

# Application of Process Mining Techniques for Innovation Analysis and support

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## Introduction

Open Innovation paradigm [1]:

- Innovation projects results are strongly affected by intra-organization and inter-organizations collaborations
- Improving collaborative skills is a hot topic for innovation managers

Innovation as a collaborative process:

- Uncertain and unstructured
- Expert-driven

Need of systematic methodologies able to investigate and support collaborative tasks.

## Objective

Discovering knowledge models on **Common Collaboration Practices** with the aim of supporting and improving collaborative projects.

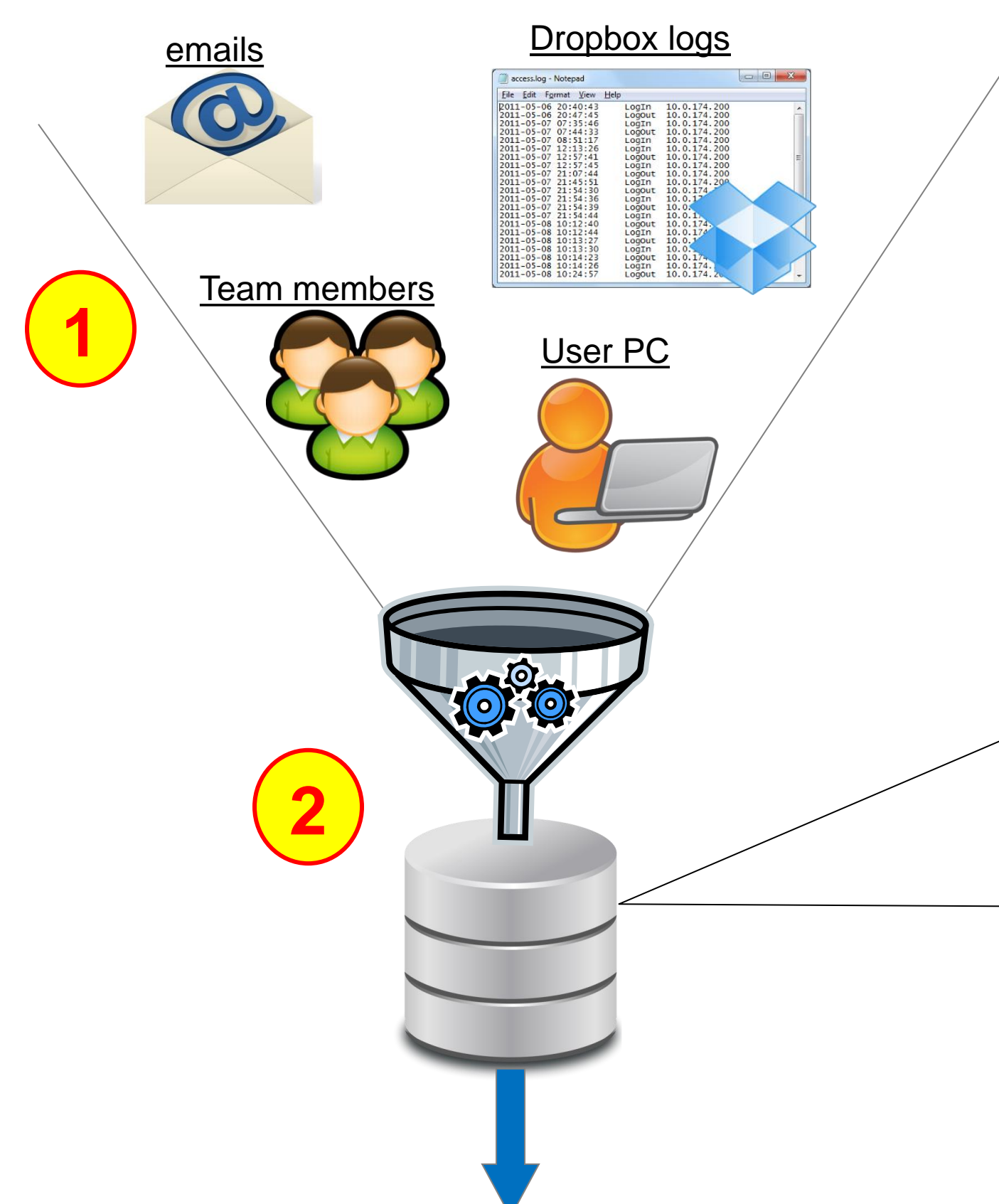
## Main issues in target scenarios

- Data retrieval: identification of suitable data sources
- Integration and synchronization of distributed and heterogeneous data
- Analysis of “spaghetti process”[3], with little or no structure

## Research Approach

- **Process Driven strategy**
  - Information extracted from data usually collected by enterprise informative systems
    - ERP logs, emails, file versioning...
- **Pattern Discovery Techniques**
  - Hierarchical clustering of sub-processes.
  - Identifying the most frequent and important collaboration patterns

