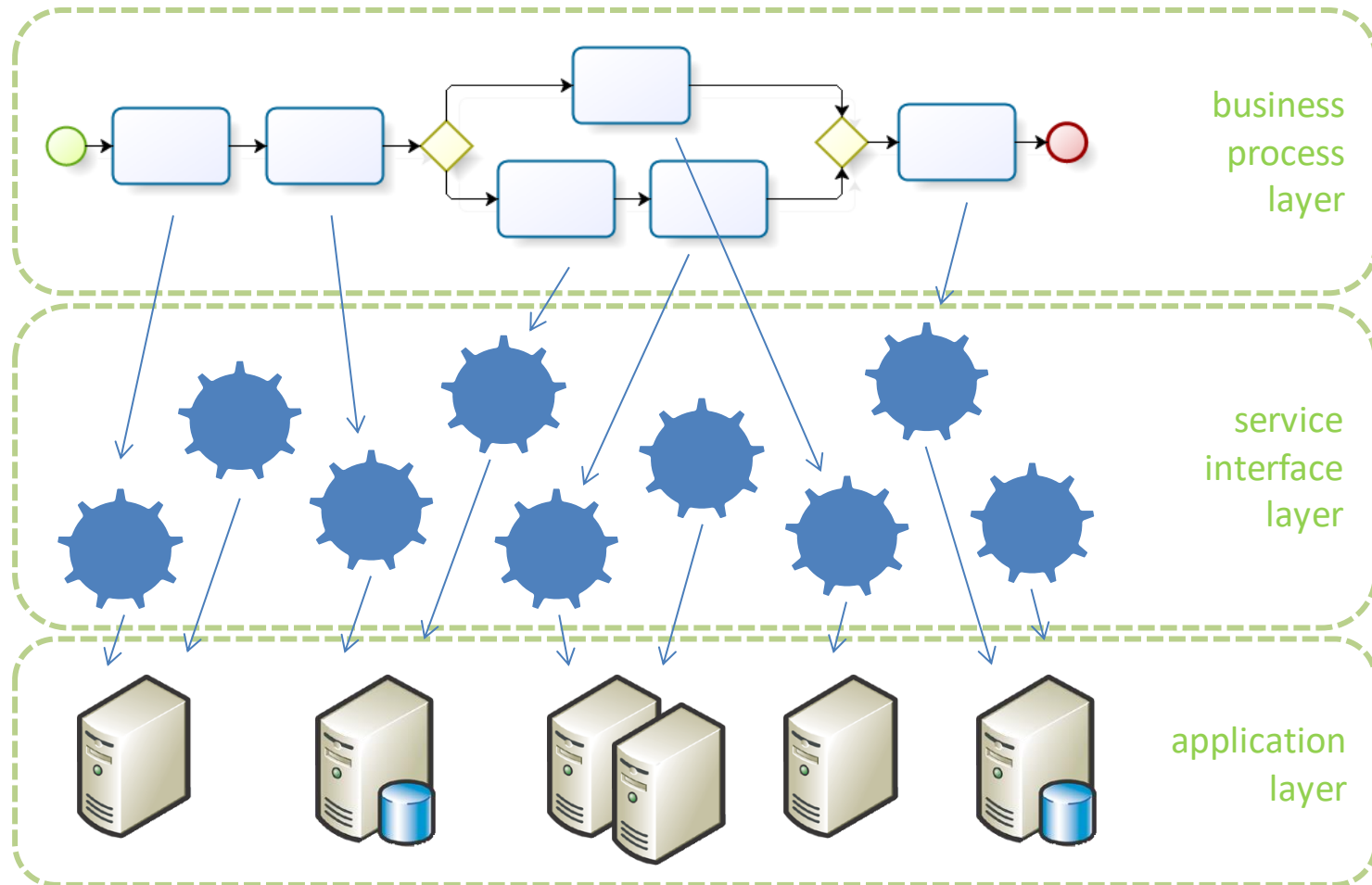
- Nome:
- Email:
- Produto:
- Preco:
- Quantidade:



