

RECLAIMING THE MARKET DATA VALUE CHAIN

LEVERAGING THE CLOUD TO OPTIMISE DISTRIBUTION AND PRODUCT INNOVATION

OCTOBER 2023

dataBP QUINLAN
& ASSOCIATES

TABLE OF CONTENTS

SECTION	TITLE	PAGE
Section 1	THE STATUS QUO	5
Section 2	CLOUD TO THE RESCUE	11
	2.1. Data Providers	18
	2.2. Data Vendors	24
	2.3. Data Marketplaces	27
Section 3	IMPLEMENTATION CONSIDERATIONS	33
	3.1. Strategic Considerations	35
	3.2. Operational Considerations	41
Section 4	HOW WE CAN HELP	45

FOREWORD

Over the past decade, passive investment strategies and technological advancements have sparked fierce competition for liquidity and intelligence, transforming capital markets into complex data-driven ecosystems. Wholesalers, once reliant on a handful of global aggregators for access to consumers, now find themselves empowered by the benefits of cloud infrastructure, enabling them to confront channel conflicts and mitigate disintermediation risks. And the landscape is rapidly evolving, exemplified by recent exchange deals such as Nasdaq and Deutsche Bourse acquiring platforms that enhance access to the investment management community.

These deals also highlight how exchange groups have shifted gears, embracing cloud partnerships that lower distribution costs while nurturing closer consumer relationships. Through automated onboarding and data access, wholesalers can reach a wide consumer base, amplifying visibility and control.

Cloud also unlocks a diverse ecosystem of Fintech solution providers, offering a myriad of services that further reduce the costs associated with acquiring and consuming data. However, this long-tail of Fintechs often brings challenges, such as revenue leakage and licensing compliance issues due to limited administrative discipline and resources. The stakes are further raised by the looming prospect of A.I., which has the potential to disrupt existing commercial policies governing these relationships.

We envision broader potential through new forms of content syndication, harnessing the cloud's reach and following the footsteps of media companies that have embraced digital rights management. Wholesalers have tapped into this transformative momentum, forming partnerships with cloud-native apps to drive product innovation and revolutionise market dynamics. This strategic shift disrupts the dominance of data vendors, paving the way for wholesalers to reclaim wallet share.

As the value chain undergoes seismic changes in data origination, enhancement, packaging, and value-added services, the true power of A.I. lies in its derived outputs. In the long term, wholesalers will recognise the imperative to adapt their commercial strategies and data licensing relationships to thrive in the fiercely competitive realm of data and liquidity intelligence. As we navigate this shifting landscape, managing commercial relationships amidst the exchange of raw and derived data becomes paramount. The market's response to these transformative changes will chart the course for its future trajectory. Brace yourself—capital markets are on the cusp of an unparalleled revolution.



dataBP

Mark Schaedel
CEO
DataBP



**QUINLAN
& ASSOCIATES**

Benjamin Quinlan
CEO & Managing Partner
Quinlan & Associates

EXECUTIVE SUMMARY

The demand for financial market data is increasing at a rapid rate, with total industry spending growing at a robust CAGR of 5.4% since 2013, reaching ~USD 45 billion by the end of 2022. And with this rise in demand, we have seen a proliferation of service companies, a diversification of distribution models, and the emergence of specialised data vendors.

Traditionally, data providers would distribute their data directly to customers or, more commonly, rely on a suite of global data vendors. While data providers maintain direct distribution arrangements with their most significant clients, the lion's share of global market data revenue (i.e. 83%) is captured by vendors.

Both the direct distribution and indirect distribution models have distinct benefits and limitations. Direct distribution offers greater flexibility, along with a reduced time-to-market, but can create a highly fragmented consumer experience. In contrast, indirect distribution offers the convenience of a single feed of data but often in bundled data sets that lack flexibility. The dependency on data vendors can also reduce the velocity at which data providers can launch new products, restricting their ability to innovate and diversify, whilst also increasing the risk of non-compliance. In some cases, data providers have acquired data vendors to bridge the gaps, but this comes at a high cost.

We believe cloud presents an opportunity to deliver the best of both worlds.

Public cloud adoption provides greater distribution and commercial flexibility and a chance to hit reset on the end-user relationship with modern distribution models. It enables more direct distribution capabilities, providing total flexibility in product creation, along with more dynamic packaging and more responsive control. Cloud can also offer additional advantages such as operational efficiencies, infrastructure modernisation, and scalability. The increasing relevance of A.I. and the appetite to improve intellectual property ("IP") protection through strategies such as digital rights management further underscore the opportunities presented by cloud technologies.

The potential of this new approach reduces the barriers to entry for smaller and alternative data vendors, activating the 'long-tail' of providers through a cloud-based management framework that replaces the legacy 'trust' model with automation and technology, whilst reducing exposure to the traditional operational and commercial risks of operating as a vendor.

In this report, we analyse the above trends in detail, whilst also exploring some of the additional capabilities required by data providers as they navigate the possibilities created by cloud distribution, as well as examine how incumbent business models are evolving in an effort to capture the opportunities presented by the evolution of market data delivery.



SECTION 1

THE STATUS QUO

GLOBAL MARKET DATA SERVICING ECOSYSTEM

KEY TAKEAWAYS

The conventional financial data ecosystem consists of three tiers: (1) data providers, (2) data vendors, and (3) data consumers:

1. Data Providers

Originate, generate, and / or capture from a variety of financial market activities. Typically includes stock exchanges, trading platforms and index providers that create and manage data content.

2. Data Vendors

Aggregate, normalise, and process data from providers and package into products and services for consumers. Index providers both create content and repackage data from providers.

3. Data Consumers

Data consumers (e.g. banks, asset managers) access raw data or data products to carry out a wide range of specific financial market activities (e.g. trading, investing, etc.). Consumers are becoming increasingly diverse.

Financial market participants are heavily dependent on data providers (e.g. exchanges, trading platforms, etc.) and data vendors for their market data needs

Data Market Ecosystem

Stakeholders

Description

Example Companies*

Data Providers

Originate, generate, and / or capture from a variety of financial market activities.



Data Vendors

Aggregate, normalise, and process data from providers and package into products and services for consumers.



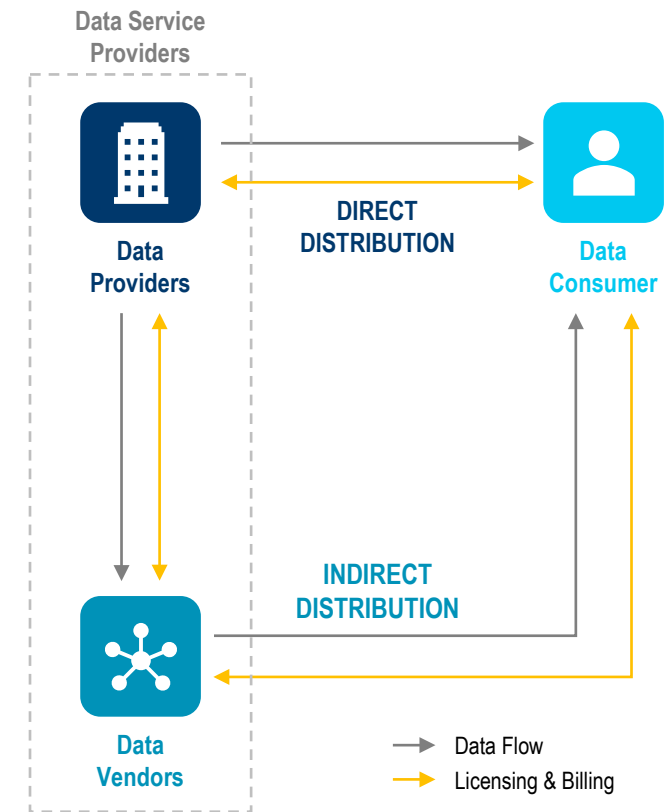
Data Consumers

Search for and subscribe to available datasets in the market that are aligned with specific business goals



Data Consumption Models

Financial Markets Context



CONVENTIONAL DATA DISTRIBUTION MODEL

KEY TAKEAWAYS

The two models for distribution have benefits and trade-offs:

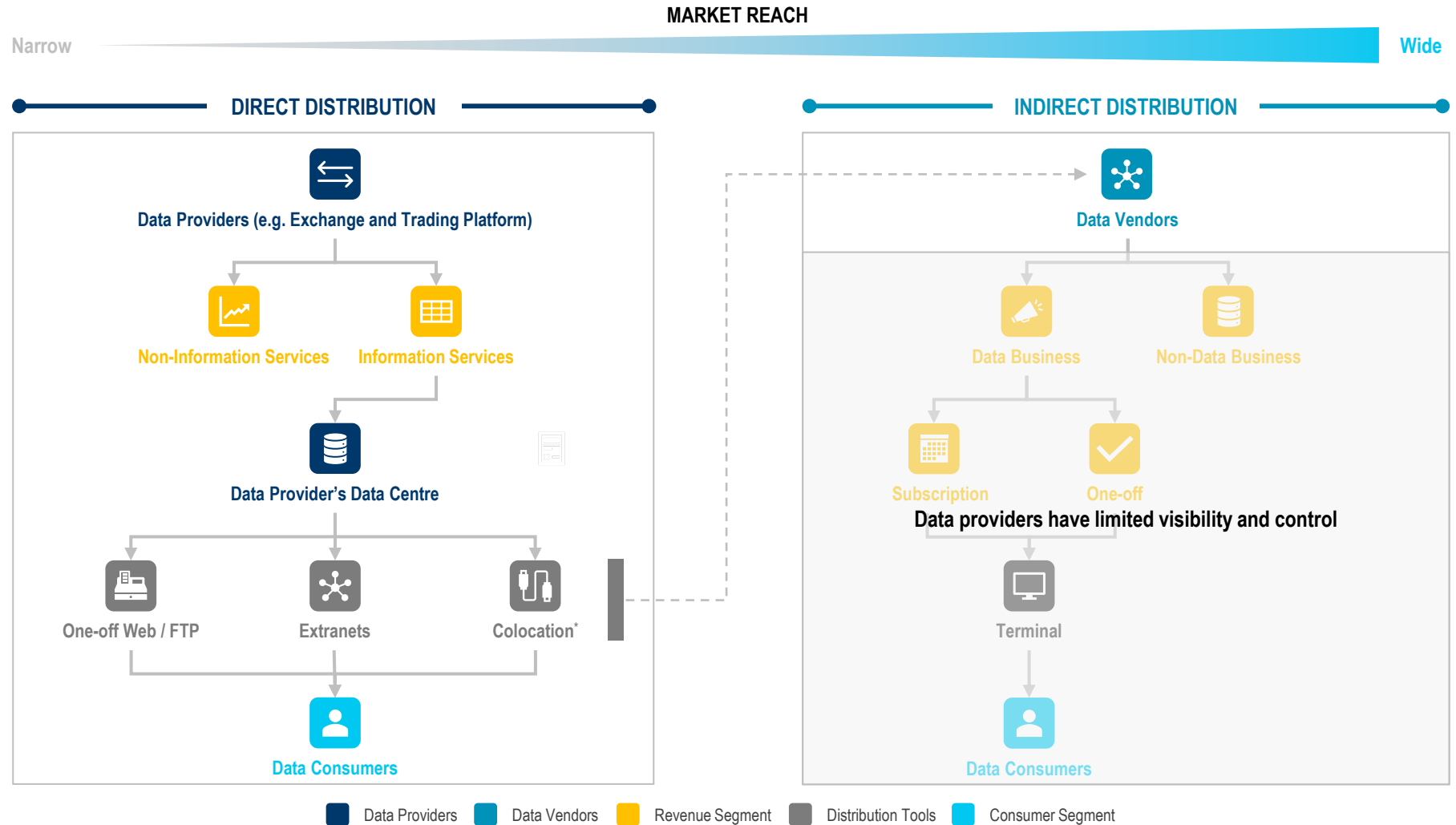
1. Direct Distribution

Direct methods of distribution include data feeds, file transfers and databases accessed via colocation, extranets, file transfer protocols ("FTP") servers, and websites. Benefits include controls and consumer visibility. For consumers, the tradeoffs include latency performance and high fidelity / raw data but higher cost and lower usability.

2. Indirect Distribution

The more prominent model is the wholesale model of indirect distribution, in which providers reach a broad market of consumers but require data providers to give up visibility and control over their data policy enforcement.

To reach a broad and diverse market of consumers, the current indirect distribution model requires data providers to compromise visibility and control over their data



THE COST OF OVER-RELIANCE

KEY TAKEAWAYS

Distribution conflicts

The wholesale model provides a convenient and low-cost distribution solution for providers to minimize the operational risks and costs related to processing, packaging, and distributing data to a wide range of end consumers.

Typically, the vendors also handle the administrative and support burdens related to licensing, entitlements management, usage monitoring and reporting.

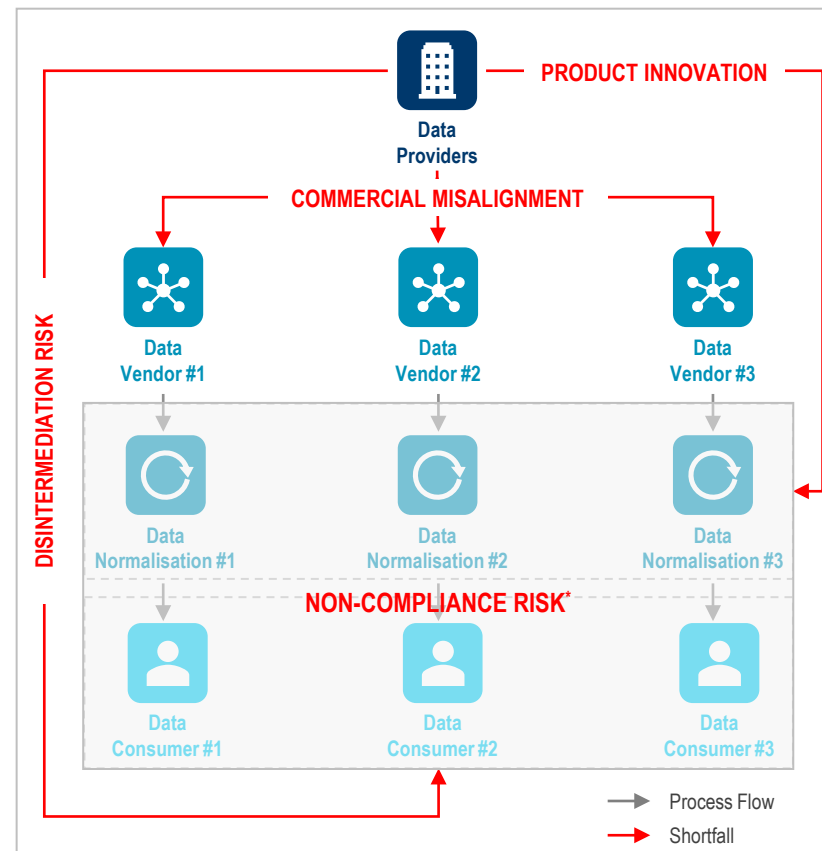
Disintermediation

Outsourcing the administrative and support burdens means giving up consumer visibility, control and cross-selling opportunities resulting in significant revenue leakage and shortfall.

