Data as a Resource

Data-driven economy and innovation

Keynote – DataSys 2021
May 30th – June 3rd, 2021, Valencia, Spain

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Why use Norway as a case?

- The population has solid digital competence.
- Broadband and mobile networks are widely adopted.
- Electronic services (in both the public and private sectors) are widely adopted.
- Government data has high quality.
- High trust in public institutions and government.

Introduction

Government white paper on "**Data as a resource** – *Data-driven economy and innovation*" was submitted to the Norwegian Parliament on March 26th, 2021.

A white paper is a communication on government policy sent to the parliament for discussion.

The white paper states the goals and ambitions of the government and will be discussed by the Parliament on June 4th, 2021 (preliminary date).

Aim of this presentation

- To present the Norwegian government's goals and ambitions.
- Include some contemporary ideas regarding data as a resource.

Background

EU Data Strategy:

- Value of data economy within EU27 member states will increase from 301 billion in 2018 to 829 billion before 2025.
- Data economy is value creation based on data as an essential input factor in producing goods and services or when data is a driver for innovative solutions.
- The data economy is closely connected to big data and analytics, and artificial intelligence.

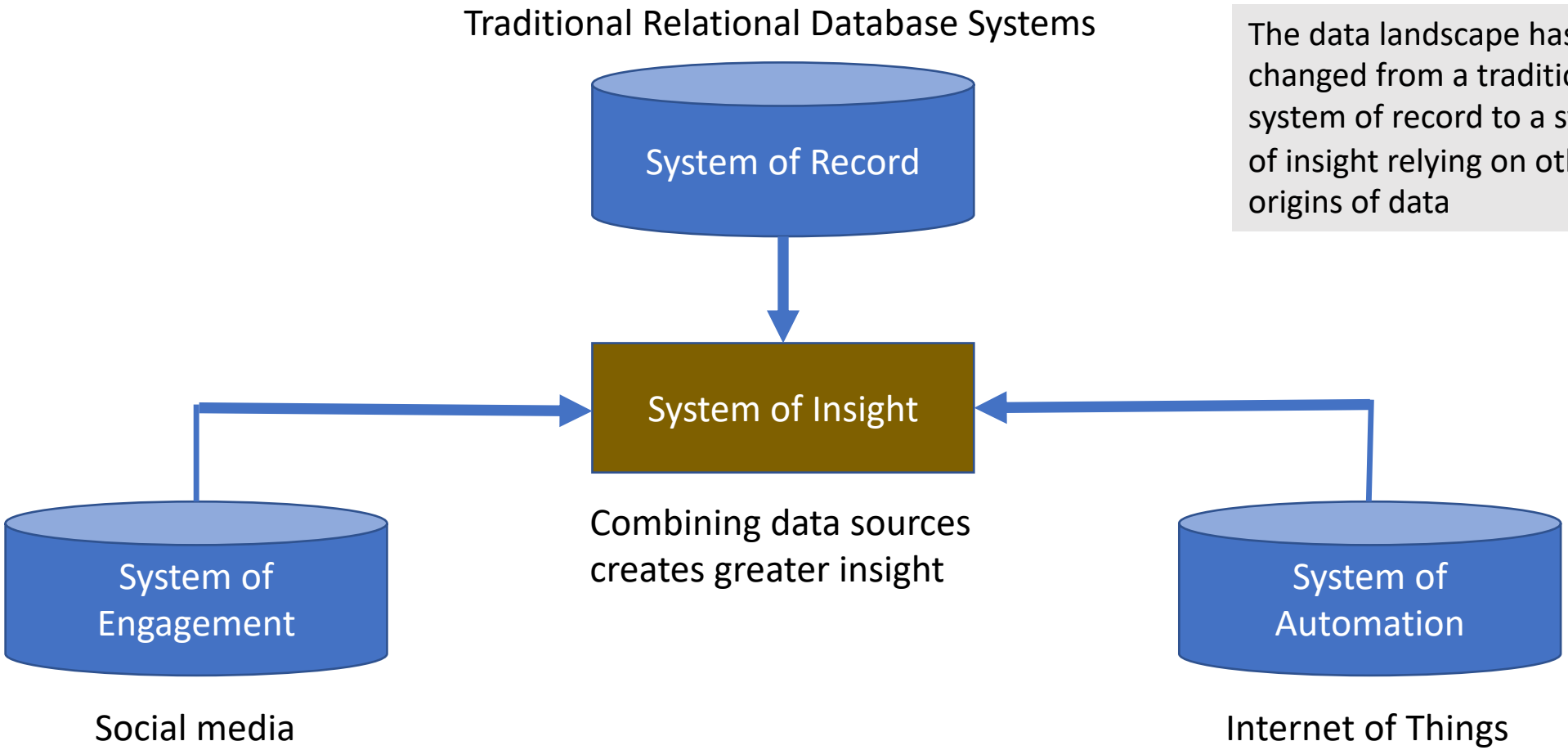
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions
A European strategy for data COM/2020/66 final