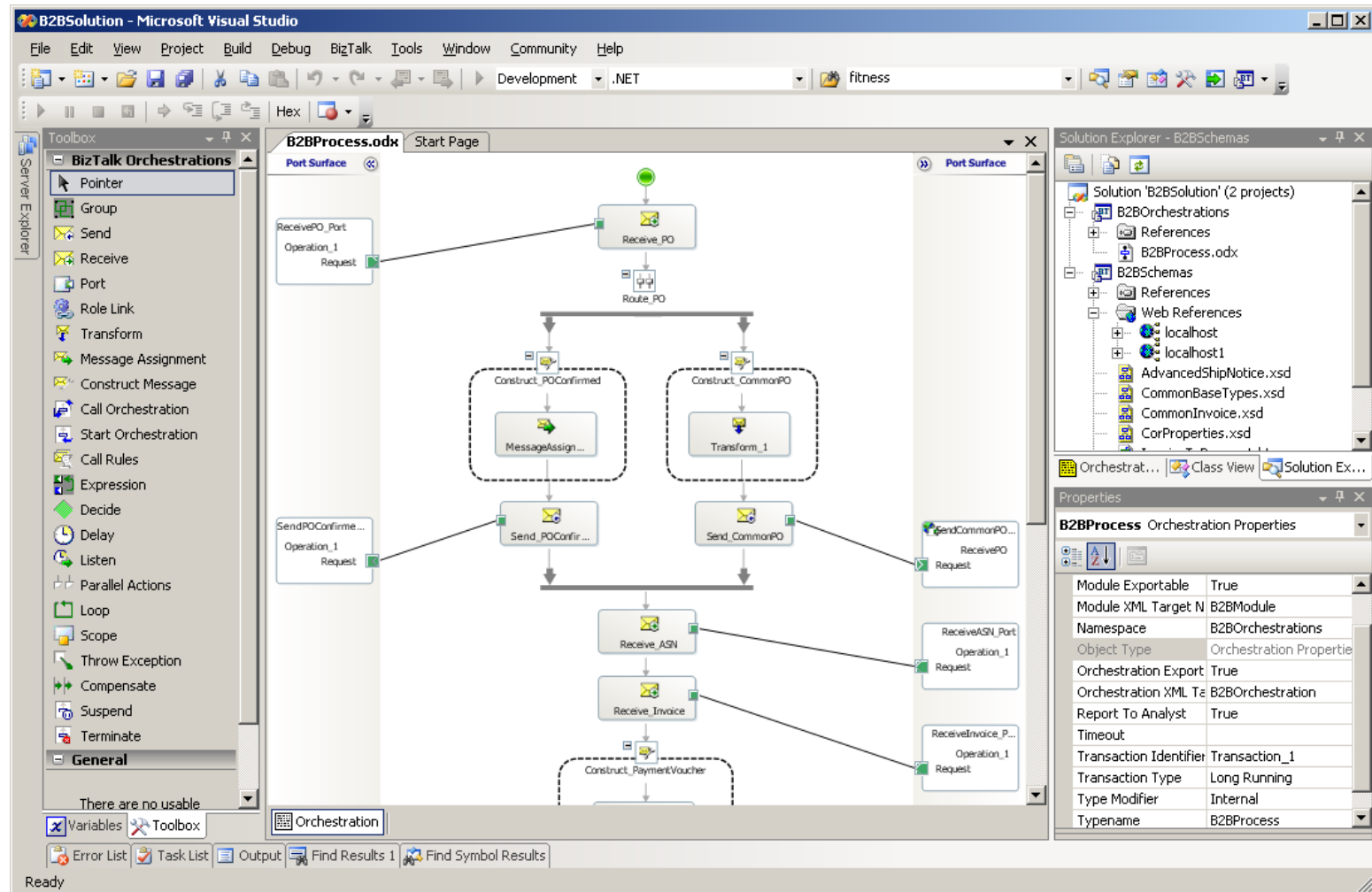
Sistemas de workflow



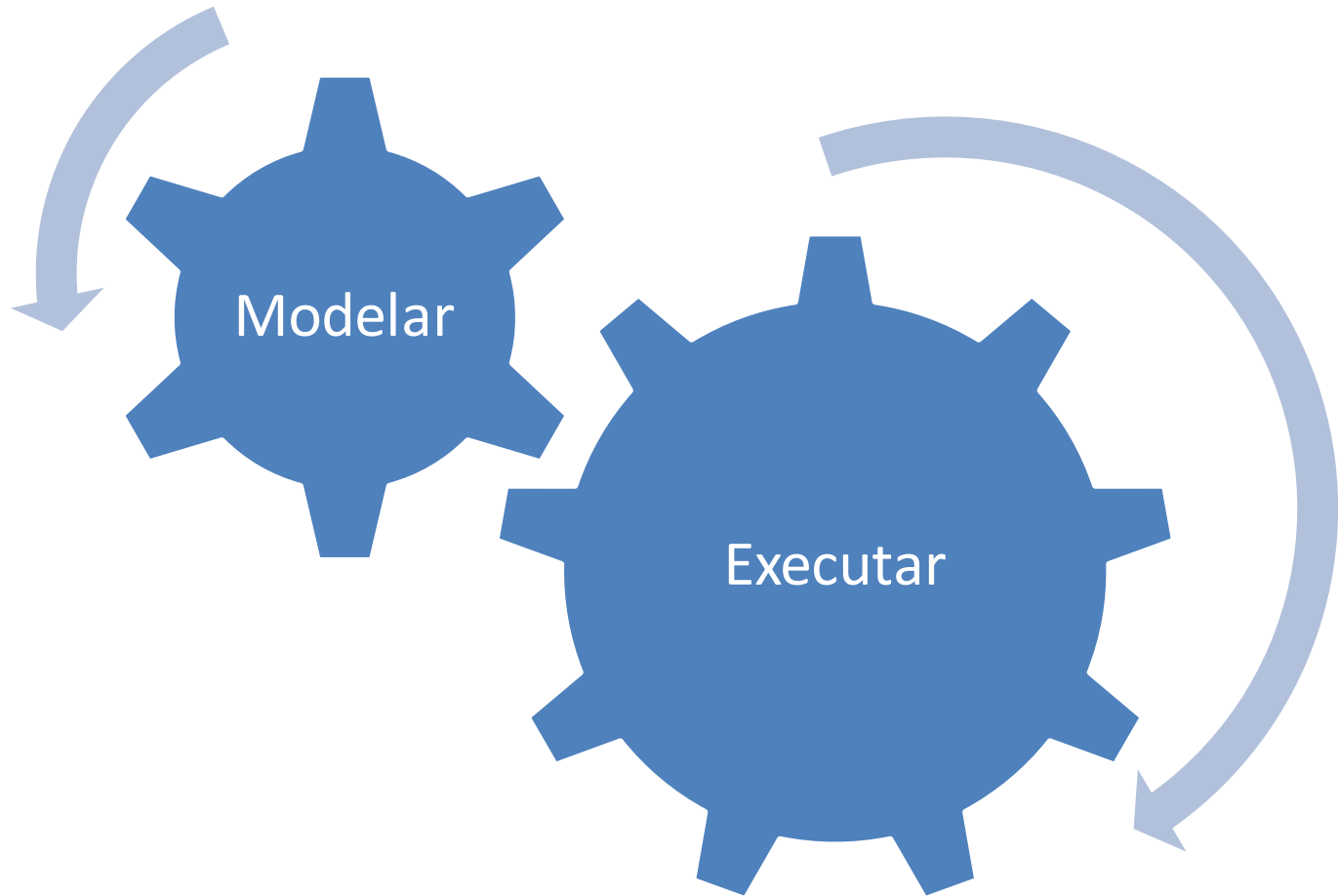
Arquitecturas SOA



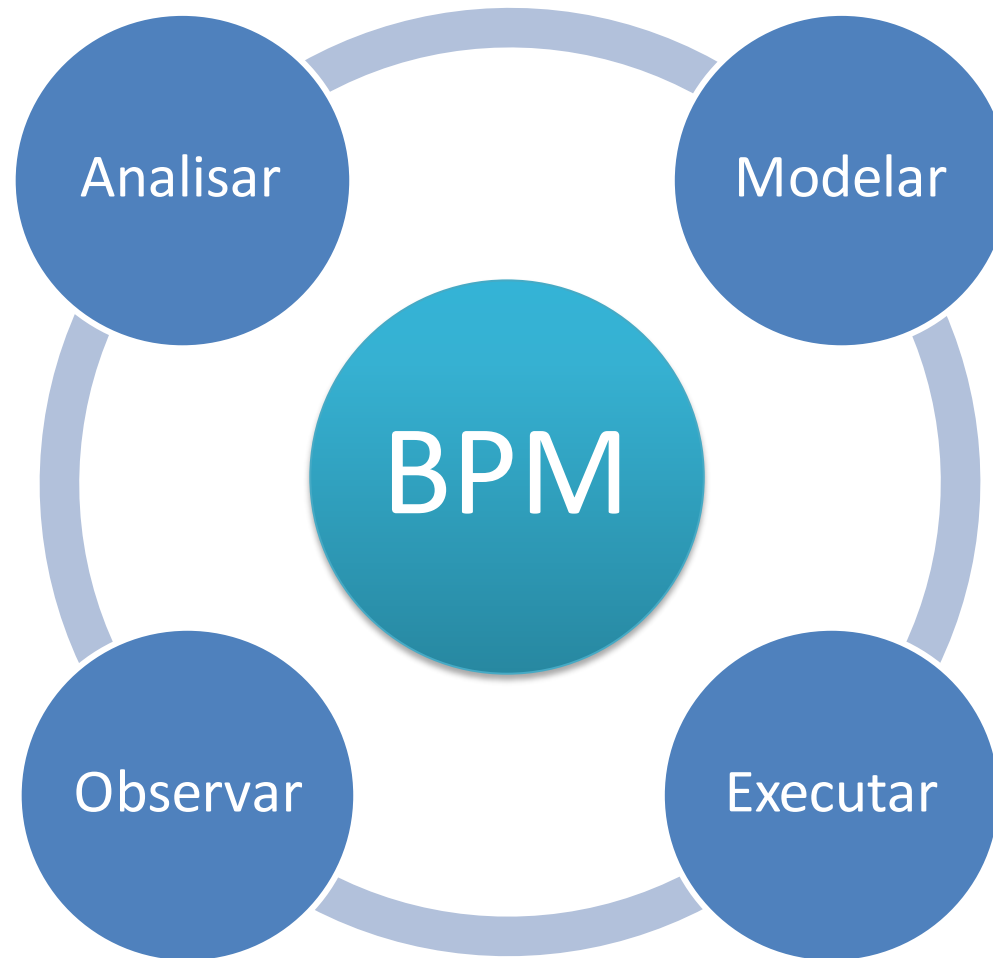
Arquitecturas SOA



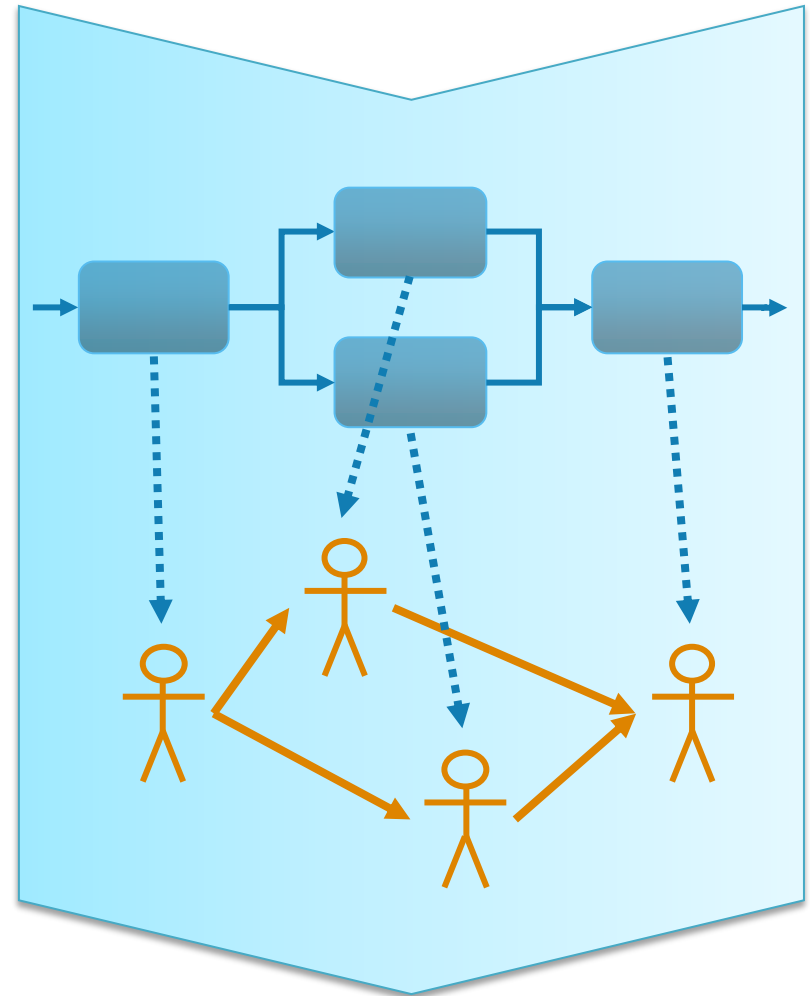
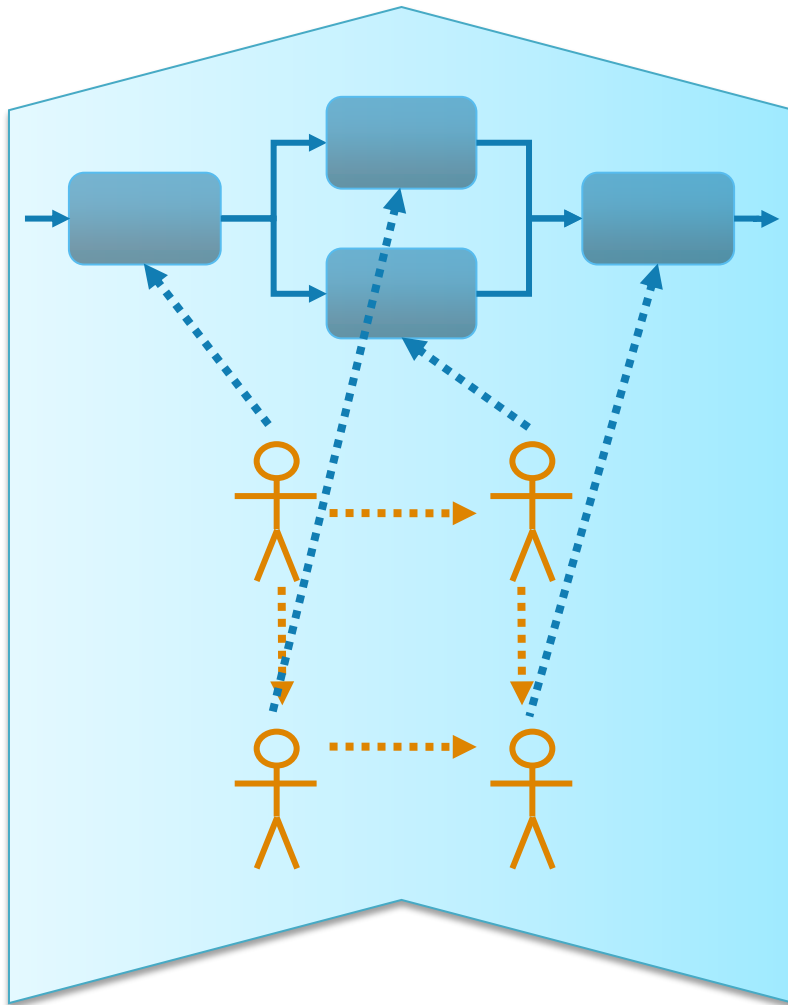
Diferença entre workflow...