An over-reliance on data vendors constrains providers' product innovation efforts and data monetisation potential while increasing the risk of non-compliance and disintermediation

Indirect Distribution Model

Description



Implication

Data Provider's Perspective

Benefits of relying on Data Vendors

Consumer Reach	✓	• Data vendors provide access to their expansive prospective and existing data consumer base
Integration Support	✓	• Vendors integrate the data across the front and back-end data platform infrastructure
Licensing & Administration	✓	• Data vendors manage licensing, billing, and usage tracking
Customer Support	✓	• Any customer enquiries and / or technical support are handled by the data vendor

Cost of relying on Data Vendors

Product Innovation	✗	• The responsibility of data-related product / service development is left in the hands of data vendors
Commercial Misalignment	✗	• Misalignments in commercial interests and conflicts in data ownership can occur
Non-compliance Risk	✗	• Limited control and visibility over data policies may lead to unintended compliance breaches
Disintermediation Risk	✗	• Data vendors may opt-out from building or continuing data commercialisation arrangements

RECLAIMING THE VALUE CHAIN

KEY TAKEAWAYS

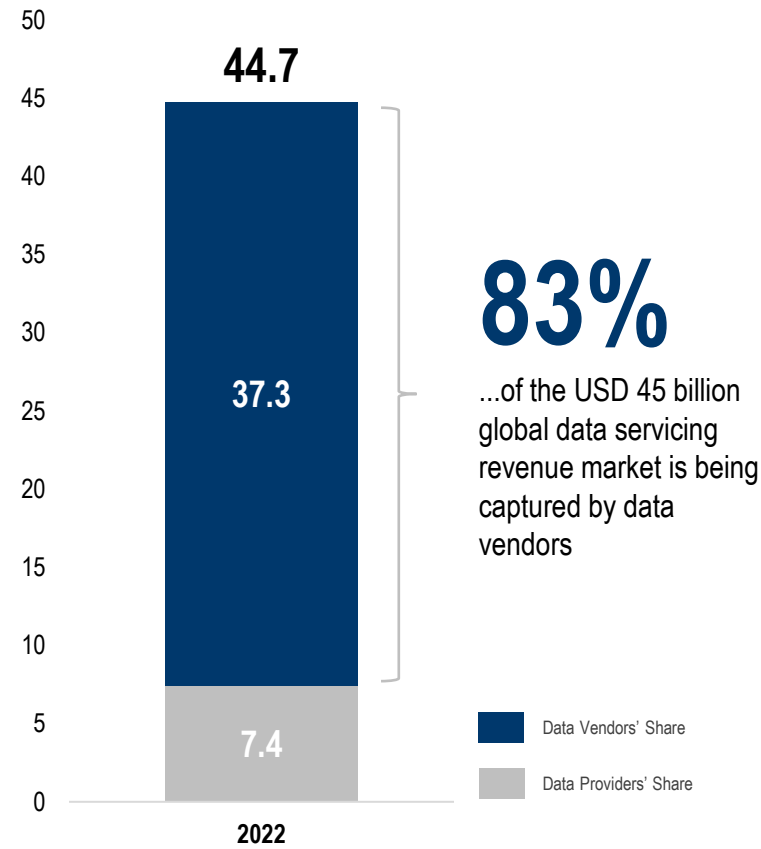
Data vendors currently capture 83% of the ~USD 45 billion global data servicing market data in 2022.

Competition for wallet share is driving many data providers to explore ways to service consumers directly, which requires providers to acquire new capabilities and build support functions.

Competition for wallet share is driving data providers to acquire a greater portion of the data value chain

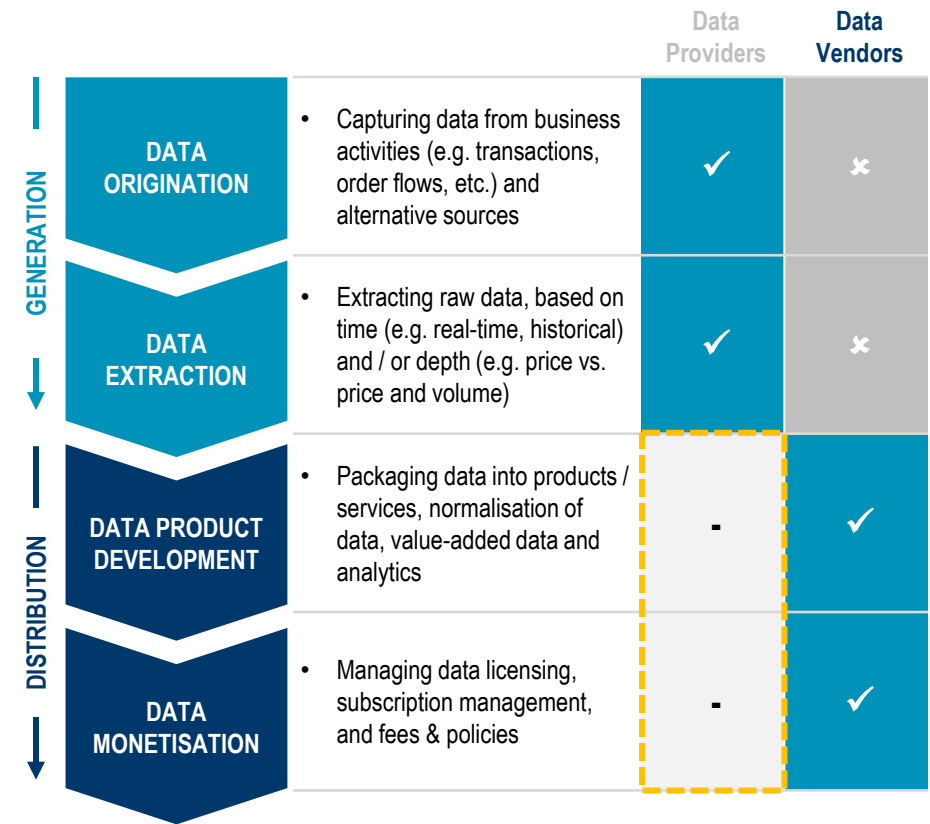
Global Data Servicing Market Share

2022, USD billion



Data Commercialisation Value Chain

From Origination to Monetisation



 Whitespace
 ✓ Current Focus
 - Neutral
 ✗ Not a Focus

CONSOLIDATION

KEY TAKEAWAYS

Some data providers have acquired data vendors to better serve their end consumers. However, this vertical integration strategy comes with significant costs.

For example, the London Stock Exchange Group (“LSEG”) acquired Refinitiv in 2021 for USD 27 billion. While there was a notable increase in “Data Analytics / Information Services” revenue post-acquisition, much of this growth was attributed to the revenue that Refinitiv generated pre-acquisition, with the difference in revenue growth rates pre- and post-acquisition being negligible.

A similar story can be seen in the ICE's acquisition of Interactive Data in 2015.

Several of the world’s largest financial data providers are acquiring vendors to capture the revenue opportunities and reclaim control, albeit at a very high cost

Acquisition of Data Vendors

Case Study



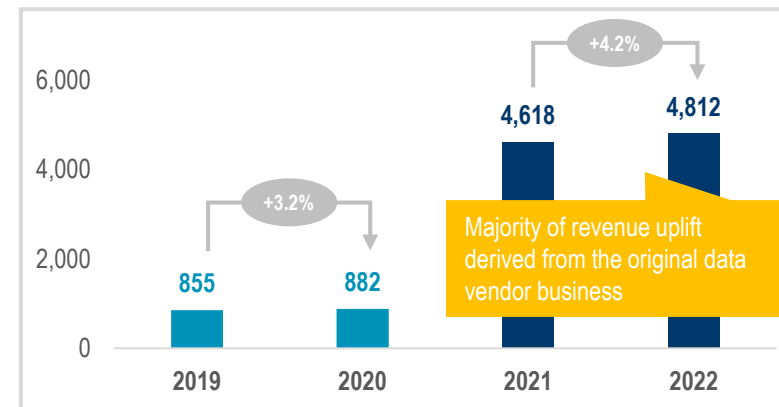
In 2021, the London Stock Exchange Group (“LSEG”) acquired Refinitiv, one of the largest providers of financial market data and analytics, transforming the exchange into a major data player

USD 27 billion

Acquisition Transaction Amount

Data Analytics / Information Services Revenue

2019-2022, GBP million



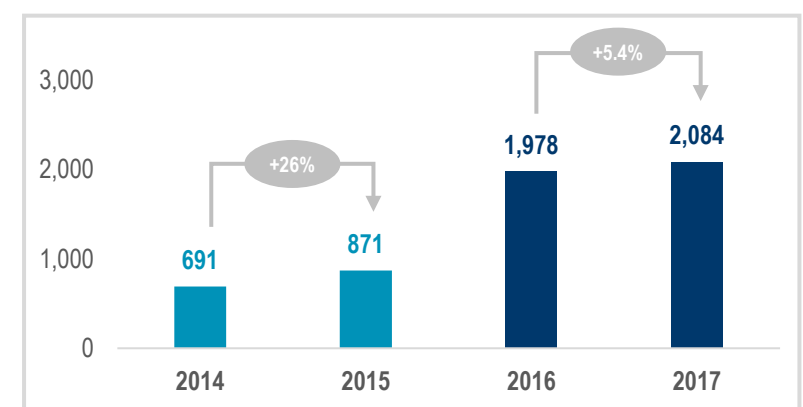
In 2015, Intercontinental Exchange (“ICE”) acquired Interactive Data Corporation (“IDC”), a leading financial data provider that specialises in alternative data, in order to expand its data offerings

USD 5.2 billion

Acquisition Transaction Amount

Data Analytics / Information Services Revenue

2014-2017, USD million





SECTION 2

CLOUD TO THE RESCUE

dataBP

QUINLAN
& ASSOCIATES

A NEW BEGINNING

KEY TAKEAWAYS

Cloud adoption offers a more attractive proposition for data providers to capture monetisation opportunities across the value chain.

The technology not only offers cost-efficient and seamless data management but also provides a new way of operating market access, data servicing, and empowerment software, such as cloud-native application programming interfaces (“APIs”) and artificial intelligence (“A.I.”).

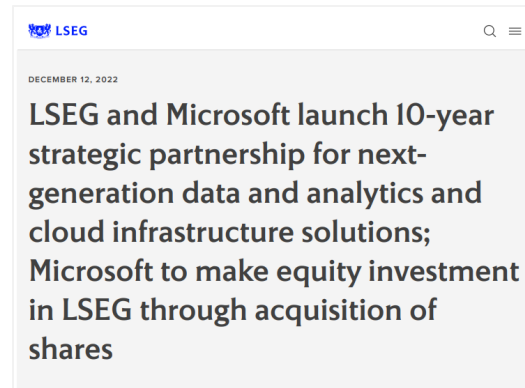
The race to cloud migration from various data providers has already begun, heralding a new era of cloud-powered infrastructure and data-driven innovation in the world of finance.

Notable investments and long-term partnerships have reshaped the landscape, including Microsoft’s GBP 1.5 billion investment in the London Stock Exchange Group (“LSEG”), Nasdaq’s collaboration with Amazon Web Services (“AWS”), and Google’s USD 1 billion investment in CME Group.

Cloud adoption is the cornerstone of the next stage of evolution in the capital markets ecosystem to fully unlock the potential of data-driven business opportunities

Notable Cloud Partnership

LSEG / Microsoft (Dec 2022), CME / Google (Nov 2021), Nasdaq / AWS (Nov 2021)



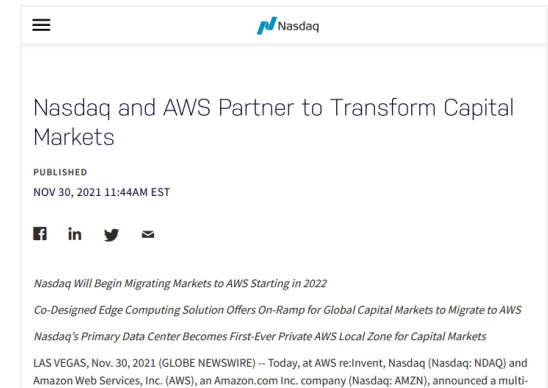
“
This strategic partnership is a significant milestone on LSEG’s journey towards becoming the leading global financial markets infrastructure and data business.

David Schwimmer
CEO, LSEG



“
This partnership will enable CME Group to bring new products and services to market faster – all in a flexible and scalable environment that will create a wide range of opportunities for the marketplace.

Terry Duffy
Chairman and CEO, CME Group



“
This landmark partnership with AWS seeks to power a truly cloud-based market infrastructure that is more resilient, scalable, and accessible for all market participants.

Adena Friedman
President and CEO, Nasdaq



NEW MODEL: CLOUD DATA SHARING

KEY TAKEAWAYS

Cloud data sharing is a complete game changer that offers data providers with an exceptional business case.

The setup requires migration to cloud, which allows real-time and seamless interaction between data and any proprietary and / or third-party data integration and application layers (e.g. cloud-native APIs, A.I., etc.).