Drivers of the data economy

The white paper lists five essential drivers of the data economy:

- Cloud services (scalability, pay for use)
- Sensor technology and Internet-of-Things (IoT)
- Big data analytics
- Artificial intelligence
- High-performance computing

The changing data landscape



The data landscape has changed from a traditional system of record to a system of insight relying on other origins of data

Four principles

The government has identified four national principles for data sharing and use.

These four principles will be discussed in the following slides.

Principle

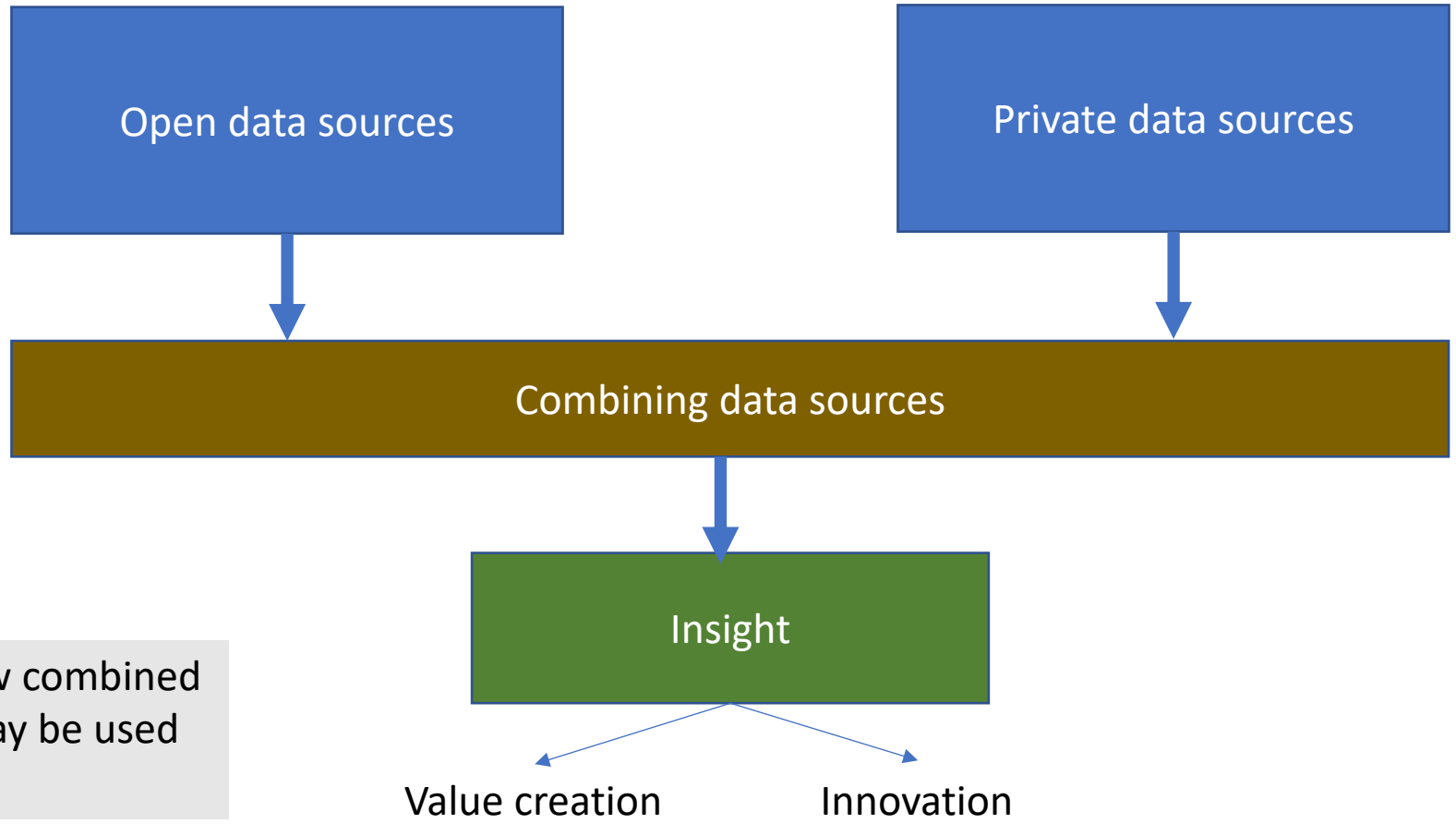
- In general, data should be open.
- Responsible and reliable handling of data, combined with good information management and information security, is a prerequisite to deciding if data should be open and shared or protected due to privacy or security concerns.