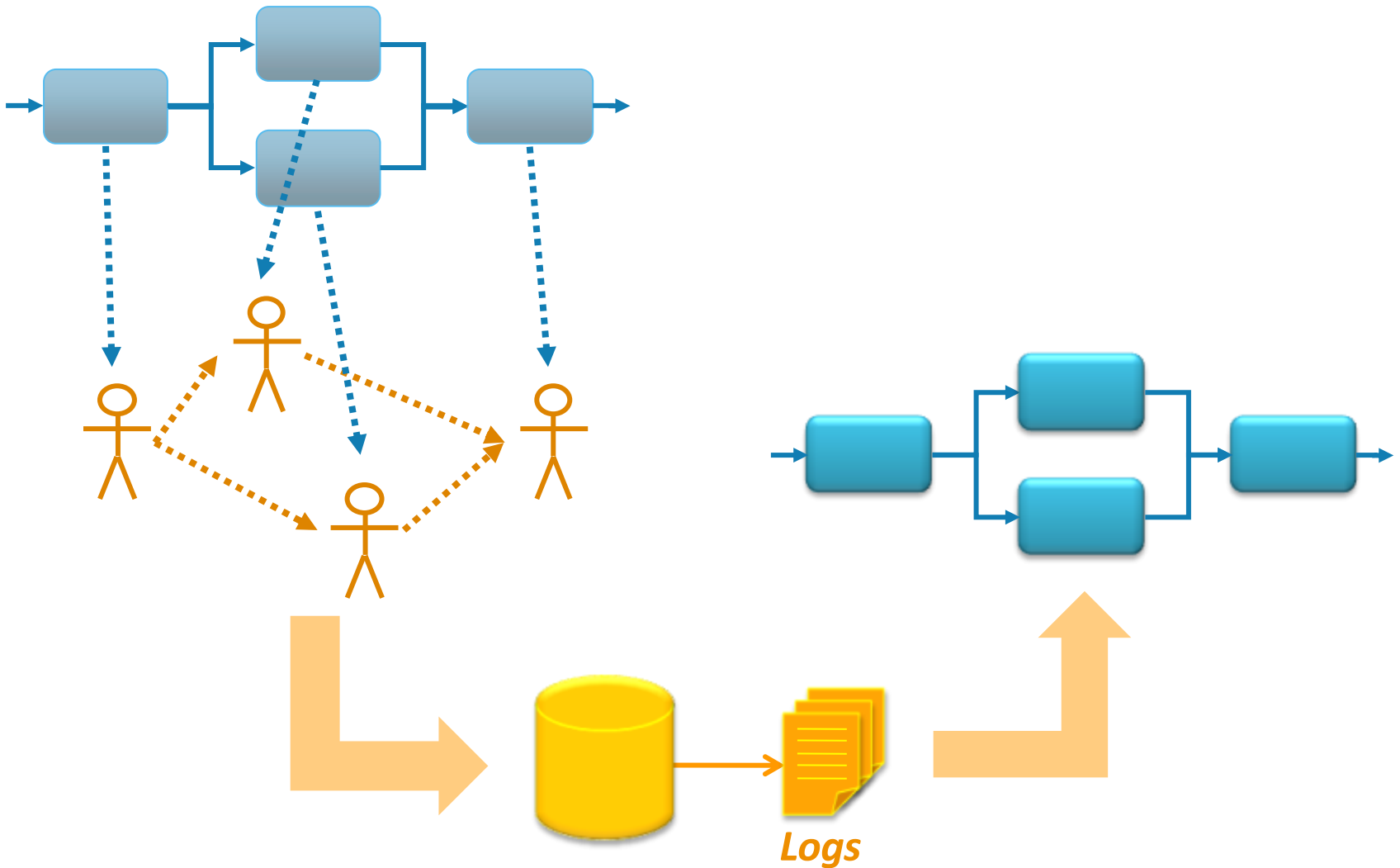
... e BPM



Top-down vs. bottom-up

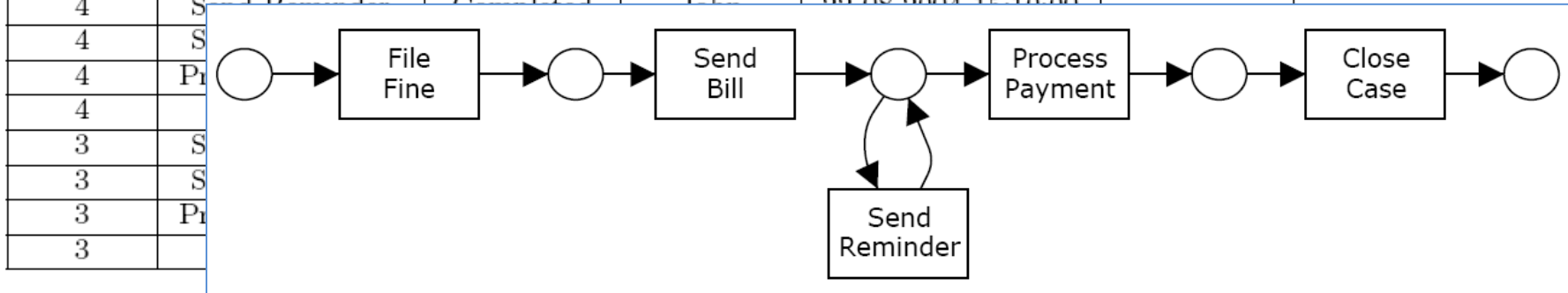


Process mining



Logs e modelos

Case ID	Task Name	Event Type	Originator	Timestamp	Extra Data
1	File Fine	Completed	Anne	20-07-2004 14:00:00	...
2	File Fine	Completed	Anne	20-07-2004 15:00:00	...
1	Send Bill	Completed	system	20-07-2004 15:05:00	...
2	Send Bill	Completed	system	20-07-2004 15:07:00	...
3	File Fine	Completed	Anne	21-07-2004 10:00:00	...
3	Send Bill	Completed	system	21-07-2004 14:00:00	...
4	File Fine	Completed	Anne	22-07-2004 11:00:00	...
4	Send Bill	Completed	system	22-07-2004 11:10:00	...
1	Process Payment	Completed	system	24-07-2004 15:05:00	...
1	Close Case	Completed	system	24-07-2004 15:06:00	...
2	Send Reminder	Completed	Mary	20-08-2004 10:00:00	...
3	Send Reminder	Completed	John	21-08-2004 10:00:00	...
2	Process Payment	Completed	system	22-08-2004 09:05:00	...
2	Close case	Completed	system	22-08-2004 09:06:00	...
4	Send Bill	Completed	system	22-08-2004 15:10:00	...