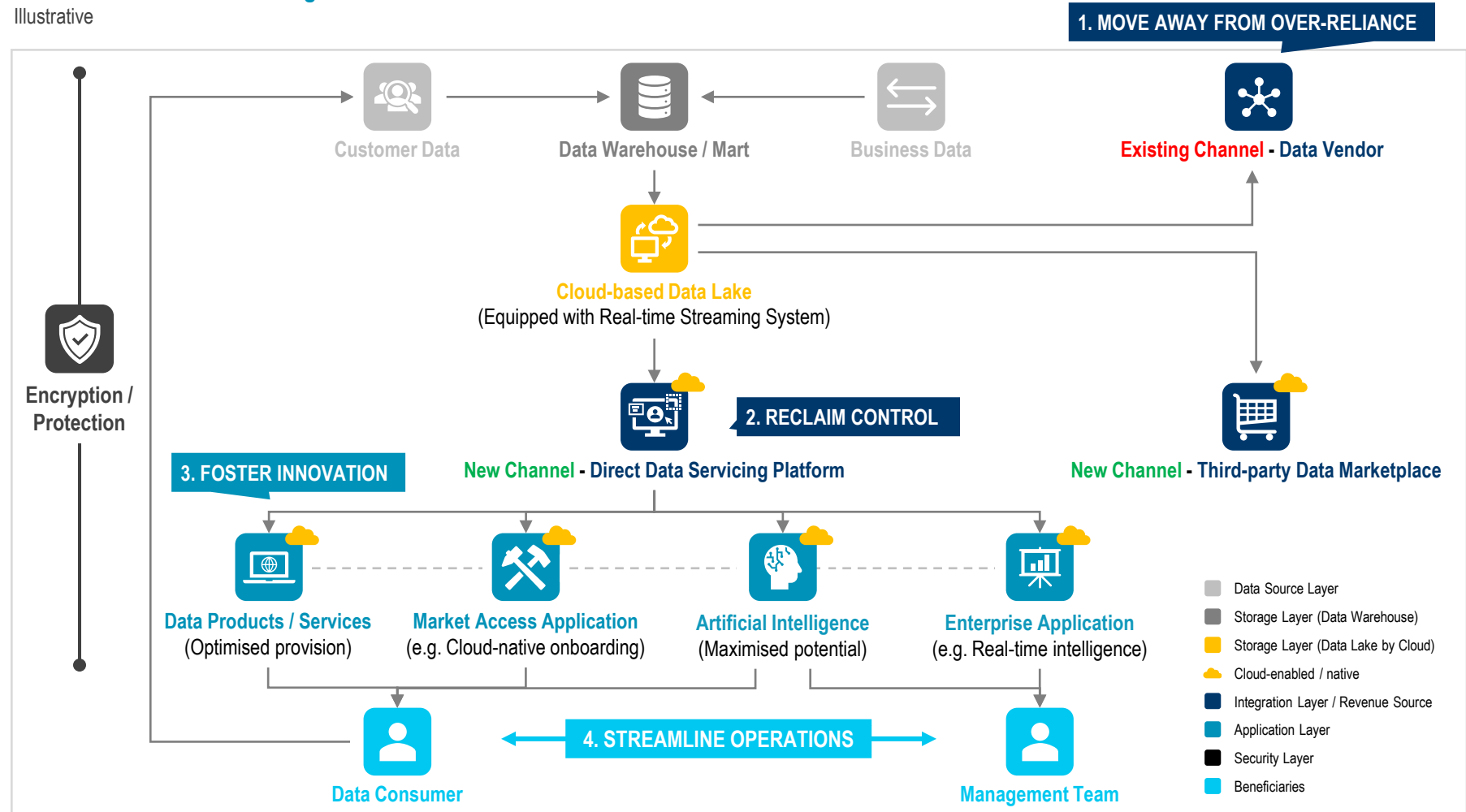
Once the data platform is launched and operational, it allows data providers to:

1. **Move away from overreliance** by opening up new monetisation channels, such as a direct data servicing platform and / or third-party data marketplace;
2. **Reclaim control** over user permissions and digital rights management, enhancing overall risk management;
3. **Foster innovation** by allowing data to seamlessly interact with data software; and
4. **Streamline operations** through real-time access to relevant data and timely updates on supporting cloud-native applications.

Cloud-based data sharing requires migration to cloud infrastructure, which not only supports data commercialisation, but also digitally enables the entire business

Cloud-enabled Data Servicing Platform

Illustrative



BENEFITS OF CLOUD SOLUTIONS

KEY TAKEAWAYS

On top of the aforementioned empowerments, cloud infrastructure offers numerous benefits to both data service providers and data consumers relative to traditional on-premises databases:

- **Data Providers:** cloud allows data providers to manage operating costs and data capacity more efficiently and flexibly, with third-party cloud services offering on-demand pricing and instant deployment.
- **Data Consumers:** cloud enables users to access data products on demand, sourcing only what is required, when required, without having to worry about server failures.
- **Both:** cloud providers offer world-class security measures to protect data providers – and, ultimately, data consumers – against external cyber threats.

Cloud infrastructure also provides efficient, cost-effective, and secure data environments for data consumers and providers, enabling on-demand access and optimised costs

Benefits of Cloud Outsourcing

On-premises vs. Cloud-based Database

BENEFITS OF CLOUD SOLUTIONS

On-demand Scalability

Cloud allows data service providers to dynamically and instantaneously reduce or expand server capacity, enabling seamless data operations

Optimised Resource / Cost Efficiency

Data service providers can effectively manage operating costs, given that the ongoing maintenance of hardware, software, and talent is fully outsourced

Greater Cybersecurity

Cloud service providers employ world-class cybersecurity measures to safeguard data providers and consumers from major cybersecurity threats

ON-PREMISES COSTS

- Software Licensing Fee
- Customisation & Implementation
- Hardware Updates & Expansion
- Adoption Training
- IT Personnel Resources
- Ongoing Maintenance (e.g. network, cybersecurity, database, etc.)

Can be outsourced to cloud service providers

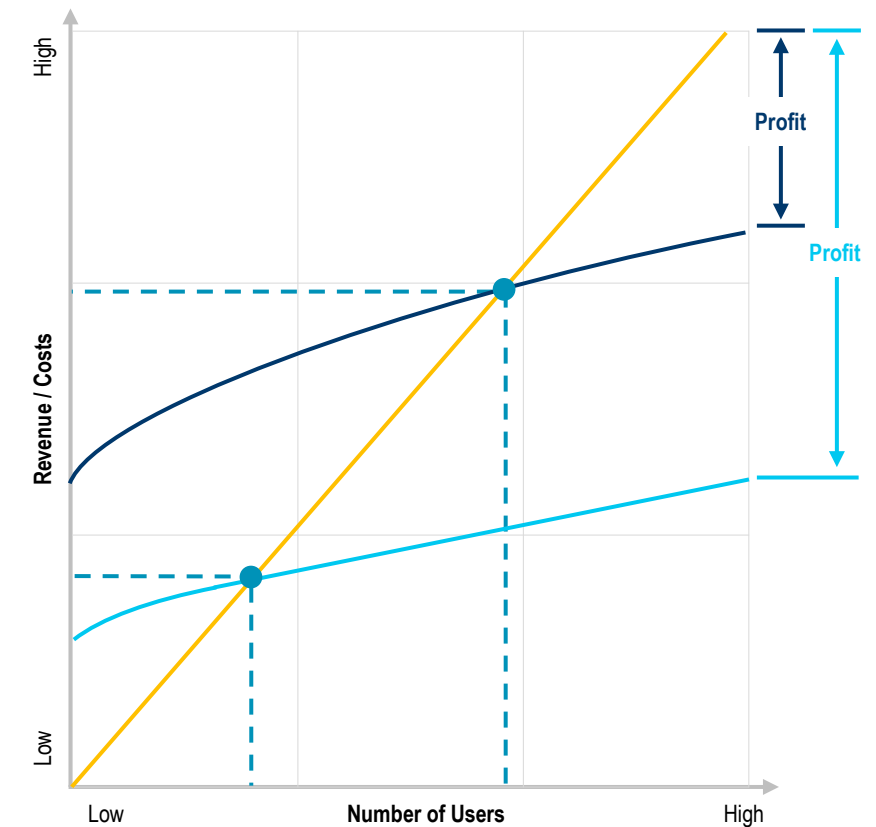
CLOUD SOLUTION COSTS

- Cloud Subscription Fee
- Customisation & Implementation

■ One-off Costs □ Ongoing Costs

Cost Benchmarking

On-premises vs. Cloud-based Database, Revenue / Costs vs. Number of Users



— Revenue — Cost of On-premises — Cost of Cloud Solution ● Breakeven Point

DATA RIGHTS MANAGEMENT

KEY TAKEAWAYS

As digital content grows via peer-to-peer file exchanges, torrent websites, and online piracy, data rights management (“DRM”) is becoming increasingly crucial.

DRM assists companies in defending themselves against the cybersecurity threats that all businesses must contend with, including limiting software usage, safeguarding client data, guaranteeing and proving compliance, improving operational effectiveness, and avoiding downtime. Most importantly, DRM safeguards monetisation avenues for data / content providers.

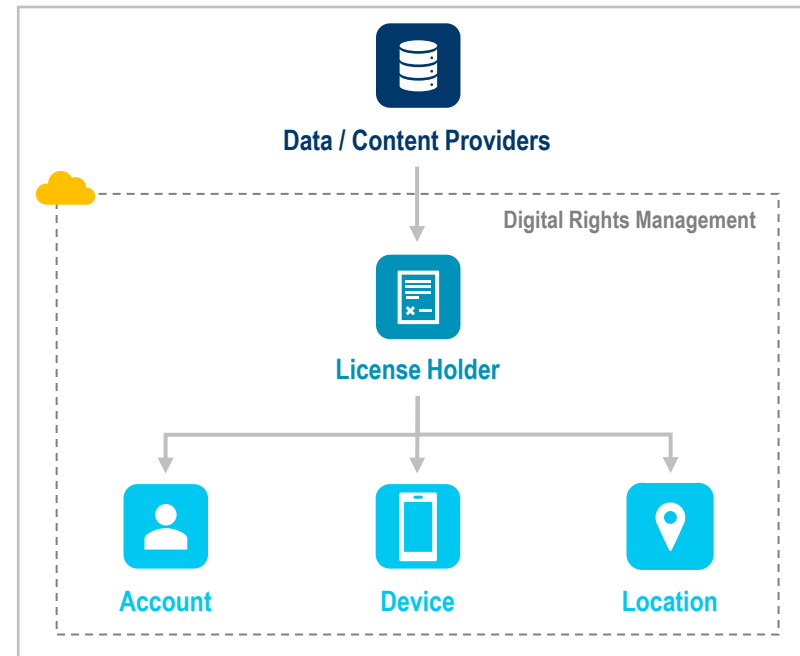
A well-configured cloud environment streamlines the DRM process with real-time updates and automation. This empowers data providers with full transparency and control, while also offering users immediate content access or free trials to reduce onboarding hurdles.

Data providers that embrace a cloud-based data distribution model will operate their businesses in a manner similar to platform-based media companies

Data providers adopting cloud-based data distribution models can look to leverage lessons from content / media companies, especially with respect to data rights management

Data Rights Management Process

Illustrative



BENEFITS

- ✓ Safeguarding Monetisation Avenues
- ✓ Meeting Compliance Requirements
- ✓ Protecting Critical IP
- ✓ Ensuring Cybersecurity

Data Rights Management in Practice

Examples

Example	Method	Result
Microsoft	Anyone downloading the software must accept the company's user license and enter a key before installation	<ul style="list-style-type: none"> • Track license compliance • Prevent unauthorised use of its software
iTunes	Audio files that users download from iTunes include data about customers' purchases and usage of songs	<ul style="list-style-type: none"> • Prevent audio files from being accessed on unauthorised devices
Healthcare Organisations	DRM enforces access controls to define and manage user permissions and access levels to health information	<ul style="list-style-type: none"> • Protect health information • Meet the HIPAA* requirements

LATENCY CONSIDERATIONS

KEY TAKEAWAYS

Some data consumers are heavily reliant on real-time data as they operate in a very time-sensitive environment, such as securities trading firms, market-making firms, and many more. As such, some data providers (e.g. exchanges) provide access to ultra-low latency environments (i.e. co-location) via direct fibre-optic connection.

While cloud technology may not be ideal for ultra-low latency data consumers, the speed of information delivery through routed connections has improved significantly in recent years, reaching 50-100 milliseconds, faster than a blink of an eye (i.e. 100-400 milliseconds).

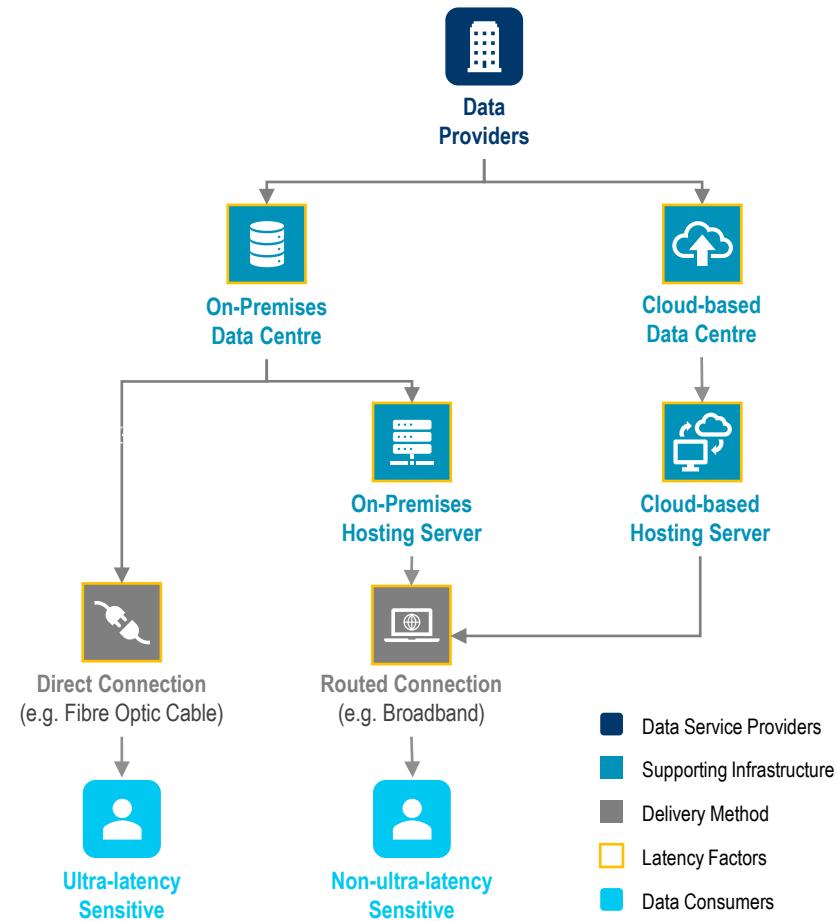
Such speeds satisfy the requirements of most real-time market data consumers, with only ~12% needing an ultra latency sensitive (< 2 milliseconds) environment, such as high-frequency trading firms.

Cloud storage and elastic computing principles are already being integrated into colocation environments.

Cloud is changing the value of speed; as cloud latency performance improves, only a small minority of consumers will benefit from the relative value of direct connections

Direct vs. Routed Connection

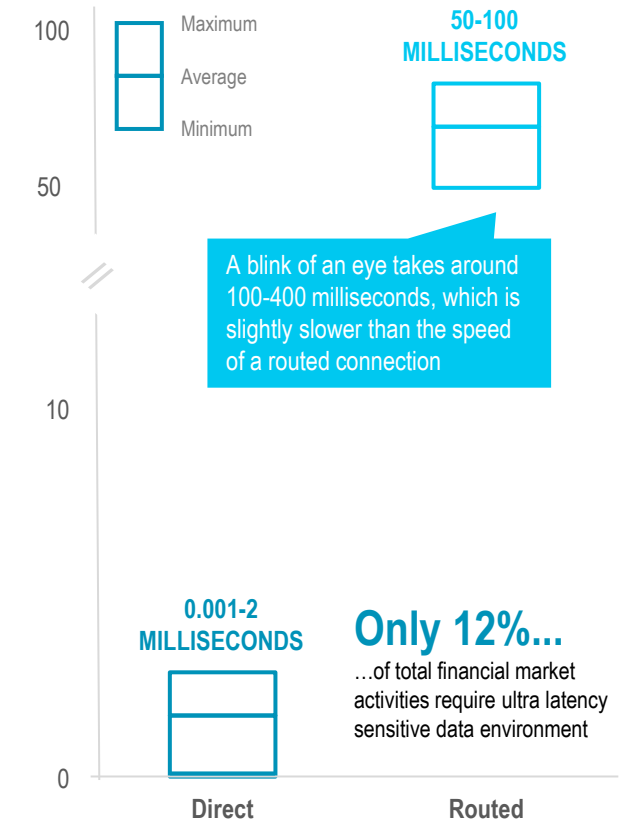
Illustrative



Source: Quinlan & Associates analysis

Direct vs. Routed Connection

Speed of Delivery, Milliseconds



END-CONSUMER ACCESSIBILITY

KEY TAKEAWAYS

Cloud-based database services are primarily offered by globally renowned information technology (“IT”) companies, such as Microsoft, Google, and Amazon.