## Methodology



Case id	Timestamp	Activity	Resource	...
1	30-12-2010:11.02	a	Pete	
	31-12-2010:10.06	c	Sue	
	05-01-2011:15.12	a	Mike	
	06-01-2011:11.18	a	Sara	
	06-01-2011:11.23	c	Pete	
	07-01-2011:14.24	d	Mike	
2	30-12-2010:11.32	b	Mike	
	30-12-2010:12.12	a	Mike	
	30-12-2010:14.16	c	Pete	
	05-01-2011:11.22	a	Sara	
	05-01-2011:11.40	c	Ellen	
	08-01-2011:12.05	b	Pete	
3	30-12-2010:14.32	a	Pete	
	30-12-2010:15.06	c	Mike	
	30-12-2010:16.34	z	Ellen	
	06-01-2011:09.18	d	Sara	
	06-01-2011:12.18	h	Sara	
	06-01-2011:13.06	g	Sean	
	08-01-2011:11.43	z	Pete	
	09-01-2011:09.55	d	Sara	
	15-01-2011:10.45	f	Ellen	

### 1) Data collection

Collection of data regarding daily activities of a research team :

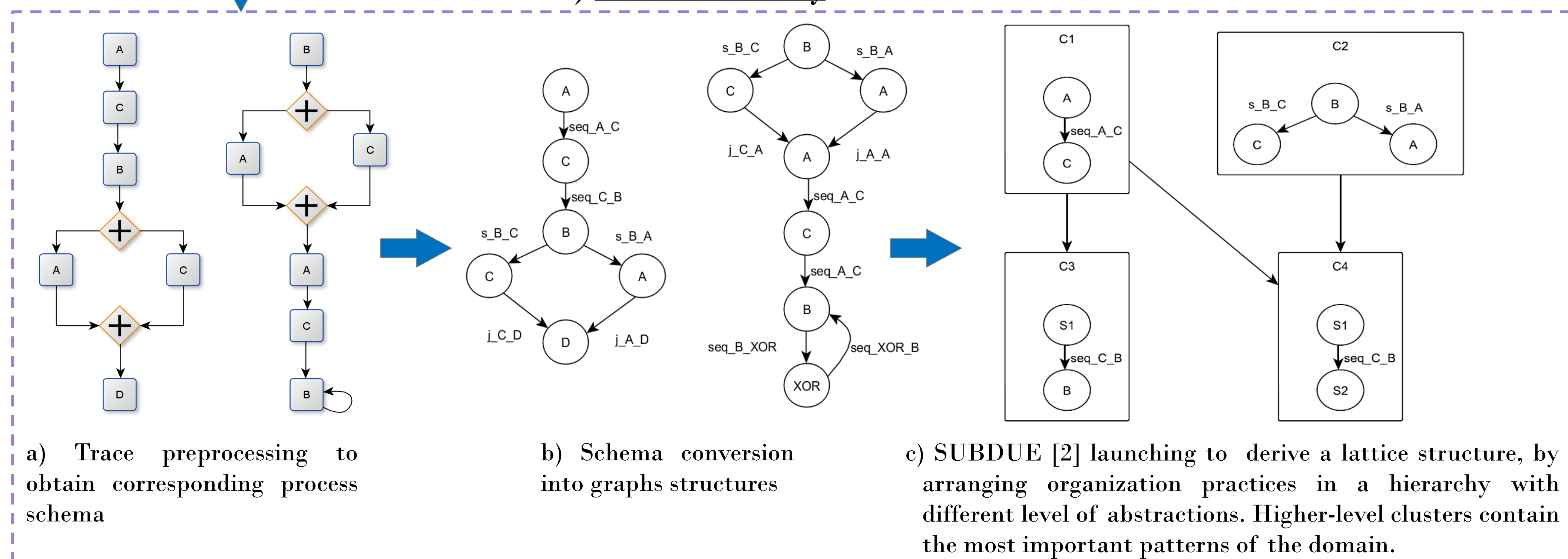
- files usually stored in enterprise IS and team members PCs
- human knowledge about informal activities not automatically stored, e.g. physical meeting

### 2) Data Integration

•Obtaining a single dataset containing all collaborative processes logs

- Main Steps:
  - Data Extraction
  - Data Cleaning
  - Homogenization

### 3) Pattern Discovery



## Conclusion

- Identifying the most common organization collaborative practices with their relationships
- Supporting organization collaborative work management
- Exploiting information stored about actual organization collaborative tasks

## References

- [1] Chesbrough, H.W., Open innovation: the new imperative for creating and profiting from technology, Harvard Business Press, 2003.
- [2] Jonyer, I., Cook, D.J., Holder, L.B., “Graph-based hierarchical conceptual clustering”, J. Mach. Learn. Res., vol. 2, pp 19-43, March 2002.
- [3] Van der Aalst, W.M.P., Process mining: discovery, conformance and enhancement of business processes, Springer, 2011.

## Further Information

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