A.K. de Medeiros, A.J.M.M. Weijters, "ProM Framework Tutorial", Eindhoven.
 University of Technology, Eindhoven, The Netherlands, November 2006

ProM

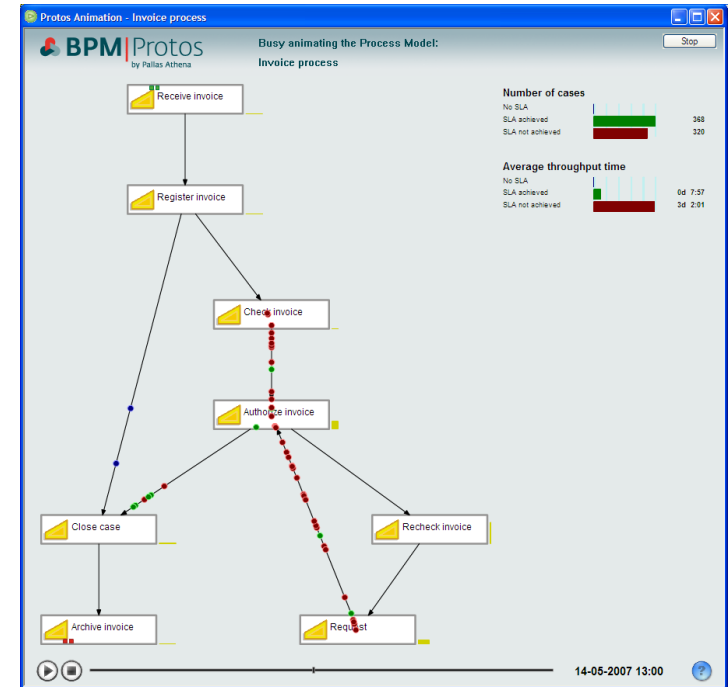
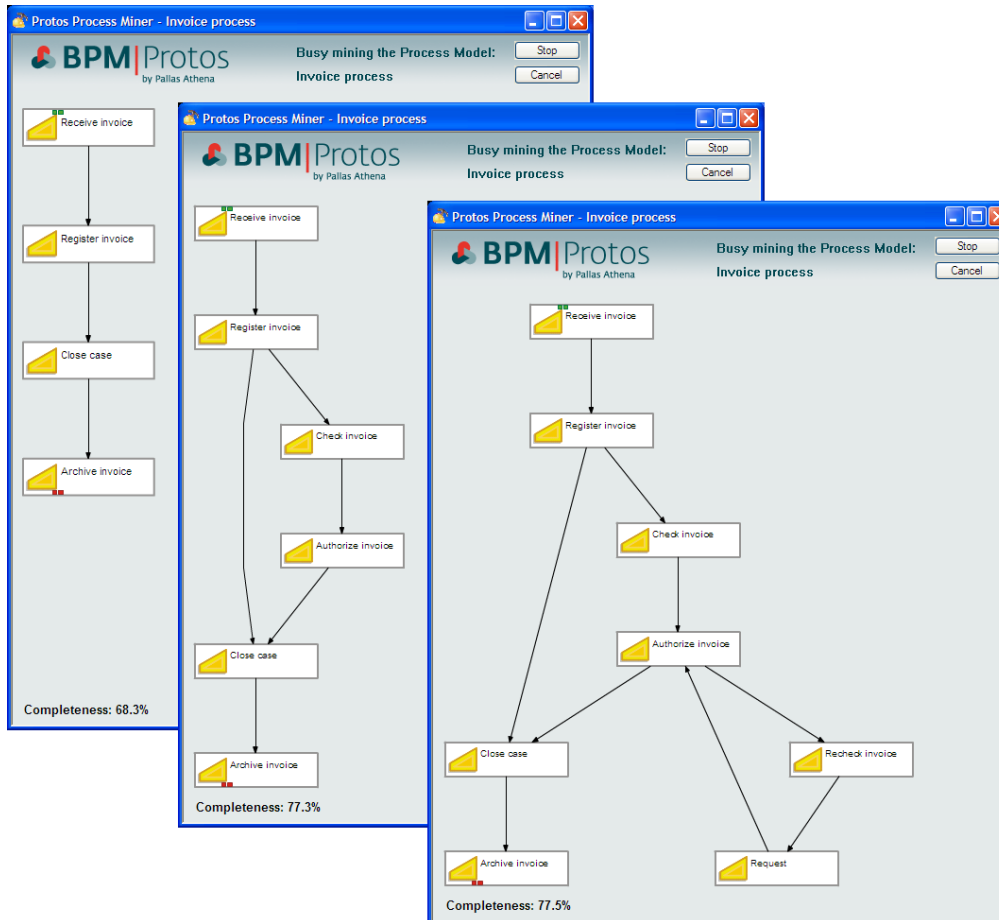
The image displays several overlapping windows from the ProM software interface. The top window shows a menu with options like 'Multi-phase Macro Plugin', 'Partial Order Generator', 'Heuristics miner', 'DWS mining plugin', 'Association Rule Miner', 'Genetic algorithm plugin', 'Duplicate Tasks GA plug-in', 'Alpha algorithm plugin', and 'Tsinghua-alpha algorithm plugin'. Below this, a 'Log events' window shows a list of events and a 'Log Traces' window with a list of event IDs (1, 10, 100, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 101). The main window shows a Petri net diagram with nodes and transitions, and a 'Process information' panel on the right. The 'Process information' panel includes the following data:

Throughput time (minute)	
avg	66.59
min	29.0
max	159.0
stddev	19.45
first	45.7

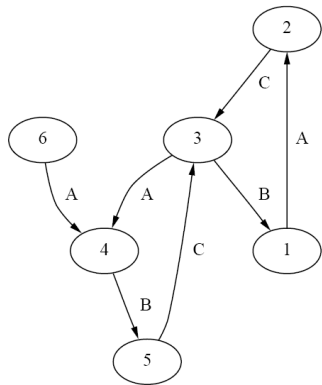
Other panels include 'Workflow log information', 'Event types', and 'Process mining' status messages. The bottom status bar shows 'Normal', 'Warning', 'Error', and 'Debug' indicators.

<http://www.processmining.org/>

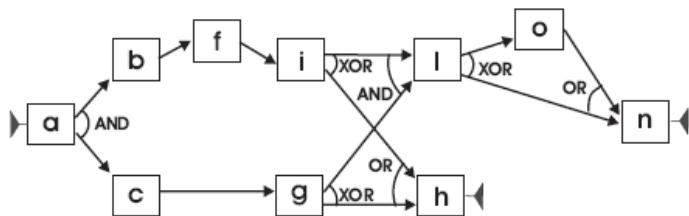
Ferramentas comerciais



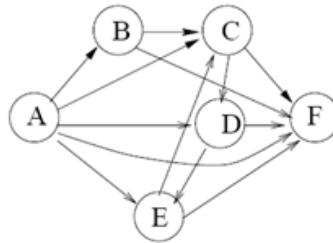
Investigação



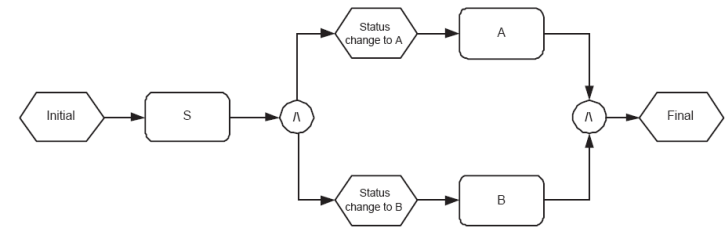
Finite State Machines
(Cook, 1995)



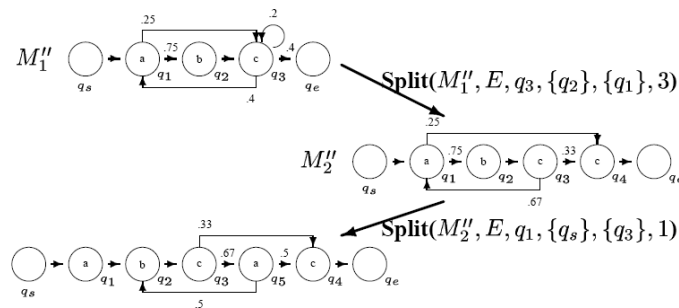
Workflow Schemas
(Greco, 2005)



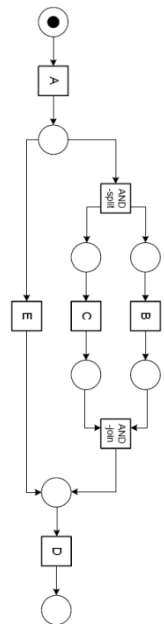
Directed acyclic graphs
(Agrawal, 1998)



Event-Driven Process Chains
(Dongen, 2004)

