d-fine

A novel approach for B2B data exchange

01. Business-to-Business data exchange today

The amount of data generated every year has been increasing ever more rapidly over the past decades. A study by the IDC[1] estimates that while the amount of data generated globally in 2010 was about 2 Zettabytes[2], this amount soared to a remarkable 64 Zettabytes by 2020.

The main driver behind the increase in data volume is the digital transformation across all industries where information is being converted into a digital format (digitization) and processes, products, and organizations are being changed by digital technologies (digitalization). An example would be the capturing of production data via sensors (digitization) in the chemical industry that help streamline operations using digital solutions (digitalization).

Oftentimes the data can generate value not only for the company itself, but also for other companies along the value chain or even for third parties. It can be used to improve product quality and operations, to forecast demand, to drive sustainability, or to create new products altogether.

As a result, companies are assessing how to improve routine information exchange with business partners as well as new business models where they either sell or buy data. For this reason, the data market, that is "the market where digital data is exchanged as products or services derived from raw data"[3], has been thriving. The enormous potential of the data market is evidenced by an EU study which saw its value increase from about 46 billion EUR in 2016 to 62 billion EUR in 2020 with a projected value of 83 billion EUR in 2025.

One example where combining data from multiple parties is creating added value is the Precision Livestock Farming (PLF) program of Evonik. The Business Line Animal Nutrition has been a supplier of nutritional building blocks, like amino acids, for many decades. However, over the years, the focus moved beyond feed to instead optimize poultry production overall by interlinking previously isolated solutions for animal nutrition, health, and farming. Moving towards this more holistic view on chicken rearing requires working together and exchanging data between various parties along the value chain.

In practice a multitude of approaches are conceivable when exchanging data between businesses (B2B). The solution space can be coarsely divided into three basic approaches with respect to the connectivity relationship between the involved parties: direct bilateral data exchange (1:1), company-centred data exchange (1:n) and multilateral data platforms (m:n).[4]

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1 IDC: Worldwide Global DataSphere Forecast 2021–2025: The World Keeps Creating More Data — Now, What Do We Do with It All?, 2021, https://www.idc.com/getdoc.jsp?containerId=US46410421

2 1 Zettabyte (ZB) = 1.000.000.000 Terabyte (TB)

3 European Commission, Directorate-General for Communications Networks, Content and Technology, Cattaneo, G., et al.: The European data market monitoring tool: key facts & figures, first policy conclusions, data landscape and quantified stories: d2.9 final study report, 2020, https://data.europa.eu/doi/10.2759/72084

4 It is important to note that mixed forms of the three approaches exist and that not all solutions can be clearly assigned to one of the three approaches
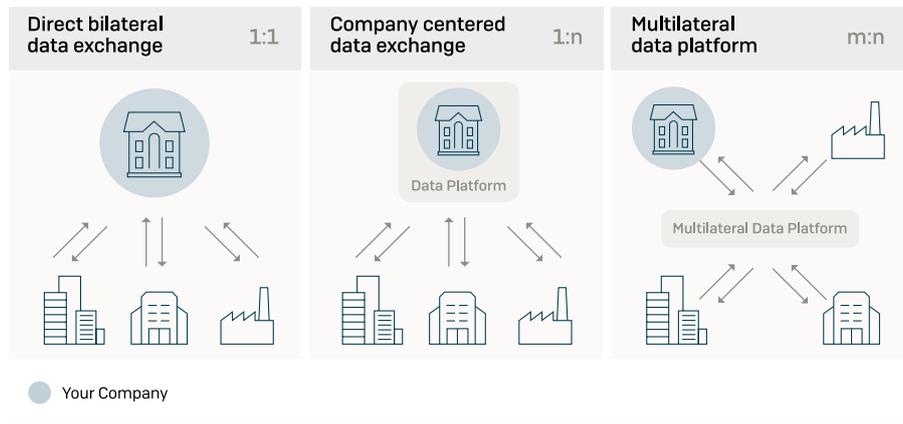
Figure 1:

Basic approaches for Business-to-Business (B2B) data exchange

Historically, companies have typically been exchanging data following the direct bilateral (1:1) or the company-centred (1:n) data exchange approaches. The former refers to data being exchanged directly between two counterparties. Generally, the counterparties agree on a contractual framework which defines the conditions for data exchange, such as terms of use and other rights and obligations associated with the data as well as the technology used to exchange the data. This agreement process, as well as the technical implementation, which can comprise solutions ranging from email to APIs to cloud based platforms such as SharePoint or proprietary solutions, must be undergone with each exchange partner individually.

To bypass the considerable coordination efforts necessary when exchanging data bilaterally, company-centred data exchange approaches (1:n) process several of the company's data exchange relationships via a single point. This is achieved by setting up and operating a solution or platform that data exchange partners get connected to, oftentimes building on similar technology as for the bilateral data exchange. As a result, the individual coordination process can be replaced by a streamlined onboarding to the company-centred data exchange solution reducing the effort for the platform-providing company when adding an additional exchange partner.