These companies serve ~5.8 million of the approximately 11 million corporations globally using cloud-based databases, or 51.6% of the total market, providing data providers with access to a large prospective customer base.

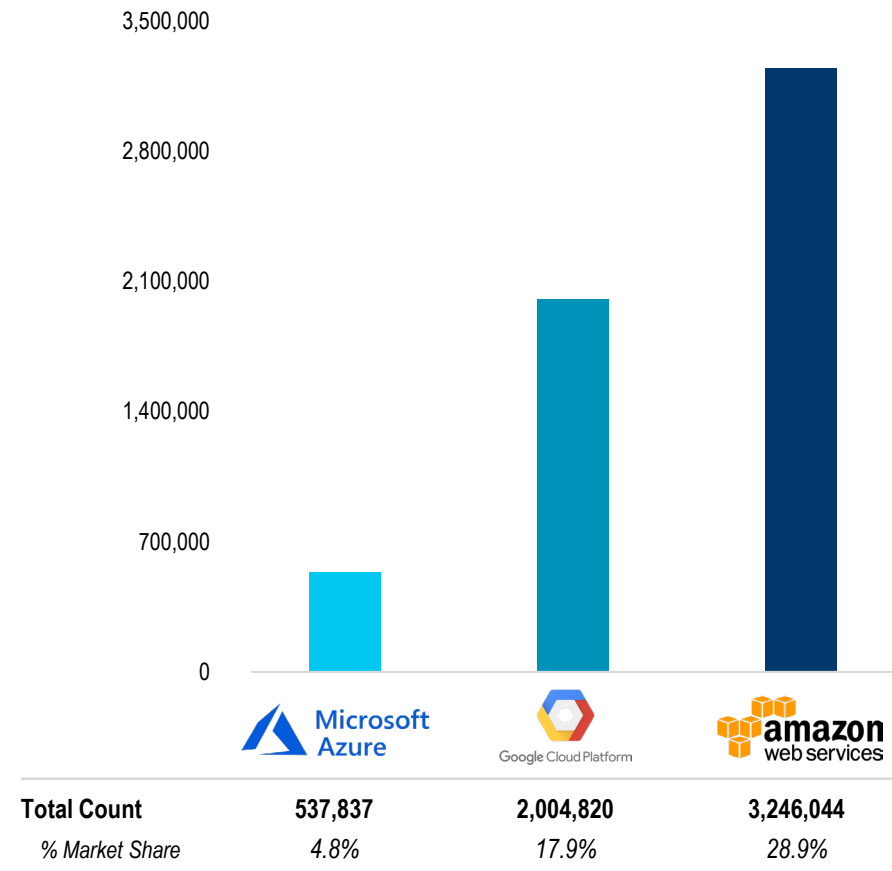
It is worth noting that 85.8% of the corporate clients served by the big three cloud providers generate annual revenues of less than USD 10 million.

Given that many data consumers with limited budgets are concerned about hefty subscription fees, such clients represent an ideal customer segment for data providers looking to expand their market reach.

Cloud solution providers can also offer data providers access to their vast customer bases across various company sizes and sectors who are seeking market data solutions

Total Number of Corporate Clients

Major Cloud Providers, 2022



Aggregate Breakdown

By annual revenue and major sector

By Revenue Size	% Total Count
< USD 1 million	36.7%
USD 1-10 million	49.1%
USD 10-50 million	8.7%
USD 50-100 million	1.9%
USD 100-200 million	1.2%
USD 200-1,000 million	1.3%
> USD 1 billion	1.0%

By Major Sector	% Major Sector
Retail	9.9%
Construction	7.4%
Information Technology	7.3%
Computer Software	6.8%
Hospital & Health Care	6.3%
Real Estate	4.2%
Financial Services	4.1%
Hospitality	4.1%

Potential Interest Groups

SECTION 2.1

DATA PROVIDERS



CLOUD DATA SHARING – DATA PROVIDERS

KEY TAKEAWAYS

Exchanges are forming strategic relationships with the major cloud providers recognising that they are the future of infrastructure and will become important ecosystems.

Cloud providers recognise that exchanges are important sources of proprietary data, infrastructure demands for their own businesses and compute demand for their users.

As of 2022, 34% of global assets / securities exchanges globally had already migrated to cloud-based environments. These exchanges are actively exploring how they can best leverage the cloud to tap deeper into the market data ecosystem.

As they develop cloud distribution assets, most exchanges tend to start carrying third-party data given their relatively narrow proprietary data offerings. For customers, this lowers the costs of data acquisition, but the breadth of coverage remains narrow relative to the conventional data vendor offerings.

Many assets / securities exchanges are already transitioning towards cloud-based data product / service offerings and distribution models

Cloud Migration

Assets Exchanges

Assets Exchanges	DATA TYPES		DATA OFFERINGS		Name of the Offering	Infrastructure Provider
	Proprietary Data	Third-Party Data	Files & Databases	Streaming Real-Time		
Nasdaq	✓	✓	✓	✓	Nasdaq Data Link	AWS
LSEG	✓	✓	✓	✓	LSEG Data Platform	AWS / Microsoft Azure
CME Group	✓	✓	✓	✓	CME Smart Stream & CME Datamine	Google Cloud
ICE	✓	✓	✓	✓	ICE Cloud Connect	AWS
ASX	✓	✓	✓	✗	ASX DataSphere	Google Cloud
DEUTSCHE BÖRSE GROUP	✓	✓	✓	✗	D7	Google Cloud
Cboe	✓	✗	✓	✓	Cboe Global Cloud	AWS
TMX	✓	✗	✓	✗	TMX Datalinx	AWS

✓ Offered ✗ Not Offered

Key Trend ✓ Offered ✗ Not offered

NEW TREND

Exchanges are becoming vendors themselves as they look to leverage their cloud investments and broaden the range of content available to customers.

CASE STUDY (1/3) – NASDAQ

KEY TAKEAWAYS

Nasdaq first migrated from an on-premises to a cloud-based database, which improved data collection processes across thousands of sources from its business operations.

Amazon S3 was used to form a data lake structure as part of the cloud migration, enhancing the flexibility and scalability of data use cases, particularly regarding extraction. AWS also offers cost-effective data archiving / backup services, ensuring business resiliency during unexpected risk events.

Through cloud migration, Nasdaq achieved enhanced data collection capabilities, faster data loading, optimised data querying, and improved business resiliency.

CLOUD PARTNER(S)



By facilitating cloud enablement, Nasdaq has yielded substantial benefits, including: (1) higher storage capabilities; (2) efficient data loading; and (3) efficient data querying

Cloud Migration

Description



Data Warehouse Migration
Migrated from on-premises data warehouse to an AWS* warehouse



Improved Data Collection
Collect financial market data from thousands of different sources on a daily basis



Data Lake Formation
Built the foundation for a new data lake on Amazon S3



Compute / Storage Separation
Enable a separation between computing and storage, facilitating greater flexibility and scalability



Data Archive & Backup
Used Amazon S3 Glacier for data archiving and long-term backup



Enhanced Cost Management
Archiving data in a cloud-based environment can be more cost-effective

✓ Enhanced Collection Capability

Data collection reached 70 billion records per day, on average, with a whopping peak volume of 113 billion

✓ Faster Data Loading

Reached its 90% mark for market data loading completion 5 hours earlier than before

✓ Optimised Data Querying

By optimising its data warehouse, Nasdaq was able to run Amazon Redshift queries 32% faster

CASE STUDY (2/3) – LSEG

KEY TAKEAWAYS

Microsoft Azure migration equipped LSEG with comprehensive infrastructure and integrated capabilities.

By leveraging these new capabilities, LSEG can re-platform its legacy Refinitiv infrastructure unloading costs and unlocking new integration potential across real-time market data, historical market data, and financial news.

LSEG also maintains its AWS partnership for many products and services illustrating a multi-cloud strategy in action.

CLOUD PARTNER(S)



Supported by cloud enablement, robust data access controls, and efficient data querying, LSEG has the opportunity to reinvent itself

Data Servicing

Description



DATA ACCESS CONTROL

Integrating Active Directory with Cloud Identity and Access Management (“IAM”) controls



COMPREHENSIVE CONTROL

Receives comprehensive access control linking sources to consumer desktops and distributed enterprise environments



DATA QUERYING

Leveraged Microsoft Power BI and SQL enables data querying in the data warehouse and Amazon S3 data lake



OPERATIONAL EFFICIENCY

By turning various data-like orders and cancellations into messages and archiving them, billing and reporting surveillance are enhanced



API DEVELOPMENT

Developed API capabilities to allow access to financial data (including real-time market data) through cloud-based technology



SEAMLESS EXPERIENCE

LSEG could facilitate one of the best-in-class customer experience via greater efficiency, flexibility, and scalability



Real-Time Market Data



Historical Market Data



Financial News

CASE STUDY (3/3) – CME GROUP

KEY TAKEAWAYS

CME made a bold move into cloud starting with Datamine for cloud data queries and then creating SmartStream for real-time distribution.

CME leverages DataBP for automated customer onboarding for both DataMine and SmartStream automating data access entitlements by linking to digitalised data licensing agreements. A clear success case enabling instant access to real-time data via the cloud over standard messaging protocols, providing consumer application with direct data access without the need for expensive ticker plants.

CLOUD PARTNER(S)



CME's SmartStream product provides instant access to streaming data via Google Cloud enabling applications to access real-time data directly without the need for a ticker plant

CME

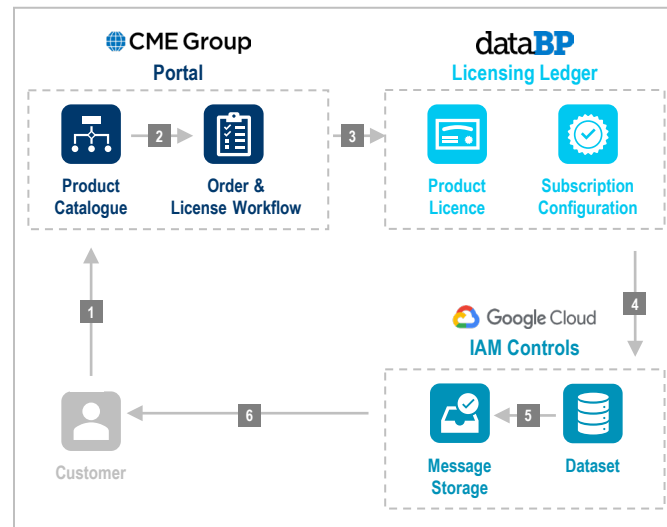
Description



CME is the world's leading and one of the most diverse derivatives marketplaces that is partnering with Google Cloud to migrate its services to the cloud and launch new products / services such as analytics services

Business Model

Data & Information Services



CME Smart Stream

Steps and Benefits

Steps	Benefits
1 Data Subscription Customers subscribe to a topic to receive certain data on an on-demand, pay-as-you-go basis	<i>Customers can enjoy cost savings on data access</i>
2 Product Configuration The product team can define content packages through a management portal	<i>Integrates the customer experience for product access</i>
3 Data Licensing Data providers may license their data to provide customers the rights to use data downstream	<i>Gain control over data with monetisation opportunity</i>
4 Entitlements Send user credentials and entitlement instructions automatically by using the API	<i>Seamless access to cloud data and services</i>
5 Data Storage Message storage ensures that published messages are retained on behalf of the subscription	<i>Provides secure and reliable storage of data</i>
6 Message Distribution Data is distributed using standard messaging to each subscription via Google pub / sub	<i>Standardise the distribution of data via message</i>

RECLAIMING THE VALUE CHAIN

KEY TAKEAWAYS

Database migration from on-premises to cloud environments enables data providers to reclaim the market data value chain, which has long been dominated by data vendors.

We forecast data servicing revenue to grow at a CAGR of 12% from 2022-25 to reach USD 64 billion, underpinned by a growing number of data providers migrating to the cloud and monetising their data without relying solely on data vendors.


We anticipate the total market share of data providers to increase from 16.6% in 2022 to 28.8% in 2025.


We believe the cloud can enable data providers to take back ownership of data product innovation and monetisation, capturing revenue that would otherwise go to data vendors


Data Value Chain

Data Providers' Perspective

		DATA PROVIDERS		
		Legacy Systems	Cloud Migration	Description
GENERATION	DATA ORIGNATION	✘	✓	<ul style="list-style-type: none"> ✓ Scalability in managing large data volumes ✓ Reduce infrastructure cost by only paying for the computing resources used
	DATA EXTRACTION	✘	✓	<ul style="list-style-type: none"> ✓ Flexibility in extracting data, leveraging data lake capabilities ✓ Scalability of data extraction capabilities based on demand
DISTRIBUTION	DATA PRODUCT DEVELOPMENT	✘	✓	<ul style="list-style-type: none"> ✓ Tailor data products and services by leveraging cloud-based apps ✓ Faster time-to-market by cloud-based deployment
	DATA MONETISATION	✘	✓	<ul style="list-style-type: none"> ✓ Capture a wider customer base by modular offerings at a low cost ✓ Generate new revenue stream by creating innovative cloud services

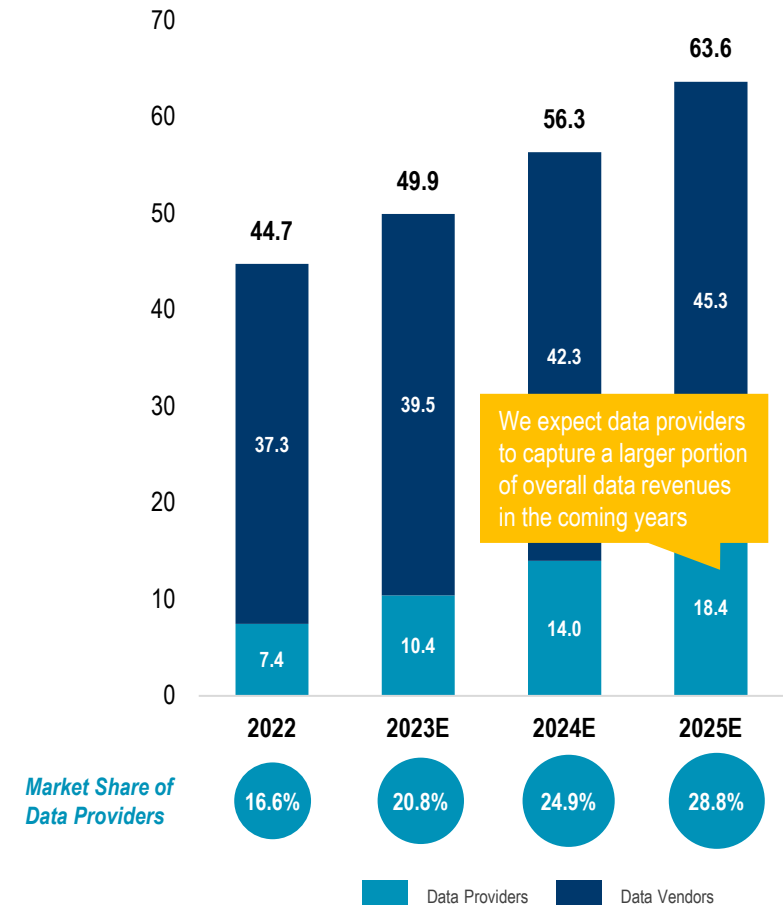
 Revenue Generation

 Highly Enabled

 Lack of Enablement

Data Servicing Revenue

2022-25E, USD billion



SECTION 2.2

DATA VENDORS



CLOUD DATA SHARING – DATA VENDORS

KEY TAKEAWAYS

Recognising the benefits and potential disruption cloud technology can bring to their business models, many data vendors are also migrating to the cloud, offering cloud-based data services such as data feeds and real-time data.