The new Norwegian “Freedom of Information Act” from 2009 states that the main rule for case documents, journals, and similar registers of an administrative agency are public except as otherwise provided by statute or regulations.

Principle

- Data should be available, searchable, and easy to use.
- It should be possible to connect different data sets
- Requirements:
  - Complete and updated
  - Machine-readable
  - Accompanied by meta-data
  - Use of ontologies
  - Access through APIs (Application Program Interface)
  - License to clarify rights and limitations on use

Interconnected data sets create value



To illustrate how combined data sources may be used to create value

Machine readable data

Comma-separated values (no tags).

Tagged data:

- JSON
- XML

The tags describe or identify the data elements.

Usually pair of name and value.

The following formats are human-readable, but more difficult for machines to handle:

PDF, DOC, DOCX

Comma separated values

```
01,Ken,Follett
02,John,Grisham
```

The different values are separated by a comma.
The values have no tags to identify the values.
The order of the values are important.

```
01;Ken;Follett
02;John;Grisham
```

Other separators may be used instead of comma.

The first line may provide names for the elements.

```
id,name,lastname
01,Ken,Follett
02,John,Grisham
```

JSON data

```
{
    ”author": [
        {
            "id":"01",
            "name": ”Ken",
            "lastname": ”Follett"
        },
        {
            "id":"02",
            "name": ”John",
            "lastname": ”Grisham"
         }
    ]
}
```

JSON (JavaScript Object Notation) is a popular data-interchange format.
It is based on a collection name/value pairs and a ordered list of values.

XML data

```
<authors>
    <author id="01">
      <name>Ken</name>
      <lastname>Follett</lastname>
    </author>
    <author id="02">
      <name>John</name>
      <lastname>Grisham</lastname>
    </author>
</authors>
```

Tags may enclose data elements

Tags may have attributes, here id is an attribute for the author tag.

Metadata

Data describing other data

Metadata can explain characteristics of the whole data set, such as:

- Origin
- Date created
- Responsible person
- Number of records
- License

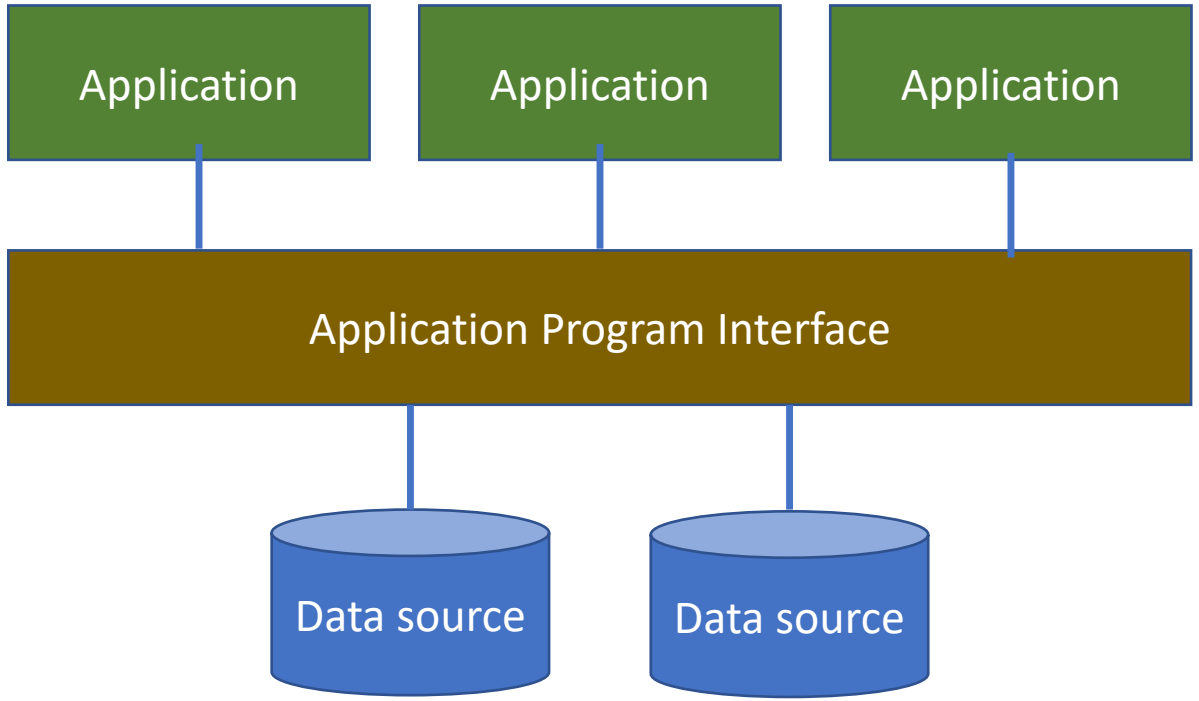
But also, characteristics about the data elements, such as:

- Datatype
- Size

Ontologies

- Precise definitions of terms
- Also synonyms

Access through API



Applications can access data through the use of an application program interface.

License

- Defines rights and obligations regarding the use of the data.
- Example: Creative Commons

Principle

- Data should be shared and used to create value for business, the public sector, and society.
  - Fairness – provider and consumer should share value created
  - Some data created by business should be open when the data is considered particularly valuable for the society
  - Data generated as part of projects financed by the government should be open

Principle

- Data should be shared and used respecting fundamental rights and freedoms and preserving Norwegian societal values.
- Trust is critical.
- Ethics regarding data use should be considered.

The picture shows how data can be collected from various sources connected to the Internet.

Data is stored, processed, and analyzed in cloud-based platforms.

The results can help create new products or services, more efficient processes, new business models, and contribute to the green transition and achieve UN sustainability goals.

Source: Norwegian Government White Paper on Data as a Resource, 2021

International collaboration

International collaboration is essential for the development of the Norwegian data economy.

The government emphasizes the need for international collaboration, particularly within the European Union and the European Economic Area.

The government aims to influence and contribute to common European regulations and policies (in collaboration with the other Nordic countries)

Data as a resource in business

- Data and the emerging data economy are vital for business.
- Businesses should work together on standardization and infrastructure to enable data sharing, value creation and innovation.
- The government will:
  - Contribute to data sharing through public-private partnerships.
  - Propose necessary regulations to facilitate more data sharing.
  - Secure participation in EU programs to make sure Norwegian companies and research organizations benefit from access to European partners and resources.

Public data as a resource for businesses

Open public data is important for innovation and business development.

The government will facilitate increased sharing of public data in an efficient and secure way.

The government will appoint a committee to propose new regulations for data sharing.

