



## Panel

### **The Eco-System of Data and Software**

(embedded-data, data drive-software, data-harmonizing systems, classification, etc.)

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This panel aims to share structures and issues of the Eco-System.

# Panel Membership

## Panelists

Anna Walek, Gdańsk University of Technology,  
Poland [anna.walek@pq.edu.pl](mailto:anna.walek@pq.edu.pl)

Petre Dini, IARIA, USA/EU

Yoshihisa Udagawa, Tokyo University of Information  
Sciences (TUIS), Japan [yu207233@rsch.tuis.ac.jp](mailto:yu207233@rsch.tuis.ac.jp)  
Chair

# Outlines

1. Back Ground
2. Definition of Data Ecosystem
3. Structure of Data Ecosystem
4. Involved Information Technology
5. Open Issues and Challenges

# 1. Back Ground

- Now, data systems are taking a significant role in companies and governments.
- Needs for continuous improvement of a data system regarding size and variety of data, and functions of a system over the years are showing up.
- The term “data ecosystem” likens growth of data system to a natural ecosystem.
- Issues and challenges can be rephrased as “Can the concept of data ecosystem be brought up to the level of giving social impact, and developing a new technical framework?”

## 2. Definition of Data Ecosystem

A data ecosystem is a collection of infrastructure, analytics, and applications used to capture and analyze data, for making better pricing, operations, and marketing decisions.

<https://mixpanel.com/topics/what-is-a-data-ecosystem/>  
<https://www.cognizant.com/glossary/data-ecosystem>

A data ecosystem refers to a combination of enterprise infrastructure and applications that is utilized to aggregate and analyze information for better understanding of customers and for superior marketing, pricing.

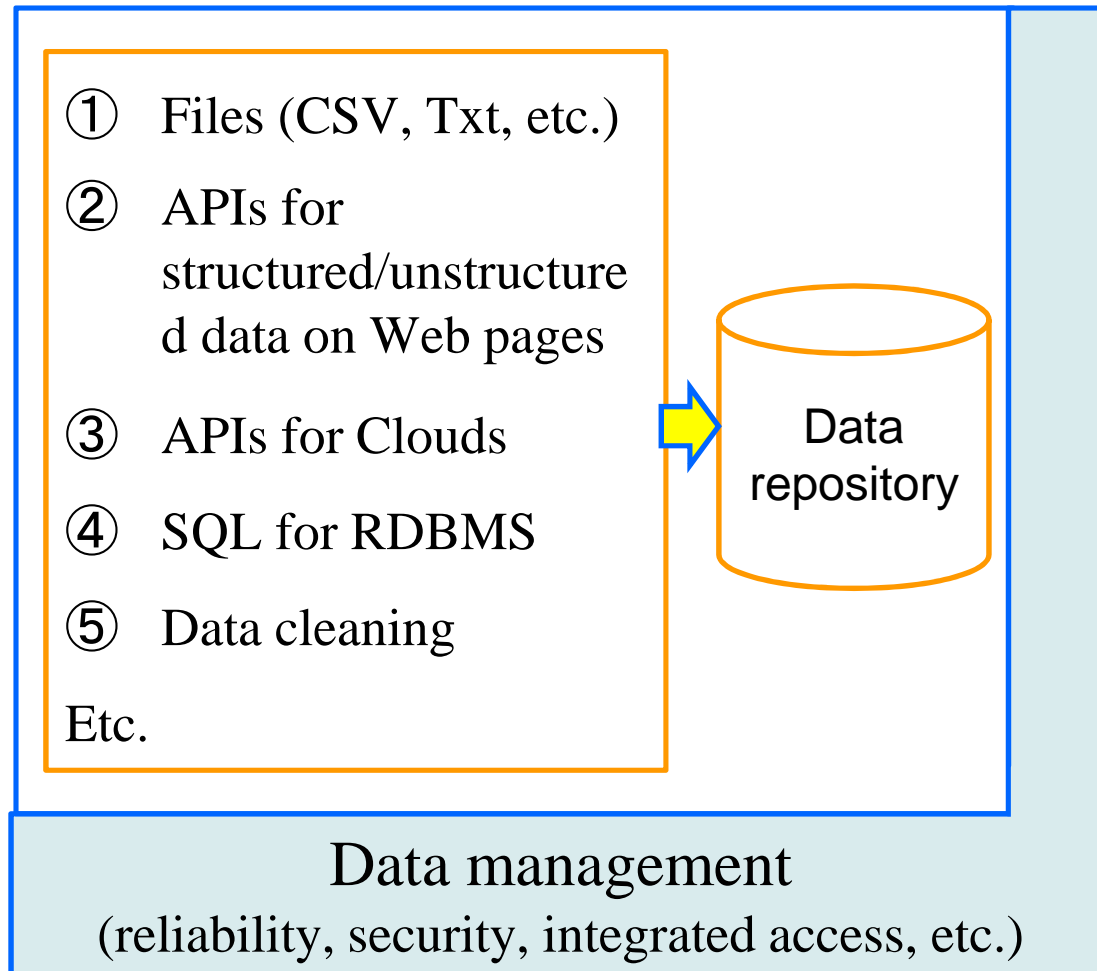
<https://www.cognizant.com/glossary/data-ecosystem>