These moves are both offensive and defensive in nature.

From an offence perspective, data vendors recognise the ability to capture long-tail data consumers unwilling to purchase bundled products (e.g. terminal access).

From a defensive perspective, there is an understanding that a growing number of data providers are looking to offer their products directly to end consumers.

Understanding the threats and opportunities posed by cloud, a growing number of data vendors are also migrating to the cloud

Competitive Benchmarking

2022, Cloud-based Real-time Data Specific

Companies (Data Vendors)	Data Source (#)	CLOUD DATA SERVICE		DATA OFFERINGS		Name of the Offering (Cloud / Real-time Data)	Cloud Partner (Infra. Provider)
		Cloud-native Data Feed	Cloud-based Real-time	Raw Data	Normalised Data		
Bloomberg	330+ (Exchanges)	✓	✓	✓	✓	B-PIPE	AWS* / Microsoft Azure / Google Cloud
REFINITIV	250+ (Exchanges)	✓	✓	✓	✓	Refinitiv Data Platform	AWS / Microsoft Azure / Google Cloud
QUODD <small>FINANCIAL INFORMATION SERVICES</small>	150+ (Exchanges)	✓	✓	✓	✓	Cloud Streaming	AWS
S&P Global	200+ (Exchanges)	✓	✓	✓	✓	S&P Capital IQ	AWS
FACTSET	200+ (Exchanges)	✓	✓	✓	✓	Exchange DataFeed	AWS* / Microsoft Azure* / Google Cloud
dxFeed	36 (Exchanges)	✓	✓	✓	✓	dxFeed Cloud Platform	AWS
ALPHA VANTAGE	9 (Exchanges)	✓	✓	✓	✓	Alpha Vantage	AWS
polygon.io	6 (Exchanges)	✓	✓	✓	✓	Polygo.io	Google Cloud
barchart	-	✓	✓	✓	✓	OnDemand	AWS
IEX Cloud	-	✓	✓	-	✓	IEX Cloud	AWS

BLOOMBERG B-PIPE

KEY TAKEAWAYS

Famous for its physical terminal that provides financial market data from more than 300 different sources, Bloomberg is widely considered to be the leading data vendor in the financial services industry.

Bloomberg terminals are usually sold on an annual subscription basis, with a price of USD 24,240 per year (as of 2022).

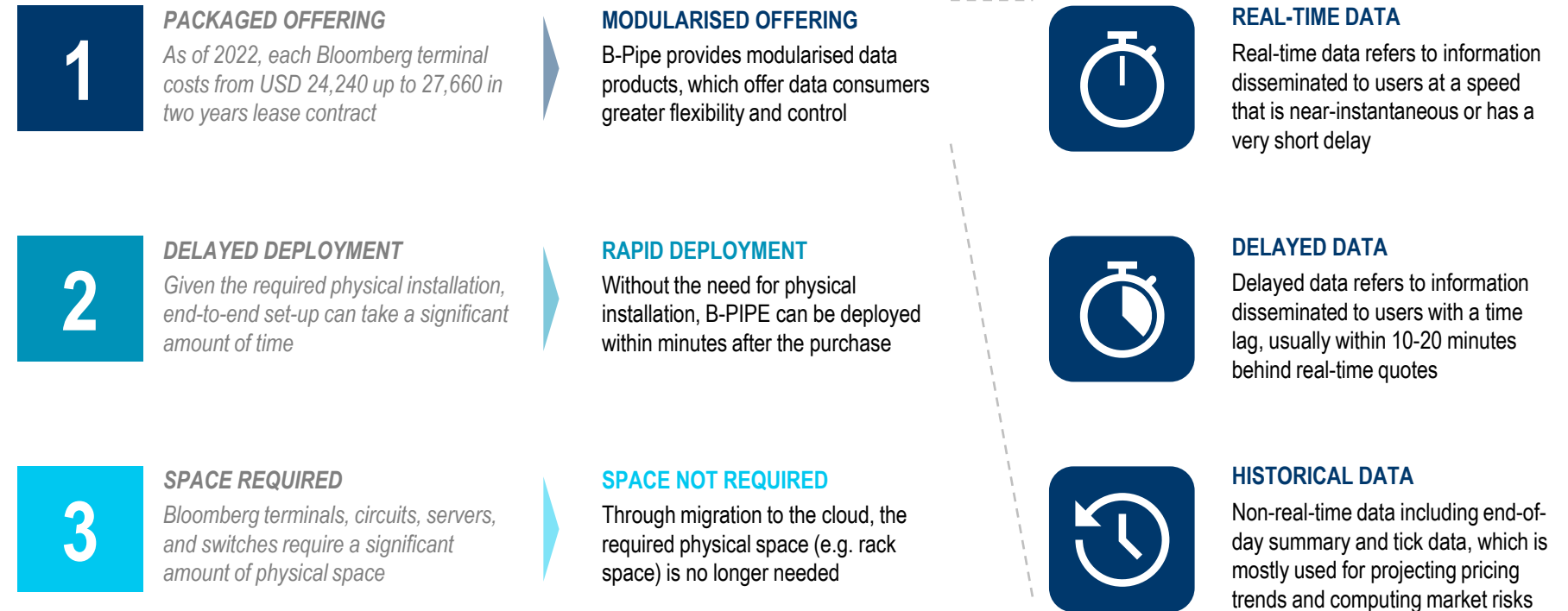
Understanding data consumer pain points around slow deployment times (due to the terminal installation) and hefty price tags, Bloomberg introduced a cloud-based data product called “B-Pipe”, with the help of AWS.

Through B-Pipe, Bloomberg is offering modularised data products that can be better tailored to various consumer needs.

For example, Bloomberg introduced a cloud-based data product called “B-PIPE”, with the help of AWS, to address data consumers’ common pain points

B-Pipe by Bloomberg

Data Consumer Pain Points & B-Pipe Proposition



SECTION 2.3

DATA MARKETPLACES



NEW CLOUD-BASED DISTRIBUTION CHANNEL

KEY TAKEAWAYS

Both direct and indirect distribution models serve distinct data consumer priorities – flexibility in data selection and subscription fees with the former and user experience with the latter.





However, flexibility and user experience may not necessarily be mutually exclusive trade-offs.

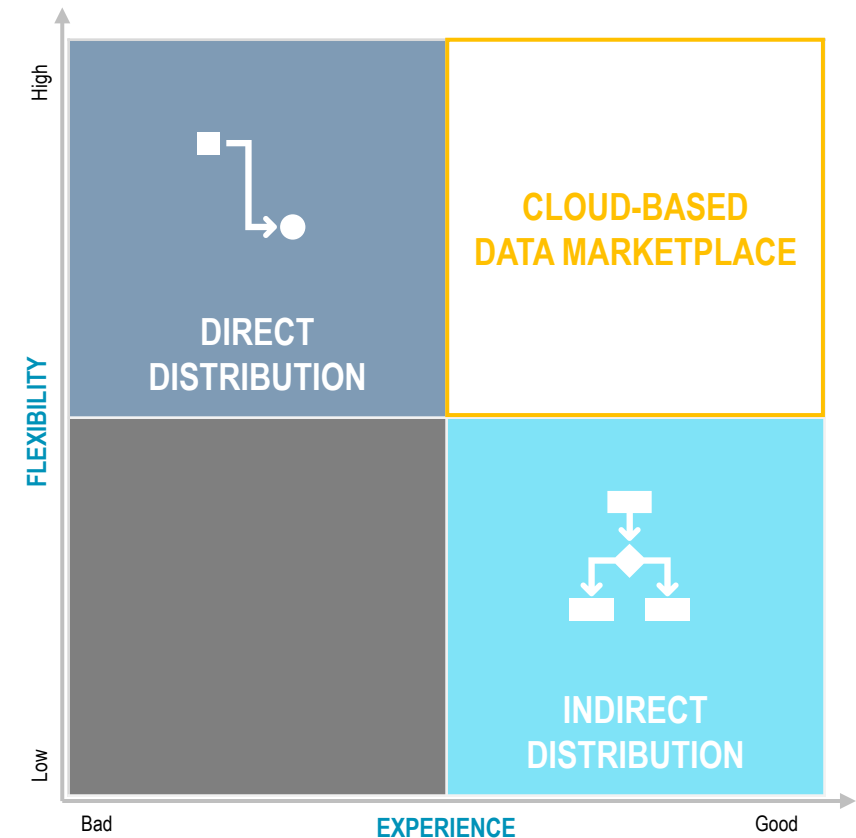
With the help of cloud technology that enables the market data ecosystem via a data lake facility, it is possible to fulfill both flexibility and user experience requirements simultaneously.

With more data service providers shifting to cloud environments, cloud-based data marketplaces can offer enhanced data commercialisation and consumption experiences

Market Inefficiencies

Flexibility vs. Experience

	FLEXIBILITY	EXPERIENCE
DIRECT MODEL	 <p>High Consumers can access relevant data at lower costs, without the need to install and pay for vendors' full suite of tools or terminals</p>	 <p>Fragmented The consumption experience is highly fragmented, which requires customers to convert and process data using tools themselves</p>
INDIRECT MODEL	 <p>Low Consumers have to sign up for aggregated / bundled data services / terminals, which are highly priced and often include irrelevant data</p>	 <p>Seamless Data is already normalised and processed by data vendors for easier consumption by the customers</p>



CLOUD-BASED DATA MARKETPLACE

KEY TAKEAWAYS

The cloud-based data marketplace leverages a data lake facility to optimise the data commercialisation and consumption experience by granting an elevated degree of control to both data providers and consumers.

In a cloud marketplace, data providers and vendors only need to upload data, following which the data lake packages and structures the data by interacting with a query tool.

Consumers only need to request data through this query tool, which will extract and structure data for their specific consumption needs.

Simultaneously, the management of licensing, billing, summarisation of insights, data revisions, and auditing services will be overseen by the cloud service provider.

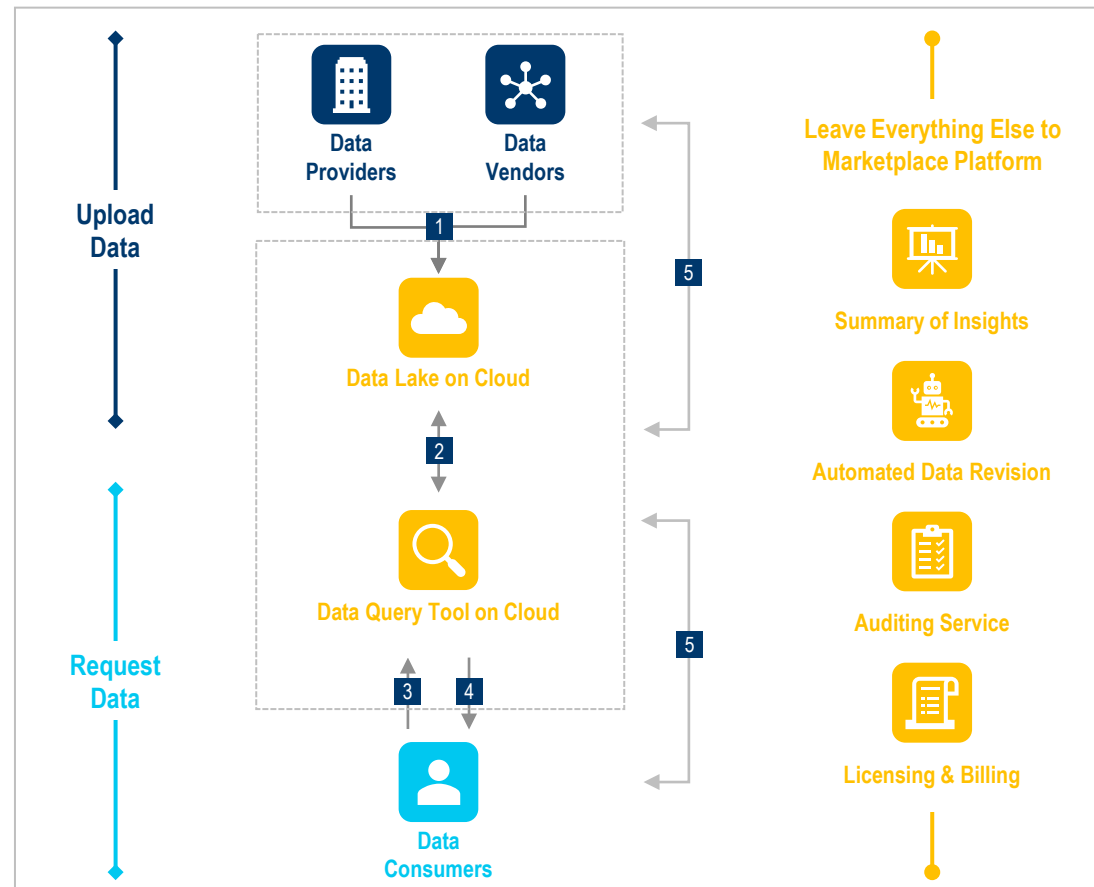
DATA MARKETPLACE PLATFORMS



Cloud-based data marketplaces seek to empower both data consumers and service providers with a higher degree of flexibility and control across the data usage journey

Cloud Marketplace

Overview



- 1 DATA UPLOAD**
 Data provider / distributor uploads their data to the cloud
- 2 DATA PACKAGING**
 Data lake on the cloud interacts with data query tool to structure the data
- 3 DATA REQUEST**
 Data consumer with specific asks requests data through a query tool
- 4 DATA DISTRIBUTION**
 Data query tool on the cloud extracts and structures data for end-user consumption
- 5 DATA LICENSING & BILLING**
 Licensing and billing are supported in a centralised manner by the marketplace

POTENTIAL BENEFITS & ROADBLOCKS

KEY TAKEAWAYS

Cloud-based data marketplaces provide a potentially attractive alternative to using data vendors, allowing data providers to gain direct consumer visibility while providing consumers with a lower-cost alternative and embedded tools for consumption.