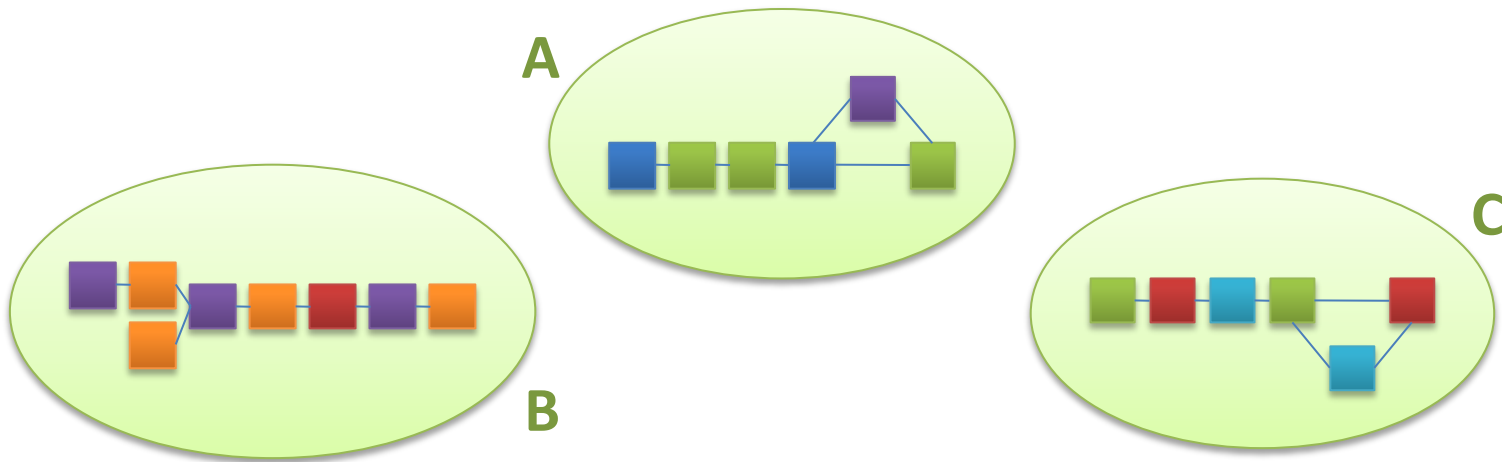
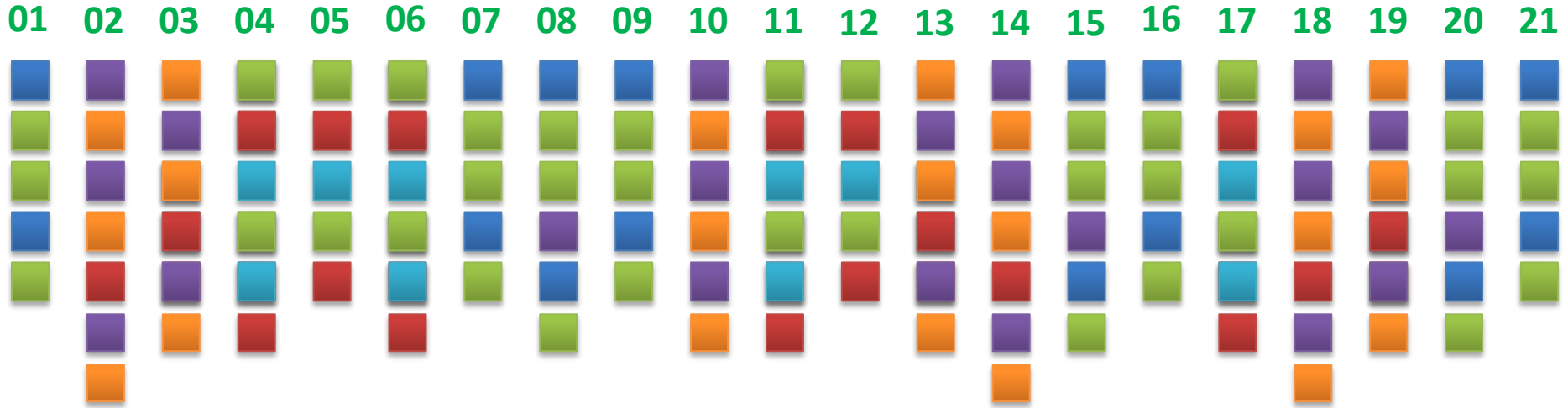


Hidden Markov Models
(Herbst, 1998)



Petri Nets
(Aalst, 2003)

Sequence clustering



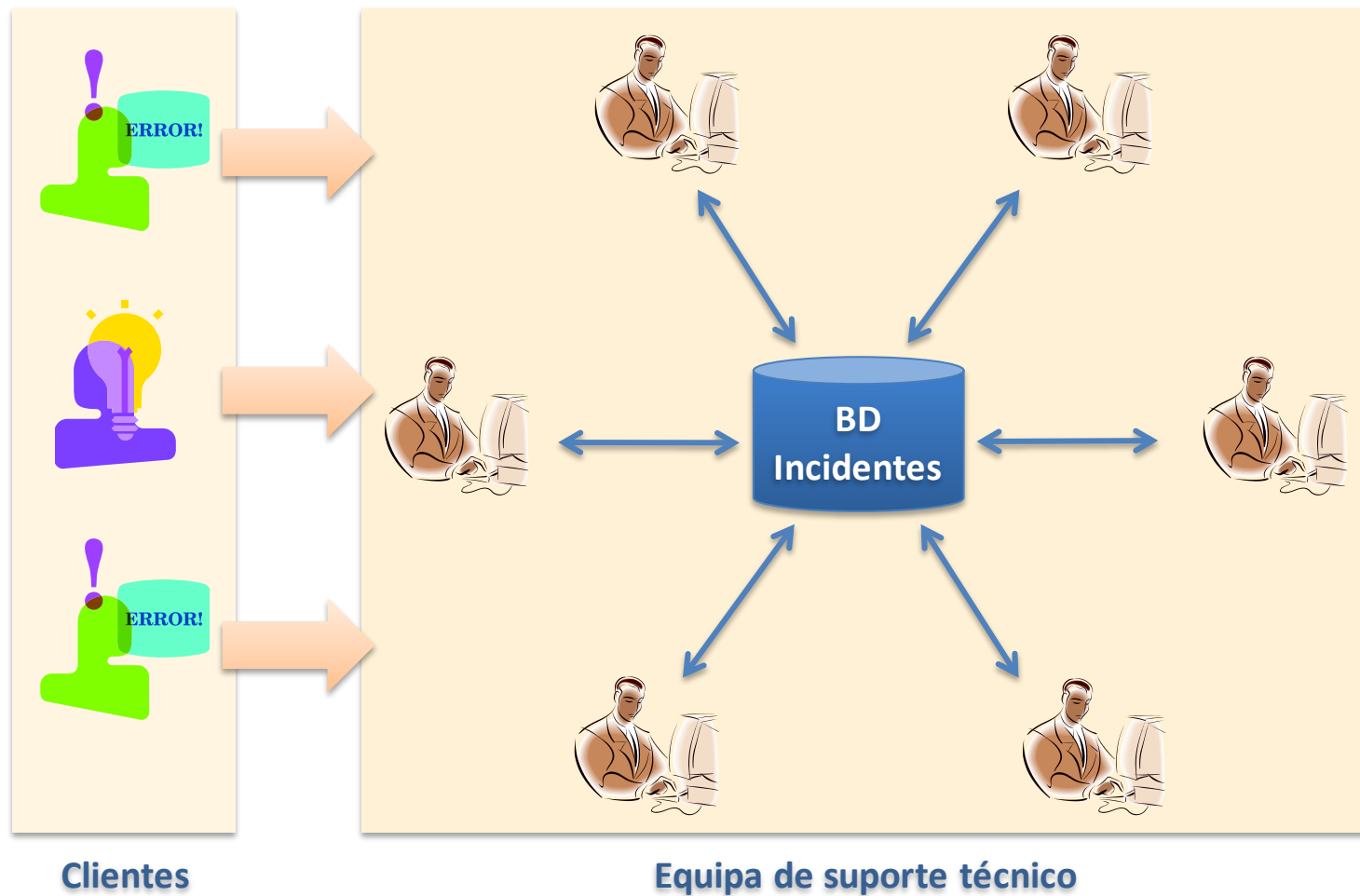
Caso de estudo

- Empresa de software

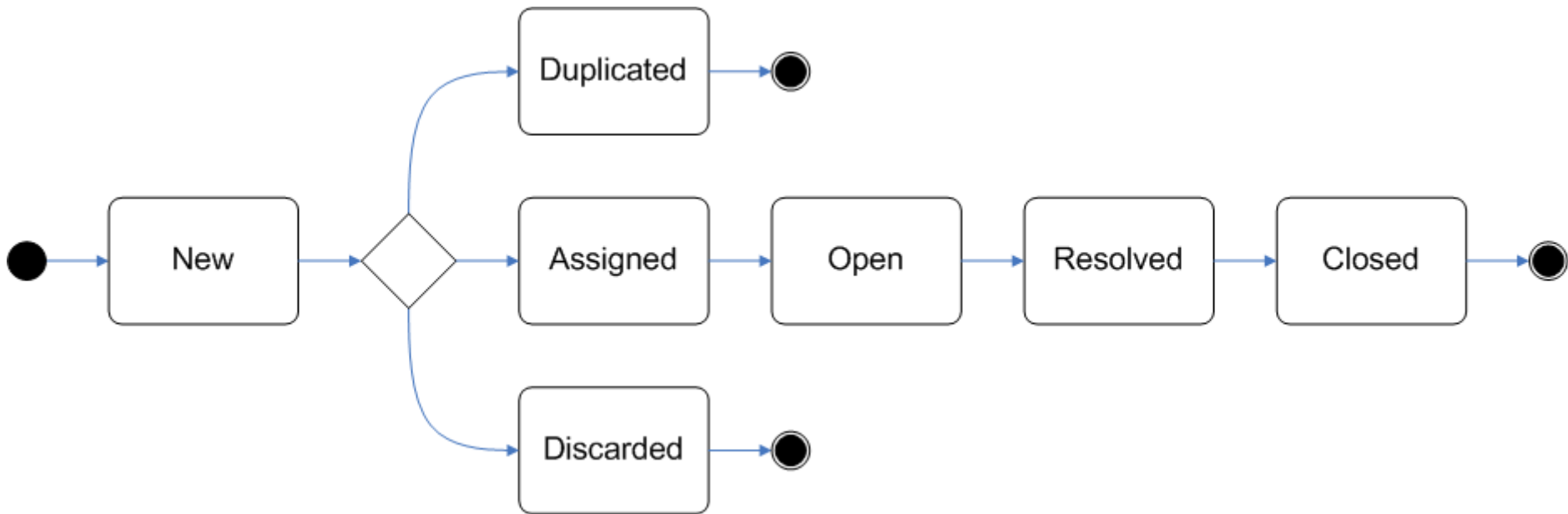
- plataforma complexa de desenvolvimento de aplicações
- novas funcionalidades em sucessivas *releases*
- testes exaustivos *in-house*
 - tanto manuais como automáticos
- clientes têm papel activo
 - funcionalidades desejadas
 - problemas encontrados
- equipa de suporte técnico / tratamento de incidentes