Gaia-X is a European initiative which pursues the development of a data infrastructure based on the values of openness, transparency, and trust.[5]

Multilateral data platforms (m:n) handle the exchange of data between several companies, but contrary to the company-centred approach no single party must exist that takes part in every transaction. The platforms are comprised of networks and data marketplaces. An example for such a network is Catena-X, an association of companies in the automotive industry which intends to build a Gaia-X-based collaborative, open but secure ecosystem. On the contrary, data marketplaces are external data platforms where the technical infrastructure and required processes, features, and administration are made available by a platform provider. Several of those platforms emerged in the past few years, for instance Advaneo data marketplace, AWS Data Exchange, Snowflake Data Marketplace, and Telekom Data Intelligence Hub.

As a consequence, the EU is working on legislation, such as the Data Governance Act[6], to regulate third-party intermediaries in data exchanges. To this end, the establishment of external platforms, so-called data trustees, without vested interest in the data they help exchange, is discussed.

5 Federal Ministry for Economic Affairs and Climate Action: What is Gaia-X?, https://www.data-infrastructure.eu/GAIAX/Navigation/EN/Home

6 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on European data governance (Data Governance Act), COM/2020/767 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0767

02.   Challenges in the exchange of data

Oftentimes extensive coordination and implementation efforts arise when exchanging data with business partners as they need to reach an agreement on the modalities for exchanging the data.

Typically, the exchange of data involves several different solutions that all require maintenance. The management of these solutions often lacks a standardized process and their evolvement over time results in ongoing adaptation efforts. Independent of the solution approach, data security is of significant concern to companies. As many data exchange use cases involve sensitive data, it needs to be kept secure at any given stage of the process.

As direct bilateral (1:1) and company centric approaches (1:n) focus on facilitating core business needs between companies they usually do not comprise payment features limiting the implementation of new data-driven business models.

Besides these technical challenges on bilateral and company-centric approaches, data providers in general struggle to retain their data sovereignty over data shared with others. Sovereignty includes the ability to decide who is allowed access to the data, over what period of time, and for what purpose. On the legal side, strong data protection laws such as the General Data Protection Regulation (GDPR) impose considerable requirements on any platform, while the EU Data Governance Act introduces the notion of neutral data intermediaries, which might serve as catalyst promoting data exchange.

The reluctance to exchange data with partners along the value chain is also driven by concerns regarding the disclosure of insights into one's business model or the unveiling of competitive advantages. In addition, companies often struggle with the setting of a fair price for their data.

Exchanging data bilaterally (1:1) or as a company centred data exchange (1:n) might, as discussed previously, not be the most efficient approaches, however, to leverage the full potential of B2B data exchange. Data marketplaces and industry initiatives such as the PLF program and Catena-X illustrate that multilateral connections between partners (m:n) solve a number of these challenges, as they function as an independent platform, taking care of technical and procedural issues. Where traditional approaches often fail to create synergies, these multilateral approaches may shine. Subsequently, we would like to focus on data marketplaces as one possible approach for multilateral B2B data exchange.

03.   Data exchange reimagined

Data marketplaces match and connect various data providers and data consumers via their platform to facilitate the exchange as well as the sale and purchase of data. For this purpose, both terms of use and a public data catalogue, providing metadata for a better understanding of the data offered, are available on the platform. Simplifying the agreement process on terms of use can reduce the coordination effort between businesses which is often one of the major obstacles for companies when exchanging data. Additionally, standard data connectors allow transparent and faster onboarding.

Besides domain-specific data marketplaces, focussing, for example, on vehicle and mobility data, several industry agnostic data marketplaces with a broad portfolio of data offerings emerged over the last five years. Data commercially available at these marketplaces include weather data, industry profiles and market data as well as consumer location and movement data.

Data marketplaces are typically operated by external providers who do not buy or sell data themselves. Moreover, they are publicly accessible and do not require customers to join any association or consortium. The only prerequisite is the agreement to the marketplace's terms of use and, if required, the payment of usage fees.

In addition, many data marketplaces provide features for closed user groups enabling a data exchange with established partners without publicly displaying the corresponding (meta)data. This makes them an interesting solution for B2B data exchange as they can cover both commercial and non-commercial data exchange between businesses.

Besides these common properties, data marketplaces may differ in important details such as the technical method for exchanging data or the data security measures applied. A common method for the exchange of data is via the cloud-based storage of the data marketplace. The data provider uploads the respective data to a repository and grants access to the data consumer. However, this approach may raise security concerns, as the data is stored on the data marketplace infrastructure.

International Data Spaces (IDS) is an initiative pursuing the creation of a secure, sovereign system for data sharing to leverage the value of data.[7]

To counter these concerns some data marketplaces offer a peer-to-peer exchange of data via connectors based on International Data Spaces (IDS) and Gaia-X standards. This way data is not exposed to third parties, allowing the data providers to retain a certain level of data sovereignty similar to direct bilateral data exchanges. However, once the data is sent to the counterparty, the data provider loses the ability to technically enforce its sovereign rights as the counterparty can utilise the data in whichever way they see fit, only legally bound by the agreed terms of use.