However, these marketplaces have shown limited uptake due to:

- **Commercial Misalignment** – These platforms charge participation fees, which reverse the model data providers use with data vendors and potentially raise concerns about fair access issues;
- **Data Licensing & Verification** – Data providers rely on a licensing-based business model, similar to that of the media industry. Currently, associated data licenses require separate, manual onboarding processes; and
- **Technical Limitations** – A lack of support for streaming data means limited utility for market data use cases.

Despite the significant benefits that data marketplaces can provide to both data providers and consumers, they have struggled to gain significant traction

POTENTIAL BENEFITS



CONSUMER COVERAGE

Data providers can access a broader consumer base active on cloud-based marketplace platforms



REDUCED TIME TO INSIGHT

Data providers can reduce 'time to insight' for consumers to identify value in new data products



REDUCED COST OF CAPABILITY ACQUISITION

Data providers do not need to set up technology infrastructure or employ labour for execution



NATIVE INTEGRATION

Native data integration with cloud and its ancillary capabilities (e.g. IAM, multi-cloud compatibility, etc.)



ACCOUNT & BILLING & LICENSING

Account, billing, and licensing are handled by the service provider under a single account



DATA DISTRIBUTION

Data can be shared in a format specifically requested by the data consumers

ADOPTION ROADBLOCKS



INCOMPATIBLE COMMERCIAL MODEL

Marketplace participation fees contradict the conventional commercial models and raise potential fair access issues



DATA LICENSING

Market data in the financial sector is primarily licensed, not sold on demand



POLICY COMPLIANCE ENFORCEMENT

Lack of data policy enforcement mechanisms increases compliance risk



OPERATIONAL LIMITATIONS

The absence of real-time streaming data support significantly restricts market data use cases

LIMITED UPTAKE

DATA MARKETPLACE DIGITAL RIGHTS MODEL

KEY TAKEAWAYS

Data licensing plays a critical role in the commercial models for data providers. Integrating data licensing and rights management provides a path forward:

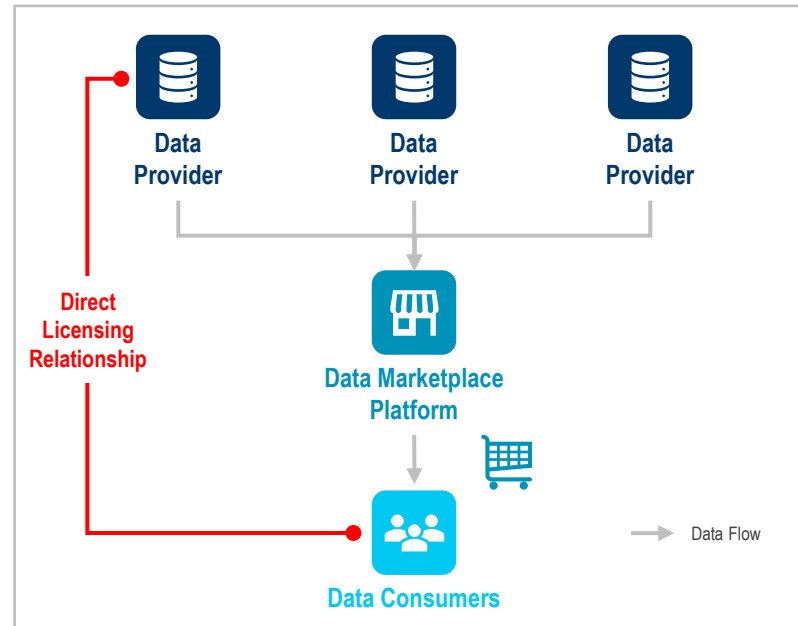
- **Current Model:** Data access is managed via a shopping cart check-out process. Data licensing processes are managed separately. Usage policies must be enforced by each consumer.
- **Integrated Model:** Data licensing workflows are integrated with data marketplaces via API allowing data providers to maintain control and customer visibility. Digital rights management technology enforces policies in consumer applications allowing the data marketplace provider and data consumer to avoid the administrative burdens of managing data policy compliance.

Similar techniques have been used in streaming media consumption for years. As more workloads move to the cloud, we see the integrated model emerging to better support data monetisation.

Integrated data licensing processes and digital rights management techniques have the potential to significantly improve the data marketplace model

SHOPPING CART MODEL

Current



BENEFITS

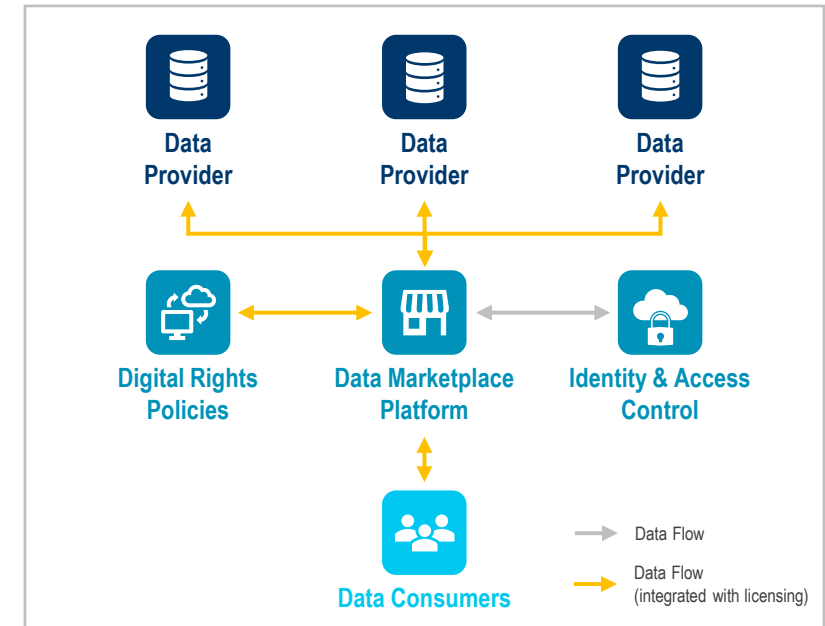
- ✓ Lower cost of acquisition for customers
- ✓ Integration with cloud services and tools (e.g. Snowflake)

CHALLENGES

- ✗ Direct licensing relationships require a separate out-of-band verification process increasing onboarding friction

INTEGRATED MODEL

Future



BENEFITS

- ✓ Data providers maintain full control and customer visibility
- ✓ Data marketplace providers and consumers avoid administrative burdens
- ✓ Data marketplace as “trustless agents”, provides data to a wider customer base and eliminates the costs (and risks) typically associated with data redistribution

DATA MARKETPLACE WHITE-LABELLED MODEL

KEY TAKEAWAYS

A potential new model combines the benefits of data marketplaces without the costs of building individual data shops through white-labelling, similar to how Shopify became a global e-commerce leader.

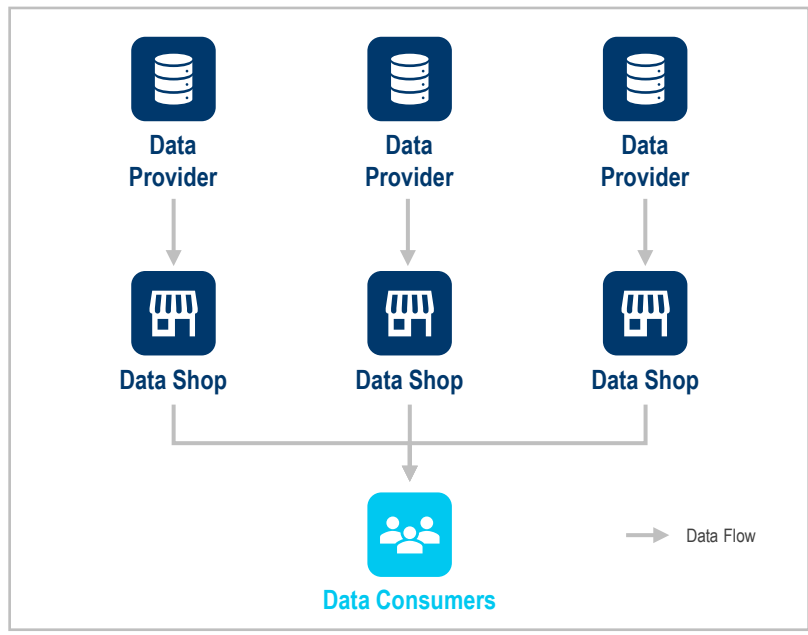
White-labelled data marketplaces will enable customised and data provider-branded versions of data marketplaces, which will allow the providers to directly control data access, maintain customer visibility, and enforce data policy compliance while avoiding the expenses associated with managing their own web shops.

Integrated data distribution and acquisition methods mean that proprietary data products are also available to data marketplace consumers (Snowflake, Amazon Data Exchange, etc.) without having to be managed separately.

Data marketplaces may provide a 'White-labelled' alternative to each data provider's individual 'Data Shop' and a convenient single one-stop-shop for data consumers

DATA SHOP MODEL

Current

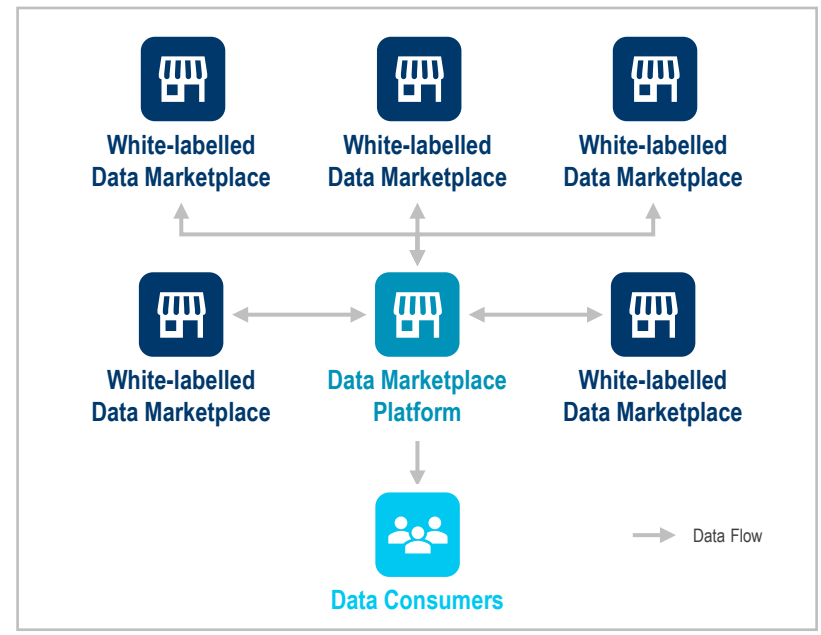


CHALLENGES

- ✗ Individual data shops developed and operated by each data provider for a narrow range of proprietary products
- ✗ Consumers manage multiple points of data acquisition

WHITE-LABELLED MODEL

Future



BENEFITS

- ✓ Avoids the costs associated with managing individual data shops
- ✓ Benefits from the reach (convenience to consumers) without losing control or customer visibility
- ✓ Allows data marketplaces to avoid the costs and administrative burdens associated with becoming a licensed redistributor ("vendor of record")

SECTION 3

IMPLEMENTATION CONSIDERATIONS

IMPLEMENTATION CONSIDERATIONS

KEY TAKEAWAYS

The term “cloud” can be used broadly in different contexts, and such usage can create confusion in the market.

To this end, it is critical to delineate the term “cloud” based on whether it is used to describe a “database” or “business”, which are independent of one another.

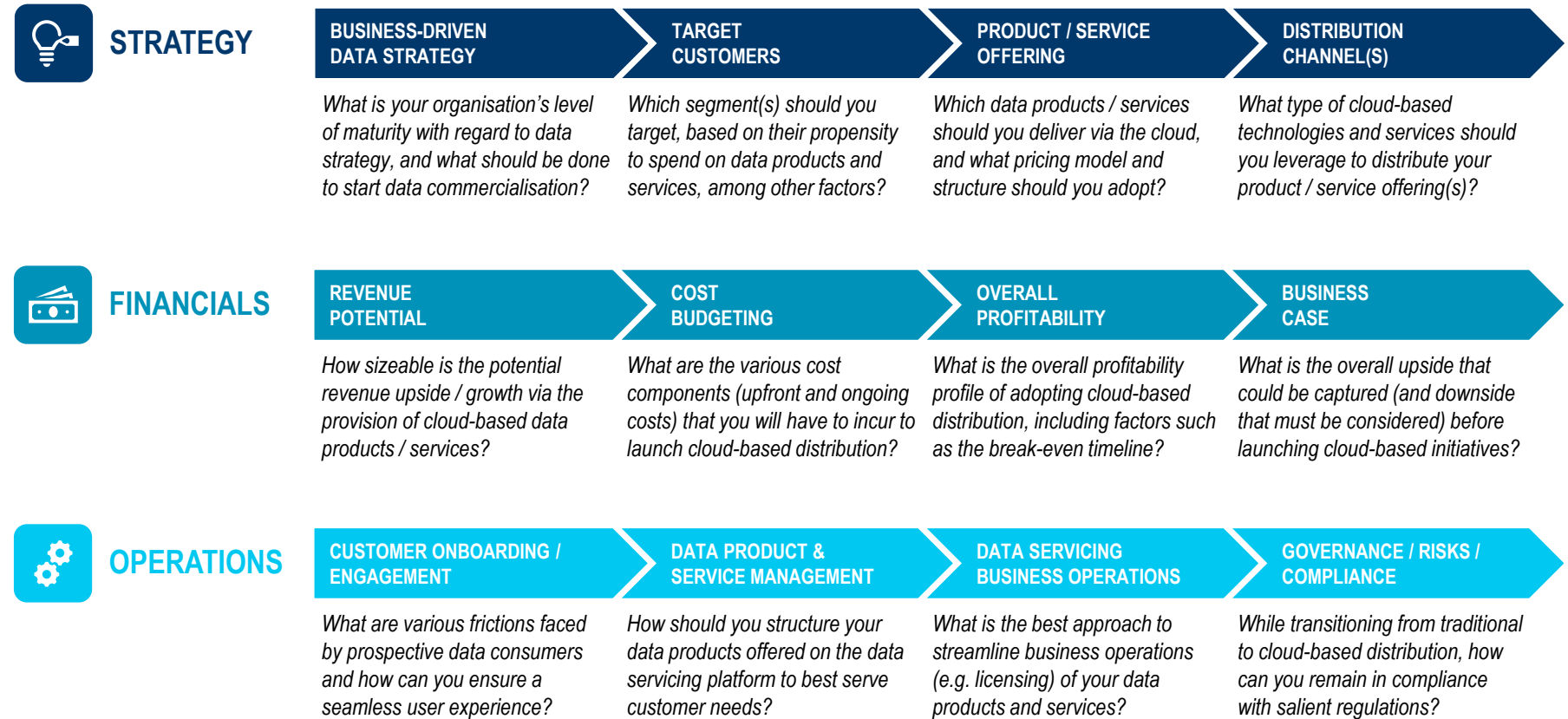
For example, cloud migration, which refers to the migration from on-premises to cloud-based databases, concerns the “database”, while cloud-based data service refers to companies leveraging the capabilities offered by the “cloud databases” and monetising them to create additional revenue sources.