Caso de estudio

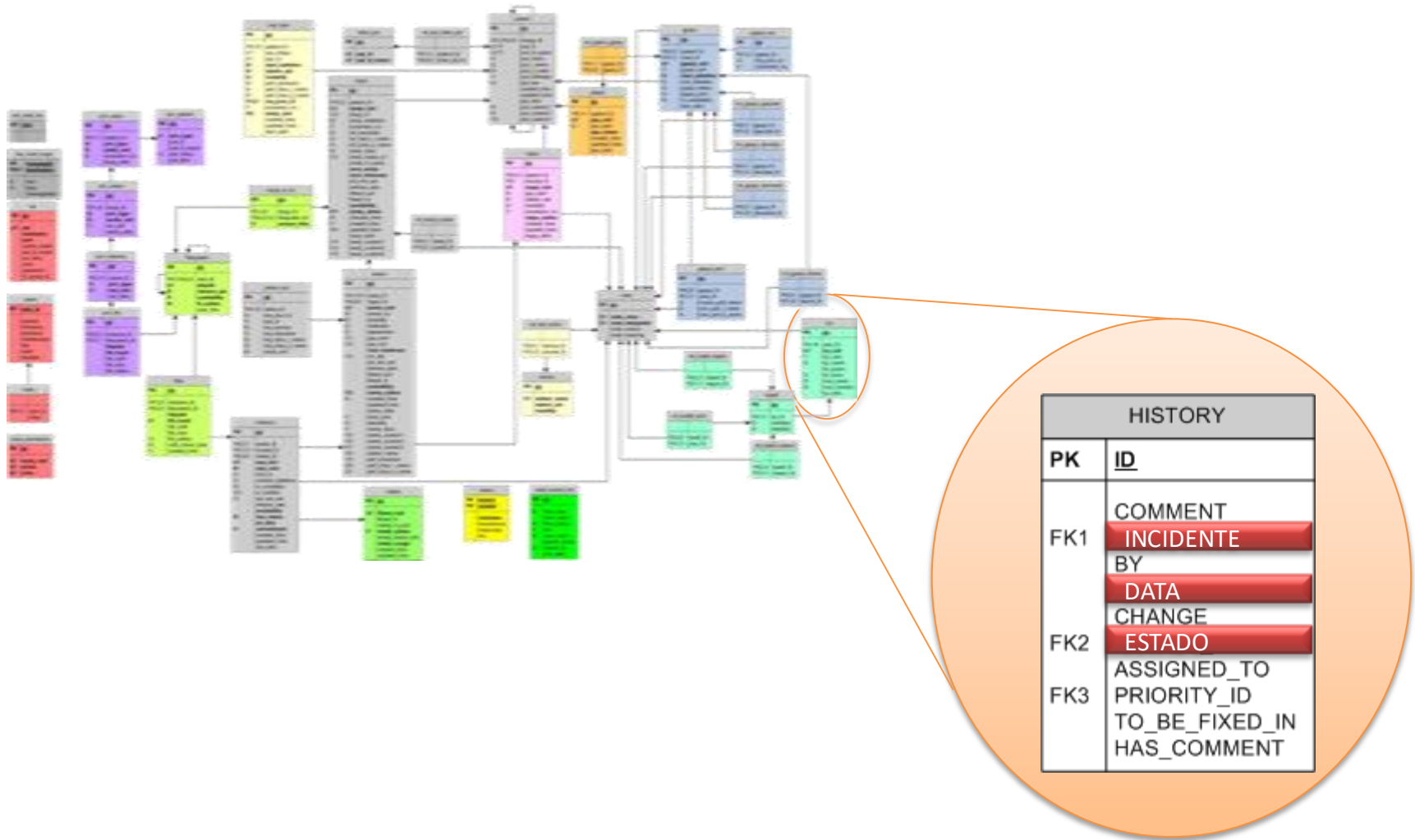


Caso de estudio



ITIL Incident Management

Base de dados do sistema



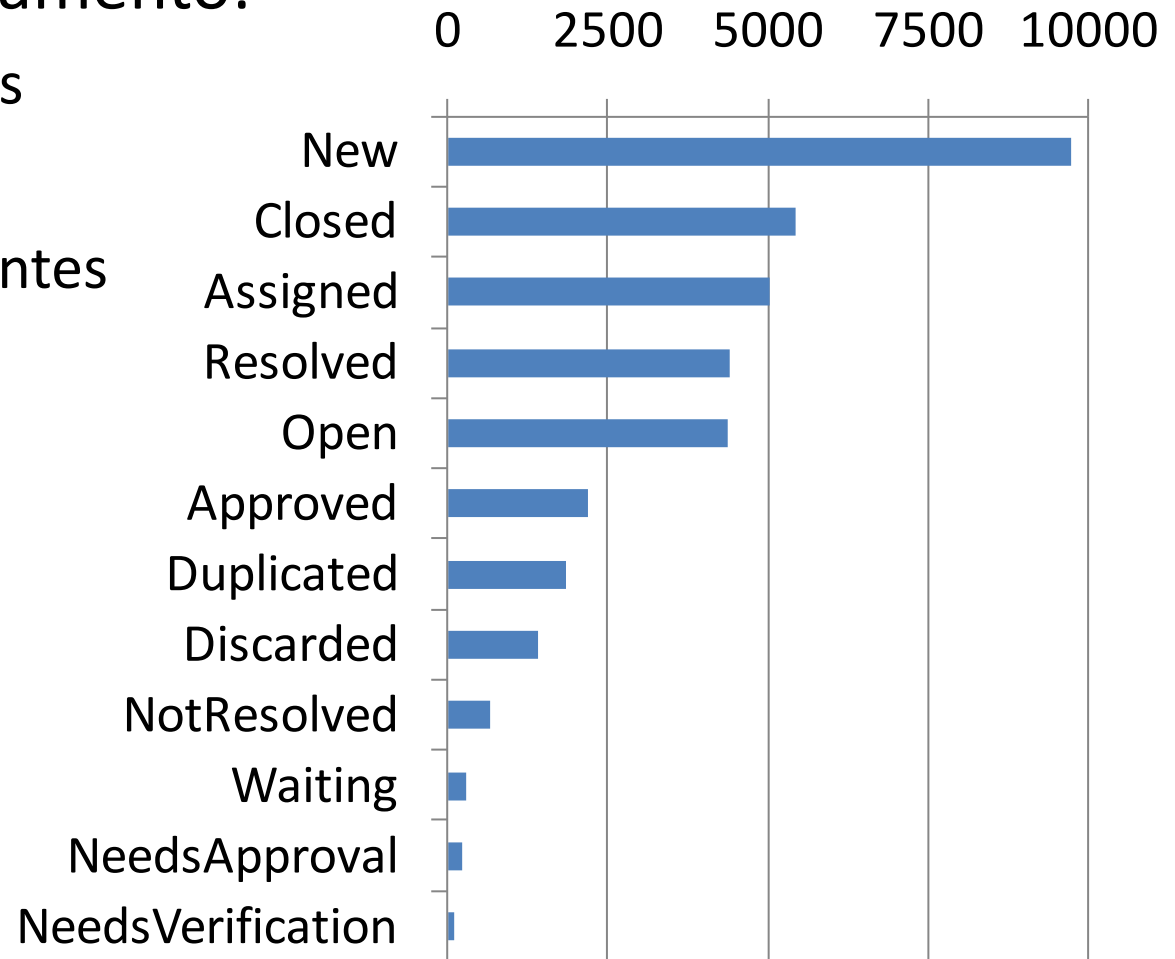
Estados

- após pré-processamento:

~ 11 000 incidentes

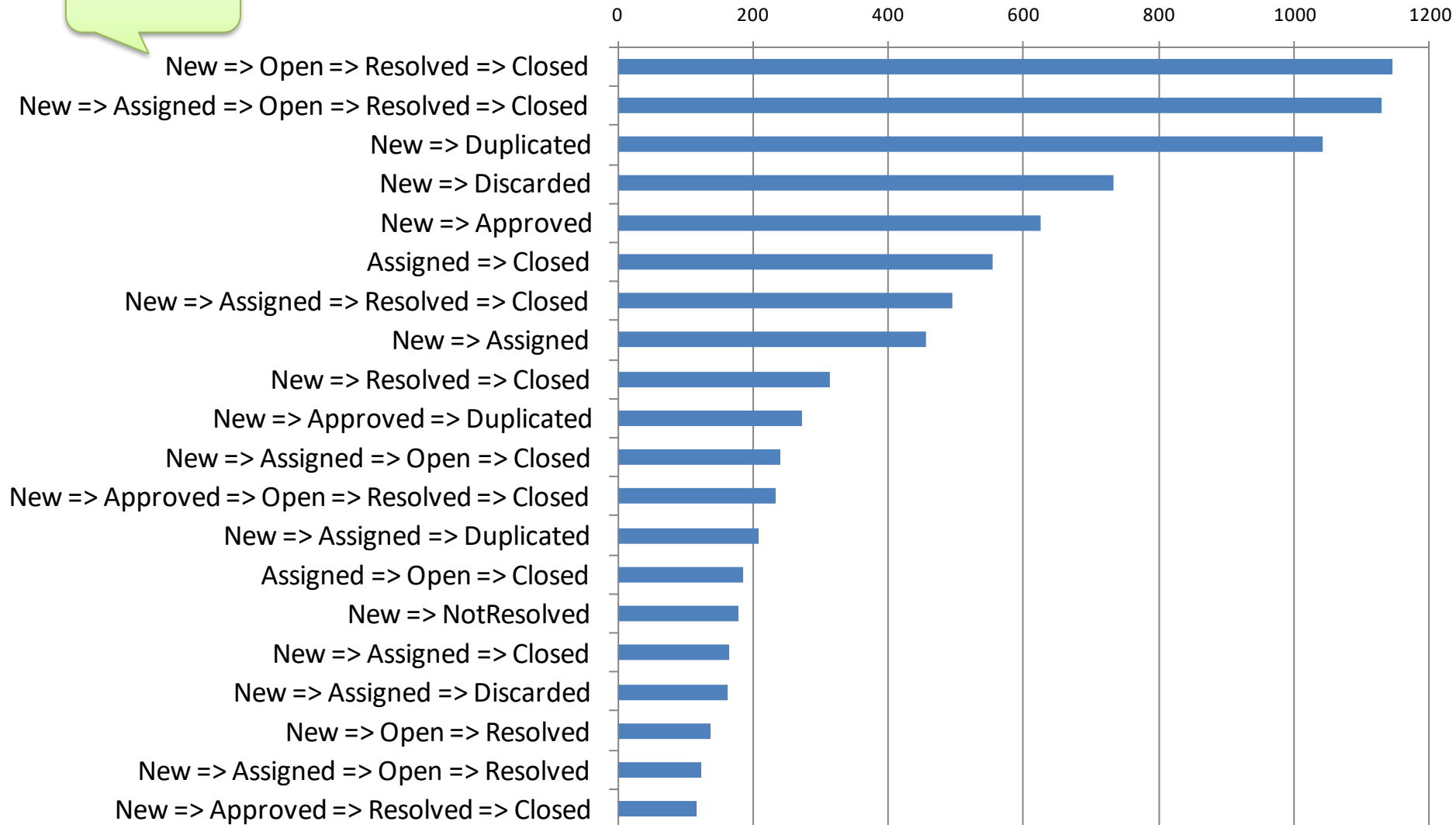
~ 36 000 eventos

~ 12 estados diferentes

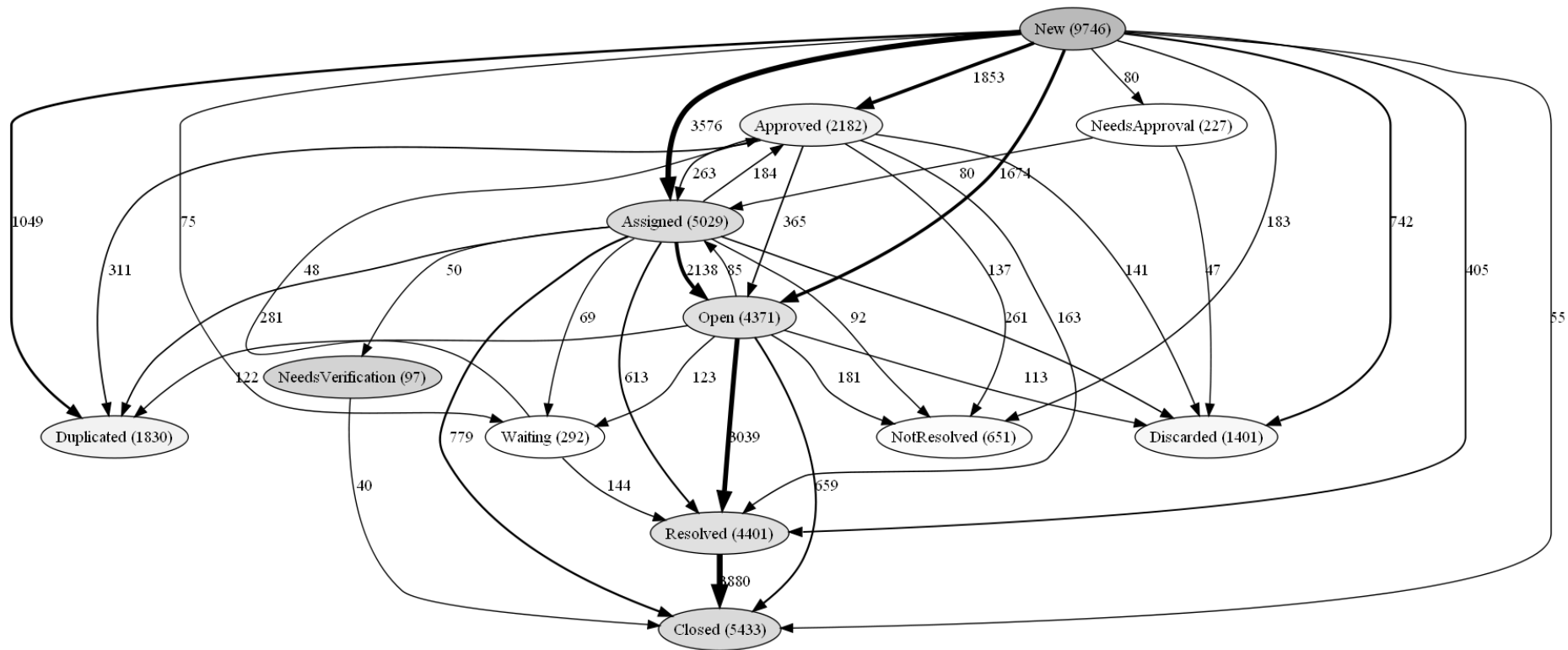


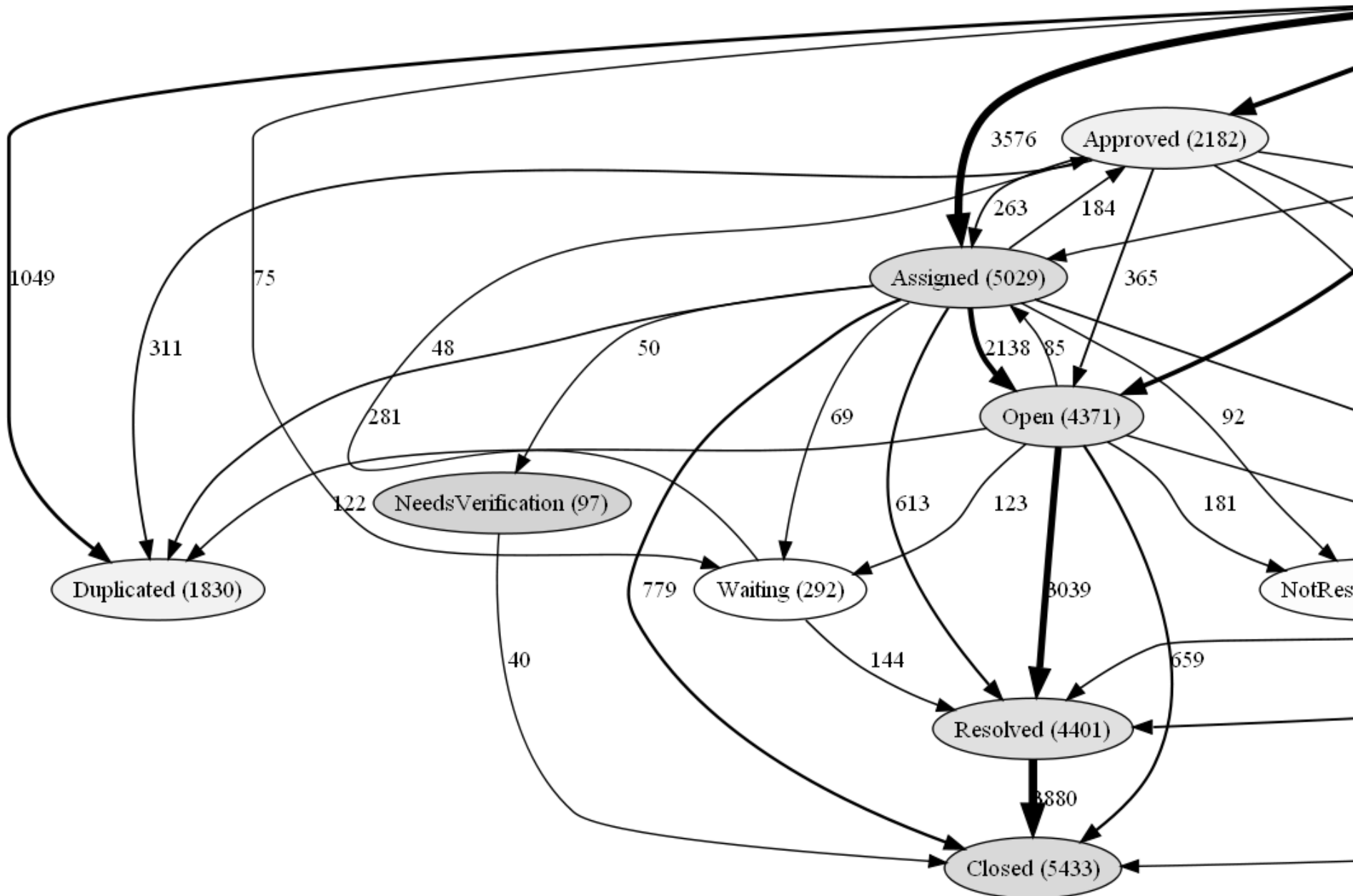
Sequências mais frequentes

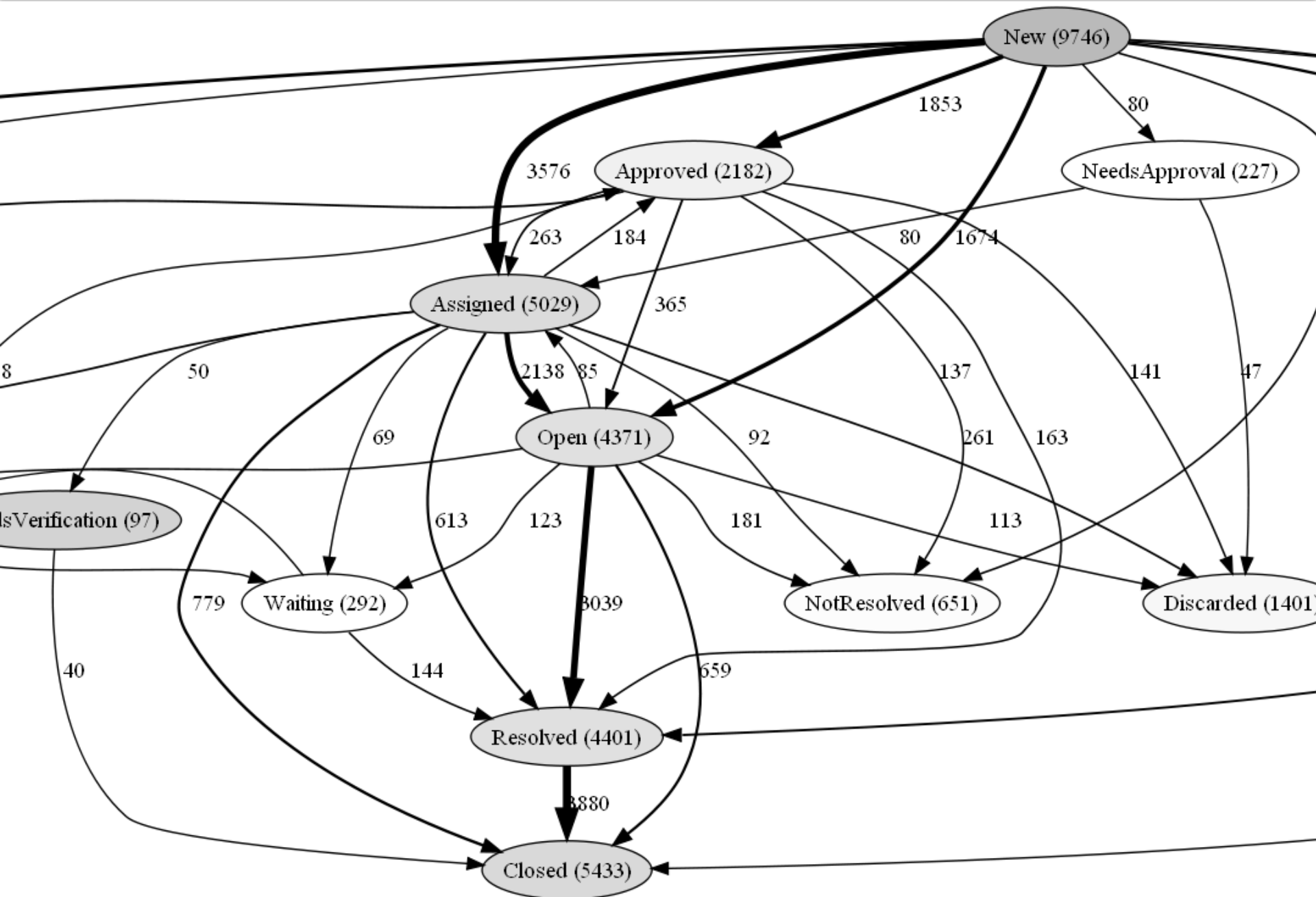
10.3%

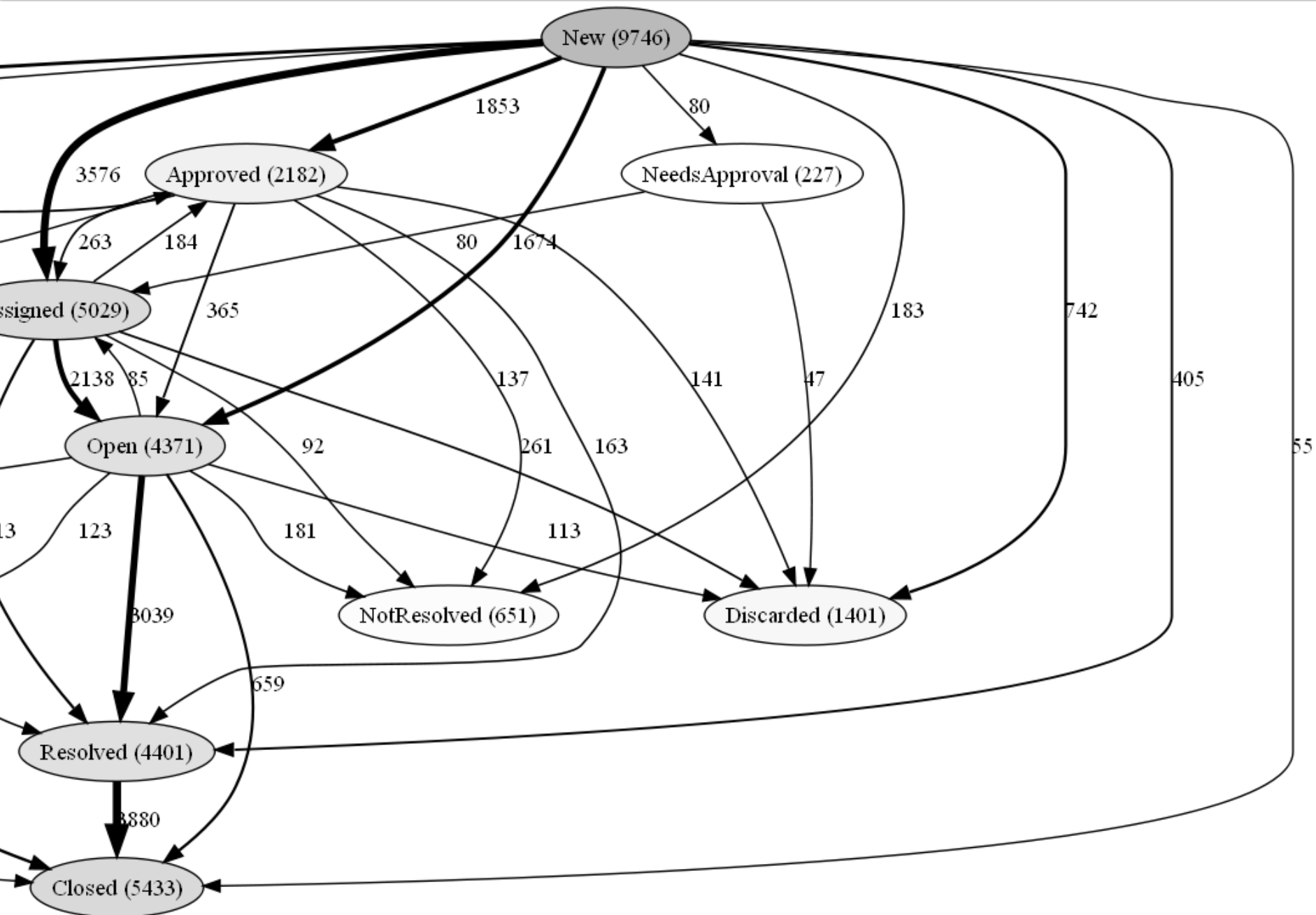


Transição de estado









Conclusão

- BPM e o ciclo de gestão de processos
- componentes *top-down* e *bottom-up*
- descoberta de processos (*process mining*)
- técnicas e ferramentas existentes
- resultados e benefícios

Mais info...

- Process Mining Group: <http://www.processmining.org/>
- ProM Framework: <http://prom.sourceforge.net/>
- Process Mining TV: <http://qa1717.tm.tue.nl/user/christian/pmtv/>
- W.M.P. van der Aalst and A.J.M.M. Weijters, *Process Mining: A Research Agenda*, Computers in Industry, vol.53, no.3, pp.231-244, 2004
- A. Rozinat, W. van der Aalst, *Conformance checking of processes based on monitoring real behavior*, Information Systems, vol.33, no.1, 2008
- D. Ferreira, M. Zacarias, M. Malheiros, P. Ferreira, *Approaching Process Mining with Sequence Clustering: Experiments and Findings*, 5th International Conference on Business Process Management (BPM 2007), LNCS 4714, Springer, 2007
- D. Ferreira, M. Mira da Silva, *Using Process Mining for ITIL Assessment: a Case Study with Incident Management*, Proceedings of the 13th Annual UKAIS Conference, Bournemouth University, April 10-11, 2008