To overcome this issue, other implementations avoid the exchange of raw data altogether. This is, for instance, achieved through an approach where the provider only grants access to query its filtered and/or aggregated raw data which resides in the provider's database. Other data marketplaces offer secured data spaces where companies can transfer their encrypted data to. The data subset can then be analysed using verified algorithms made available by the marketplace or a third-party service provider. Here it is essential, that neither the provider of the algorithm nor the data recipient have access to the raw data at any point in time.

The latter are promising approaches to comply with the technical prerequistes for data intermediaries imposed by the proposed Data Governance Act. Considering for example, the confidentiality level of the data, companies might choose the exchange method which best fits their needs since data marketplaces often offer several options in parallel.

Another advantage of data marketplaces are the minimal implementation, integration, and maintenance efforts compared to bilateral or company-centred solutions, as data marketplaces provide the general technical infrastructure and only an interface or the set-up of a connector is needed. In case of multiple data providers and users exchanging data on a given marketplace, all of them

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7 International Data Spaces e. V.: Innovating the future of data exchange in Europe and beyond,

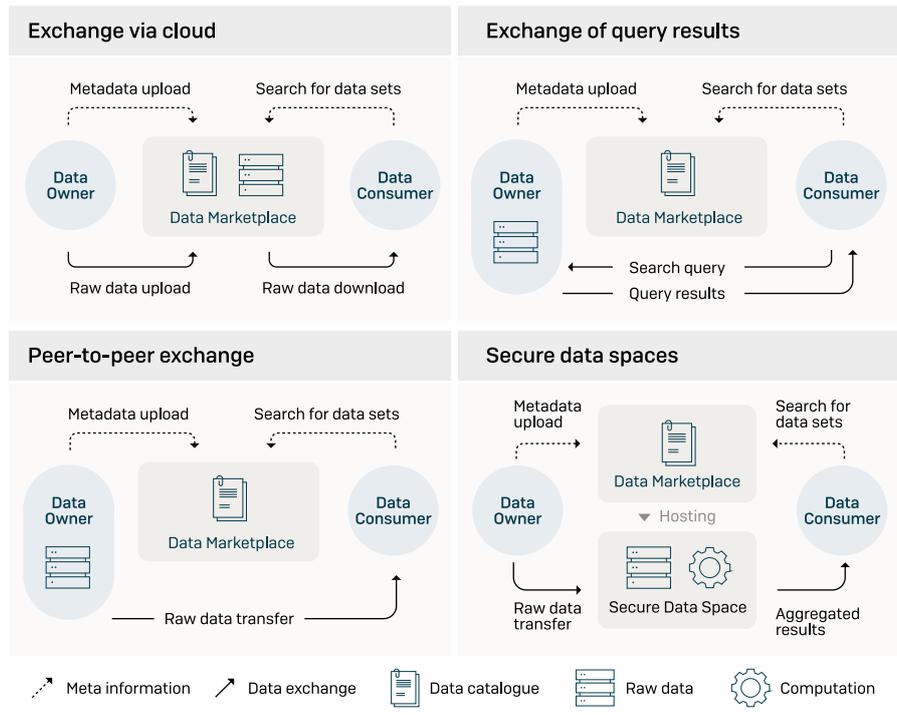https://internationaldataspaces.org/we

Figure 2:

Typical data exchange methods of data market-places

would benefit from a drastically reduced number of interfaces, as each individual company would be able to source and provide data to a multitude of other organizations through just one interface – the one to and from the marketplace.

This requires the company, and its data exchange partners, however, to agree on using the same data marketplace. Only when a specific marketplace solution gains broad market acceptance within the company's relevant industry sector, the advantages can fully play out. Acceptance among industry partners may depend on factors ranging from the concern of a vendor lock-in, to legal uncertainties such as the protection of their data. Having access to data from a wide variety of data providers calls to the scene competition authorities. It is thus paramount that data intermediaries take the necessary precautions. Technical solutions alone cannot resolve all these challenges, but data marketplaces offer features that help tackling them.

In contrasts to data marketplaces, networks are operated by members of the respective industry sector. They are not publicly accessible and have a strong industry focus. Catena-X, for example, is operated by a consortium of companies within the automotive sector and Evonik considers the operation of a multiateral platform within the PLF program to leverage synergies in the poultry industry[8]. By focussing on a specific industry, it is possible to address the industry's requirements more directly.

Ultimately, the identification of a suitable B2B data exchange solution is always use case dependent and a one-size-fits-all solution does not exist. The decision on suitable solutions for a specific use case should thus be based on a detailed requirements analysis. Nevertheless, data marketplaces are a promising solution that should be considered when looking to exchange data with other businesses. Especially when the commercialization of data is pursued.

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8 In both examples, the companies are supported by software providers, for instance to provide the technical infrastructure, but the main responsibility of the platform solution as a whole lies with the companies.

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