Eco-Software System can be defined analogously.

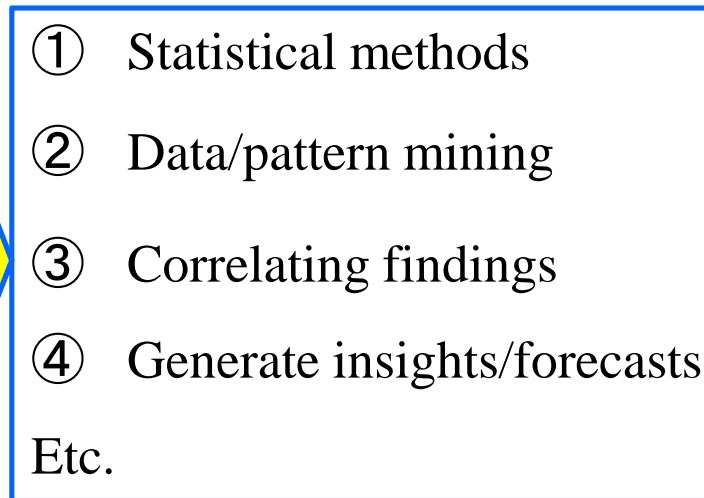
- The definitions are not yet finalized. They can be revised as needed.

# 3. Structure of Data Ecosystem (an example)

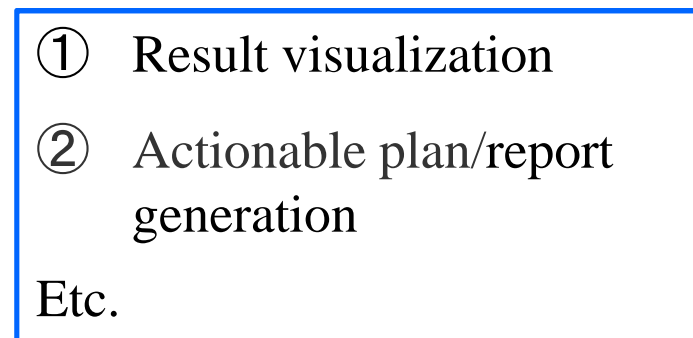
## (1) Data acquisition and access function



## (2) Data analytics function



## (3) Presentation function



## 4. Involved Information Technology (examples)

- Infrastructure (e.g., hardware, internet, clouds)
- File-based data access
- API-based data access (e.g., Web, clouds)
- Data-management tools (e.g., RDBMS, non-SQL)
- Statistical analyses tools/software
- Domain specific analyses
- Data mining algorithms (e.g., Apriori, Clustering)
- Machine learning and AI
- Visualization tools/software
- Etc.

## 5. Open Issues and Challenges (examples)

- How to make a win-win condition for all the participants in a data ecosystem
  - ❑ Small instances of implementation experiences
  - ❑ Lack of consensus of data ecosystem structure, concept of operation and system growth
- How to get a data ecosystem to drive business innovations
  - ❑ Lack of methodology to collect high quality, related data in distributed environment
  - ❑ Immature technology for handling unstructured data
  - ❑ Information security and copy right



## 5. Open Issues and Challenges (continued)

- **Impact on development process**
  - Is the traditional waterfall model applicable? If not, what comes next?
  - For example, how to meet the request to upgrade 6 times every 3 months for the next 2 years?
- **Education of development personnel**
  - Technologies are not fixed.
  - Interoperability standards are not developed.
- **Responsibility concerning distributed data and open data**
  - Accounting for data provision
  - Responsibility for dissemination of fake information
  - Partial service outage due to system trouble
- **Cost estimation of administration and evolution of a data ecosystem for stakeholders**

Etc.

These are a brief introduction to the panel.

Thank you for taking time to watch.