In other words, just because a company migrates to a cloud environment does not mean the company can magically start to monetise its data via the cloud – new capabilities need to be acquired, particularly in the context of data business operations.

To achieve a seamless migration to the cloud, corporates must take into account a comprehensive array of strategic, operational, and financial considerations

Considerations

Strategic, Operational, and Financial Factors



SECTION 3.1

STRATEGIC CONSIDERATIONS



BUSINESS-DRIVEN DATA STRATEGY

KEY TAKEAWAYS

BAIT is a framework that helps to showcase how a data strategy project should be approached, from formulation to execution, while detailing the individual components necessary for a successful data project.

The BAIT framework consists of four key parts, all of which represent a vital step in the overall process:

1. Business
2. Application
3. Information
4. Technology

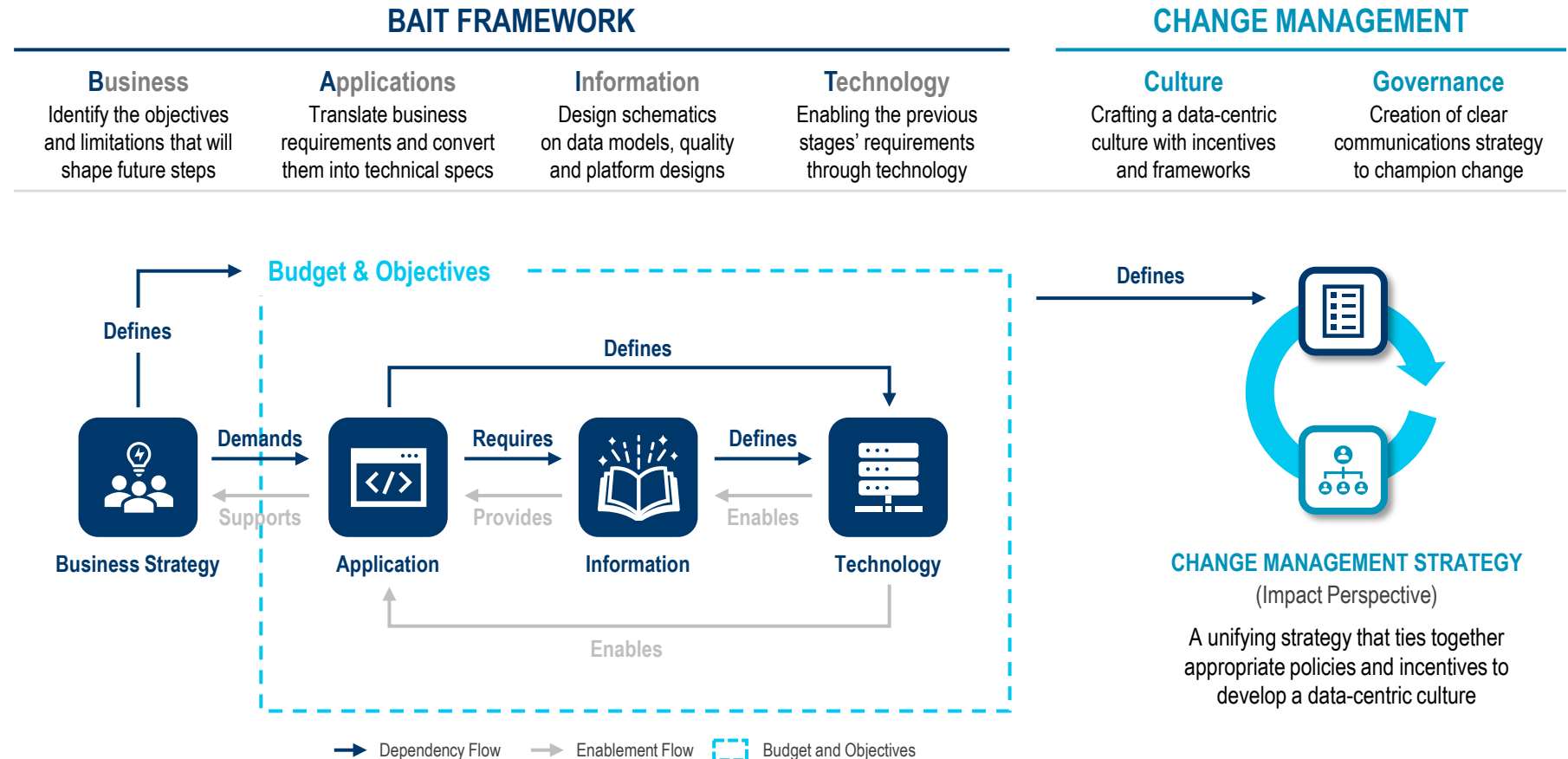
Tying together a data strategy requires more than just the most advanced hardware, software, or talent; it requires a unifying change management strategy.

Companies need to carefully tailor their data strategy with these components in mind to match their business objectives. This should be paired with near-perfect execution of holistic data systems for all business decisions, as doing otherwise would result in, at best, a loss in productivity or, at worst, direct monetary losses.

There are various business, application, information, and technology considerations that organisations must address before looking to commercialise their data

Classifications & Relevant Components

Illustrative



CUSTOMER SEGMENTATION

KEY TAKEAWAYS

It is critical for firms to identify and assess the attractiveness of target customer segments, considering cloud-based data distribution is not sufficient for some of the data consumers.






In fact, depending on the company size and revenue scale, different prospective data consumers will have different budgets and requirements.

Additionally, understanding the level of alignment in the areas of financial sophistication (i.e. do they have relevant knowledge?) and technology compatibility (i.e. can their infrastructure support the data service we provide?) is also critical.

To identify key pockets of demand for data products and services, data service providers should seek to conduct detailed customer demand segmentation / mapping and sizing

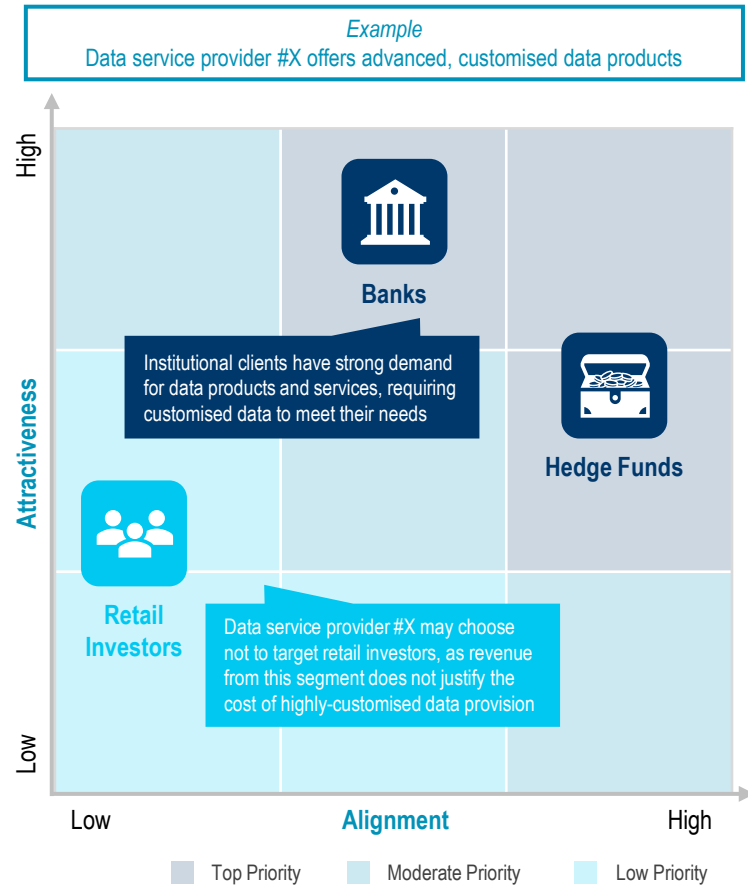
Target Segmentation

Categorisation Criteria (Illustrative)

	Category	Description
Attractiveness	 Segment Size	Total number of individuals / organisations within a particular customer segment to determine the potential market size
	 Customer Reach (B2B / B2B2C only)	Size of current customer base, and the ability to reach out and engage with additional retail customers
	 Estimated Data Budget	The willingness of each individual / organisation in a segment to pay for data products and services
Alignment	 Financial Sophistication	Level of financial expertise and knowledge possessed to determine data needs (e.g. advanced vs. simple data, etc.)
	 Technology Compatibility	Level of alignment between the technology infrastructure of a segment with the data service provider's data offerings

Prospective Customer Segment

Illustrative



PRODUCT-DRIVEN BUSINESS MODELS

KEY TAKEAWAYS

Once a relevant data customer segment(s) is identified, data service providers should evaluate different pricing models, including objective benchmarking, to assess the most viable option(s) for their data services.

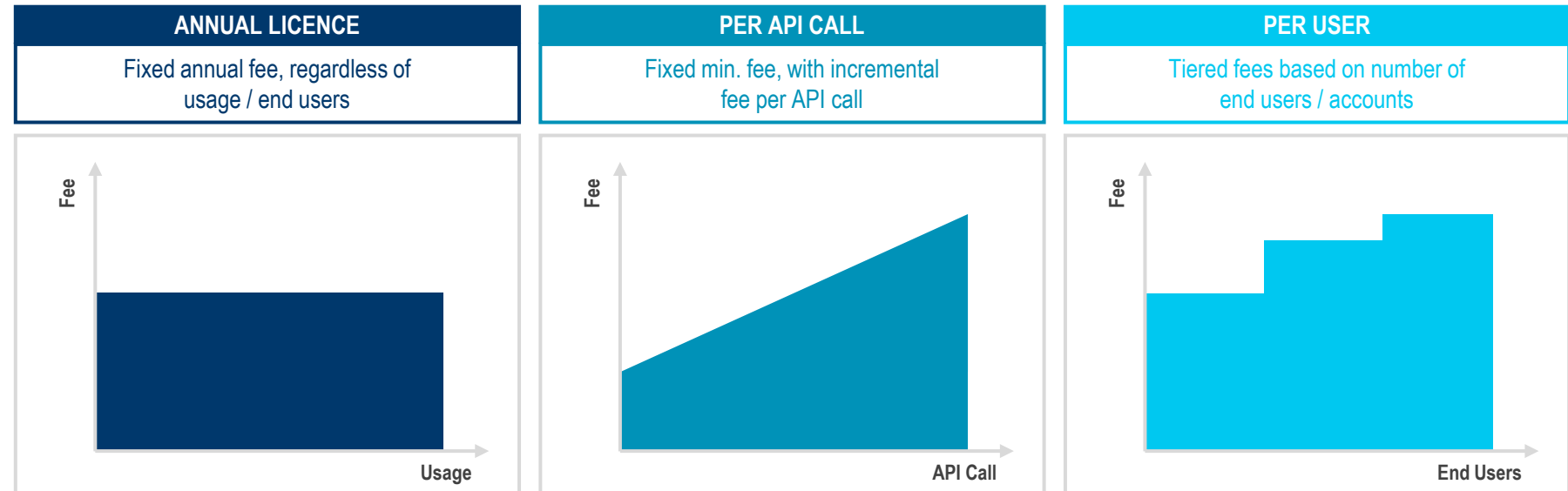
Some pricing models that may be considered for data servicing businesses include:

- Annual license
- Per API call
- Per user

Different pricing models should also be evaluated, such as fixed license fees or variable fees based on API calls or the number of end users

Potential Business Models

Examples*



POTENTIAL DRAWBACKS TO BE CONSIDERED

FAILURE TO CAPTURE GROWTH

Since the annual licensing fees are fixed, cloud service providers may fail to capture upside potential from growth in usage, which may increase operational costs

LOSS OF LARGE CLIENTS

A per API call model may not be suitable for larger clients with high API call volumes, particularly those with rapidly fluctuating usage patterns

RISKS OF BEING ARBITRAGED

As fees are charged based on the number of users / accounts, data consumers may end up sharing their accounts with other potential consumers, inhibiting revenue growth

PRICING STRUCTURES

KEY TAKEAWAYS

Many data providers in the financial market are rich in data but lack proper data business experience, which is different from their core business operations (e.g., securities trading, market making, etc.).

As such, after developing a suitable business model, supporting the business with a robust pricing structure is equally important.

A robust pricing strategy needs to be developed for cloud-based data products and services, with consideration given to pricing components, models, and fee ranges

Pricing Structure Components (Illustrative)



DISTRIBUTION CHANNELS

KEY TAKEAWAYS

After identifying target customers and exploring suitable pricing models, data service providers should weigh up the merits of various distribution channels through which they could effectively target them.