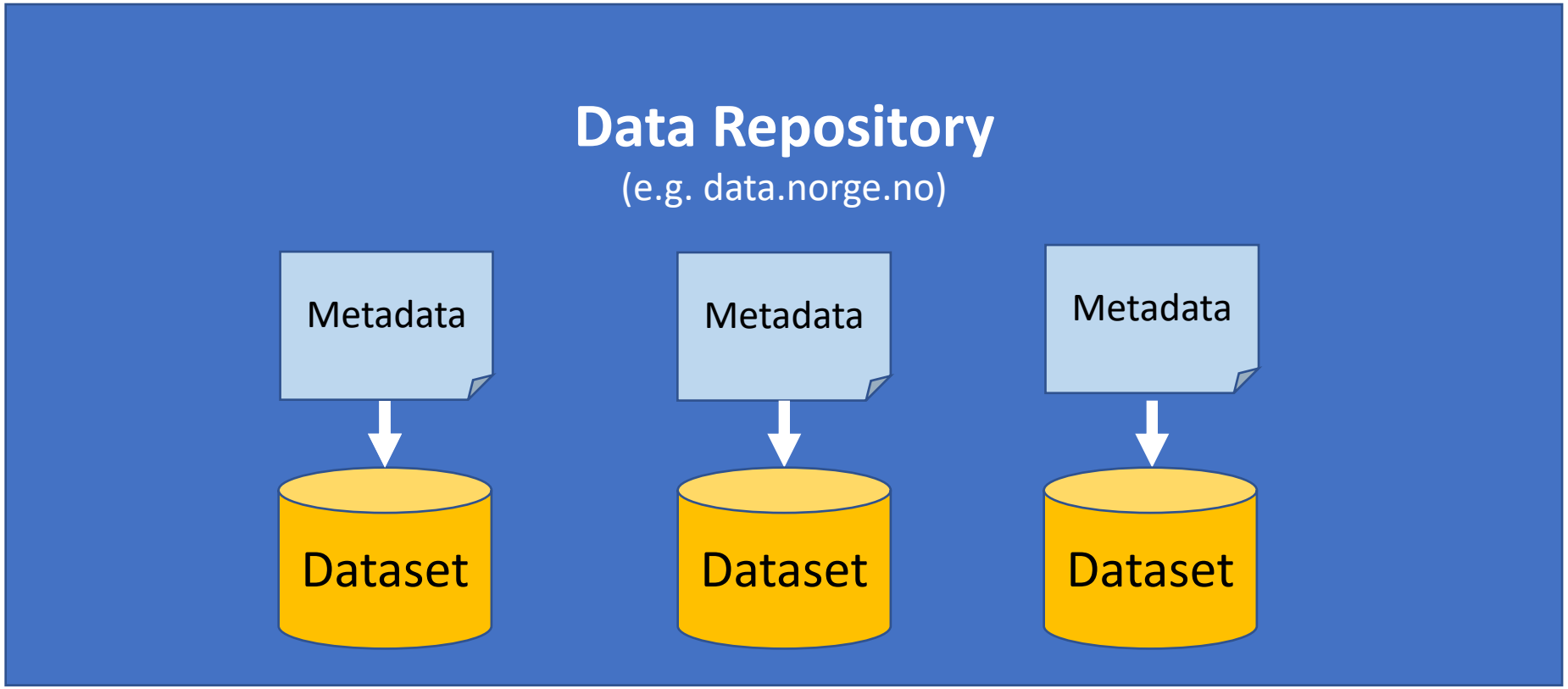
Public data repository

Public data repositories are essential to make data publicly available.

They contain datasets and their metadata.

The Norwegian public administration data repository is located here:

https://data.norge.no



Building competence

The government also focuses on developing competence:

- More candidates with specialized ICT eduction.
- Update of the workforce through courses and life-long learning.
- Research on the data economy.
- The government also recognizes the need for multidisiplinary research and education in this field.

Fair, ethical, and responsible use of data

Finally, the government discusses fair, ethical, and responsible use of data. The key points here are:

- Ensure identical conditions of competition between multinational companies and national actors.
- Create user-friendly and safe digital services and products for the citizens.
- Encourage public and private entities to develop solutions that simplify individuals' access to personal information and control of such information.
- Examine the possibility of developing a general solution where citizens can obtain information about the personal data stored by the government.

Conclusion

- The Norwegian government has recently published a white paper on “Data as a Resource”.
- The white paper emphasizes the importance of the data economy and states goals and ambitions.
- The data economy will be vital for both private companies and the public sector.
- Open public data is the main rule.
- Regulations and further work on regulatory issues are needed. Ethical considerations are essential for proper the use of data.
- Private companies should work together to benefit from data sharing.
- The data economy is global, and competence will be critical. The government will prioritize education and research on the data economy.

Thank you for reading

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