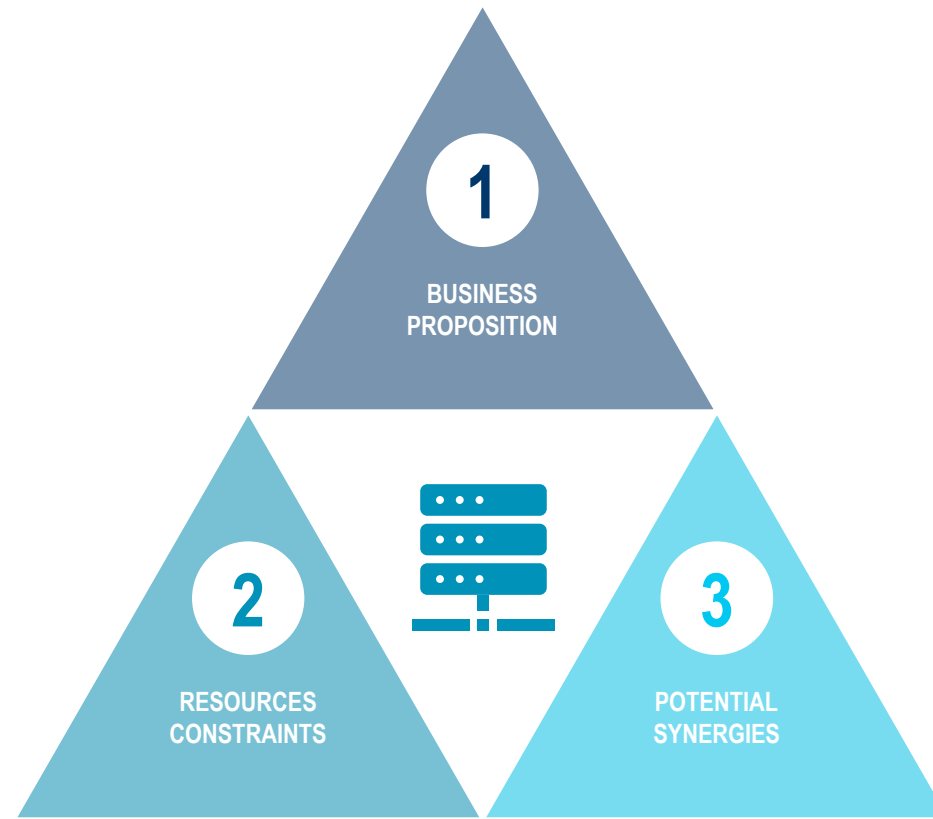
The most optimal channel(s) may vary depending on the following :

- Business Proposition
- Resources Constraints
- Potential Synergies

In order to determine the most suitable channel to offer data products and services, data service providers must consider the following dependency factors

Key Dependencies

Features



1

BUSINESS PROPOSITION

B2B data service providers may opt for a more direct sales approach to reach out to institutional clients with customised needs, as opposed to B2C providers that can utilise online / digital channels

2

RESOURCES CONSTRAINTS

Providers with large budgets may allocate their resources across channels (e.g. hold events, publish original content), while those with limited budgets must carefully select the most effective channels

3

POTENTIAL SYNERGIES

Data service providers may explore potential synergies with other organisations (e.g. data marketplaces, indirect providers) and consider partnering with them to acquire more customers

SECTION 3.2

OPERATIONAL CONSIDERATIONS



ENGAGEMENT VALUE CHAIN

KEY TAKEAWAYS

New operational capabilities are needed to effectively monetise market data, as data consumers will not open their wallets unless their experience across the end-to-end engagement value chain is adequately fulfilled.

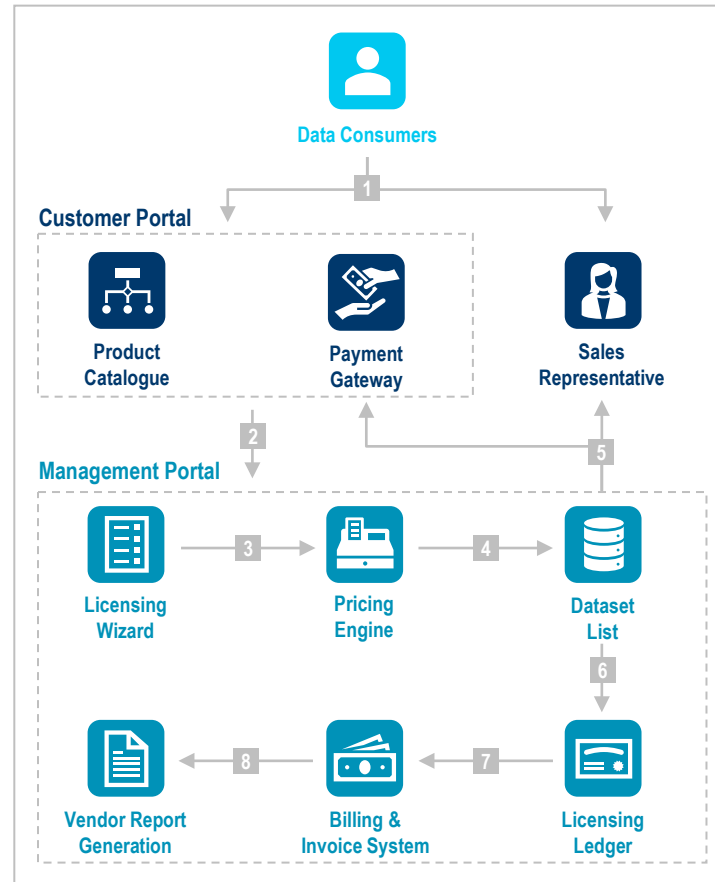
Engagement Value Chain

- Sales Initiation
- License Configuration
- Pricing
- Data Purchase
- Customer Approval
- Record Keeping
- Vendor Reporting

Data service providers should look to fulfil customer needs / demands across the value chain by developing a clear customer engagement process

Data Consumer Engagement Value Chain

Illustrative



CUSTOMER ONBOARDING	Prospective data consumers are onboarded on a data servicing platform
SALES INITIATION	The customer initiates an order, either through the website portal or via a salesperson
LICENSE CONFIGURATION	The licensing wizard reviews the order and determines the relevant policies & terms based on the user's requirements
PRICE SETTING	The pricing engine calculates the variable and fixed fees, tiers, discounts, tax rates and currency conversion
DATA PURCHASE	Data purchases and licenses are carried out, upon which KYC checks occur to verify the customer's identity
CUSTOMER APPROVAL	Upon passing the compliance check, the purchase / payment is approved
BUSINESS RECORDKEEPING	Behind the scenes, all customer licensing, orders, billing, and reported usage are recorded in a secure system
BILLING MANAGEMENT	Billing details are processed, and the customer is provided with billing information
VENDOR REPORTING	Usage reports and entitlement reports are generated, which include details regarding data usage, access, and more

DATA PLATFORM REQUIRED CAPABILITIES

KEY TAKEAWAYS

To fulfill the customer value chain, two portals must be set up: (1) a management portal and (2) a customer portal.

Management portal is used by the data service provider to properly track and seamlessly operate the business:

- Customer Management
- Product Management
- Licensing & Subscription Approval
- Billing Operations
- Revenue Management
- Compliance Assurance

Customer portal is used by the data consumer to directly engage with the data service provider to make a purchase, set up workflow, receive bills, etc:

- Integration via SSO
- Data Catalogue
- Custom Licensing Workflows
- Billing & Reporting
- Online Purchases
- White-labelling

A number of capabilities / features are required for a data service provider to better serve their customers and realise the monetisation potential of their data

Required Capabilities

Management & Customer Portal

MANAGEMENT PORTAL



Customer Management

Facilitate seamless customer onboarding and approval processes by integrating with CRM software (e.g. Salesforce)



Product Management

Support the management of product definition, configurations, and catalogue on the cloud (e.g. Oracle, Google Cloud)



Licensing & Subscription Approval

Simplify ongoing licensing and subscription management via an integrated enterprise workflow



Billing Operations

Enable the management of billing rules based on pricing models, made possible by the calculation engine



Revenue Management

Track and manage revenue streams by integrating with billing system and payment gateways (e.g. Stripe)



Compliance Assurance

Facilitate compliance by the availability of an entitlement reporting format and analysis feature, along with audit planning

CUSTOMER PORTAL



Integration via SSO*

Enable a seamless authentication method for users to access the platform in a single sign-on manner



Data Catalogue

Showcase information about datasets and sources available in the platform, such as data types, pricing, etc.



Custom Licensing Workflows

Manage the licensing of data, including tracking usage and billing



Billing & Reporting

Facilitate the billing process on customers for data access with built-in report generation



Online Purchases

Facilitate a secure and seamless payment experience by integrating the customer portal with payment gateways



White-labelling

Customise the features and display of the customer portal to align with the company's branding (e.g. logo, colours)

AVAILABLE OPTIONS

KEY TAKEAWAYS

There are three options available to acquire operational capabilities: (1) outsource to third-party service providers with relevant capabilities, (2) acquire a company with data monetisation experience, and (3) build capabilities from scratch through hiring relevant talent, seeking advice, etc.

Considering various criteria (e.g., affordability, scalability, control, customisation, talent needs, and time-to-market), it appears that outsourcing the capability to a third-party vendor with a strong track record is the best option among the three.

Given the level of investment and resources required to acquire / build relevant capabilities in-house, outsourcing may be the preferred option for many data service providers

Potential Options

Outsource, Buy, or Build

	<div style="text-align: center;"> 1 </div> <div style="text-align: center;"> <h2>OUTSOURCE</h2> <p>Cloud Service Providers</p> </div>	<div style="text-align: center;"> 2 </div> <div style="text-align: center;"> <h2>BUY</h2> <p>Acquisition</p> </div>	<div style="text-align: center;"> 3 </div> <div style="text-align: center;"> <h2>BUILD</h2> <p>Organic Development</p> </div>
DESCRIPTION	Outsource the data cloud migration process to third-party cloud service providers / partners	Acquire an existing player in the industry who offers robust cloud data products / services	Build relevant cloud capabilities to harness the migration process on your own, from the ground-up
CRITERIA			
Affordability	✓	✗	✗
Control	-	-	✓
Customisation	-	-	✓
Scalability	✓	-	-
Talent Needs	✓	-	✗
Time-to-market	✓	-	✗

 Key Focus
 ✓ Favourable
 - Dependent / Neutral / N.A.
 ✗ Unfavourable



SECTION 4

HOW WE CAN HELP

dataBP

QUINLAN
& ASSOCIATES

WHERE WE CAN SUPPORT YOU

Together with DataBP, Quinlan & Associates can support data providers in achieving optimal cloud migration and cloud-based data distribution enablement across the following pillars:

1. BUSINESS STRATEGY

- Target Customers
- Product / Service Offering
- Distribution Channel(s)
- Monetisation Strategy

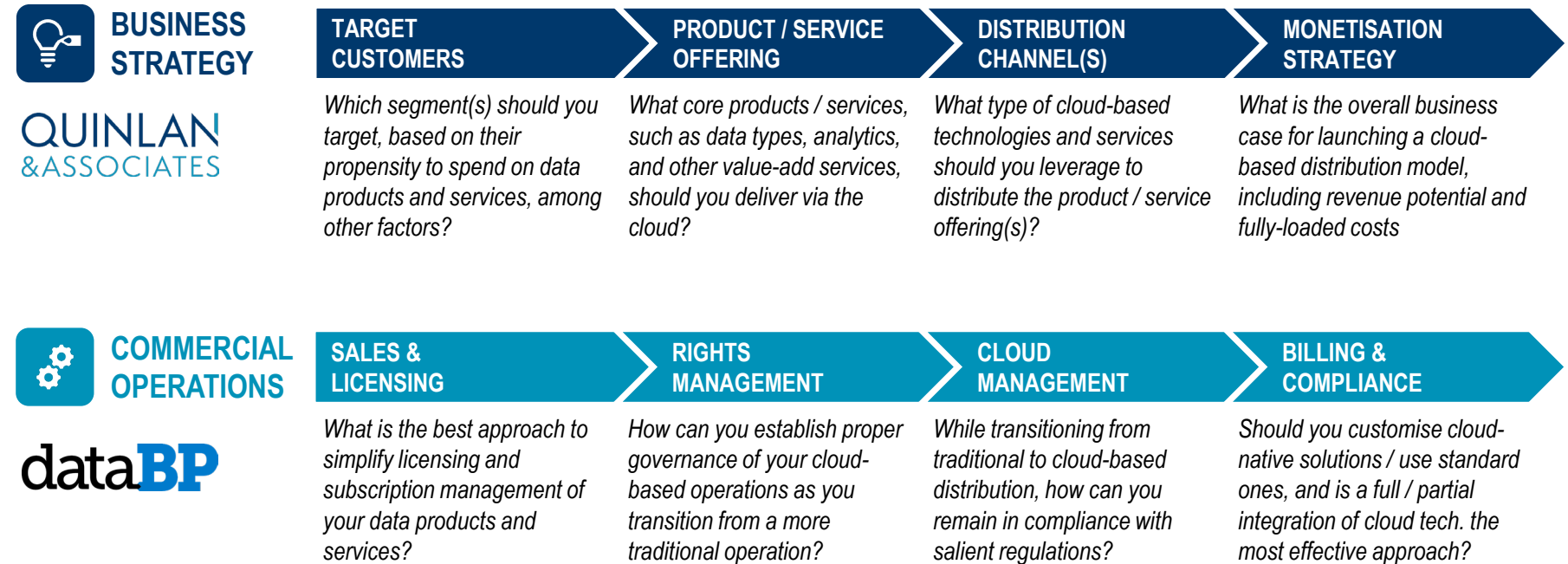
2. COMMERCIAL OPERATIONS

- Sales & Licensing
- Rights Management
- Cloud Management
- Billing & Compliance

Quinlan & Associates and DataBP can support data providers in achieving an optimal direct distribution experience

Areas of Deliberation

Strategic, Operational, and Financial Factors



QUINLAN & ASSOCIATES

WEBSITE www.quinlanandassociates.com
EMAIL enquiries@quinlanandassociates.com
TEL +852 2618 5000
ADDRESS Level 20, One International Finance Centre
1 Harbour View Street, Central
Hong Kong SAR

BENJAMIN QUINLAN
CEO & MANAGING PARTNER
TEL: +852 2618 5000
EMAIL: bquinlan@quinlanandassociates.com

JUSTIN CHUNG
ENGAGEMENT MANAGER
TEL: +852 2618 5000
EMAIL: jchung@quinlanandassociates.com

ALISON HU
SENIOR CONSULTANT
TEL: +852 2618 5000
EMAIL: ahu@quinlanandassociates.com

dataBP

WEBSITE www.databp.com
EMAIL contact@databp.com
TEL +1 877 288 7908
ADDRESS 14 Wall Street
20th Fl, New York, NY 10005
United States of America

MARK SCHAEDEL
CEO
TEL: +31 (0) 629 721 700
EMAIL: mark.schaedel@databp.com

ARIEL SMUKLER
APAC LEAD & SOLUTION ARCHITECT
TEL: +66 811 511 542
EMAIL: ari.smuckler@databp.com

ZACHARY CHASTAIN
CLIENT SUCCESS MANAGER
TEL: +1 877 288 7908
EMAIL: zachary.chastain@databp.com

QUINLAN & ASSOCIATES

© 2023 Quinlan & Associates.

All rights reserved. This report may not be distributed, in whole or in part, without the express written consent of Quinlan & Associates. Quinlan & Associates accepts no liability whatsoever for the actions of third parties in this respect.

The information and opinions in this report were prepared by Quinlan & Associates. This report is not financial or investment advice and should not be relied upon for such advice or as a substitute for professional accounting, tax, legal or financial advice. Quinlan & Associates has made every effort to use reliable, up-to-date and comprehensive information and analysis in this report, but all information is provided without warranty of any kind, express or implied.

Quinlan & Associates disclaims any responsibility to update the information or conclusions in this report. Quinlan & Associates accepts no liability for any loss arising from any action taken or refrained from as a result of information contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages. This report is not an offer to buy or sell securities or a solicitation of an offer to buy or sell securities.