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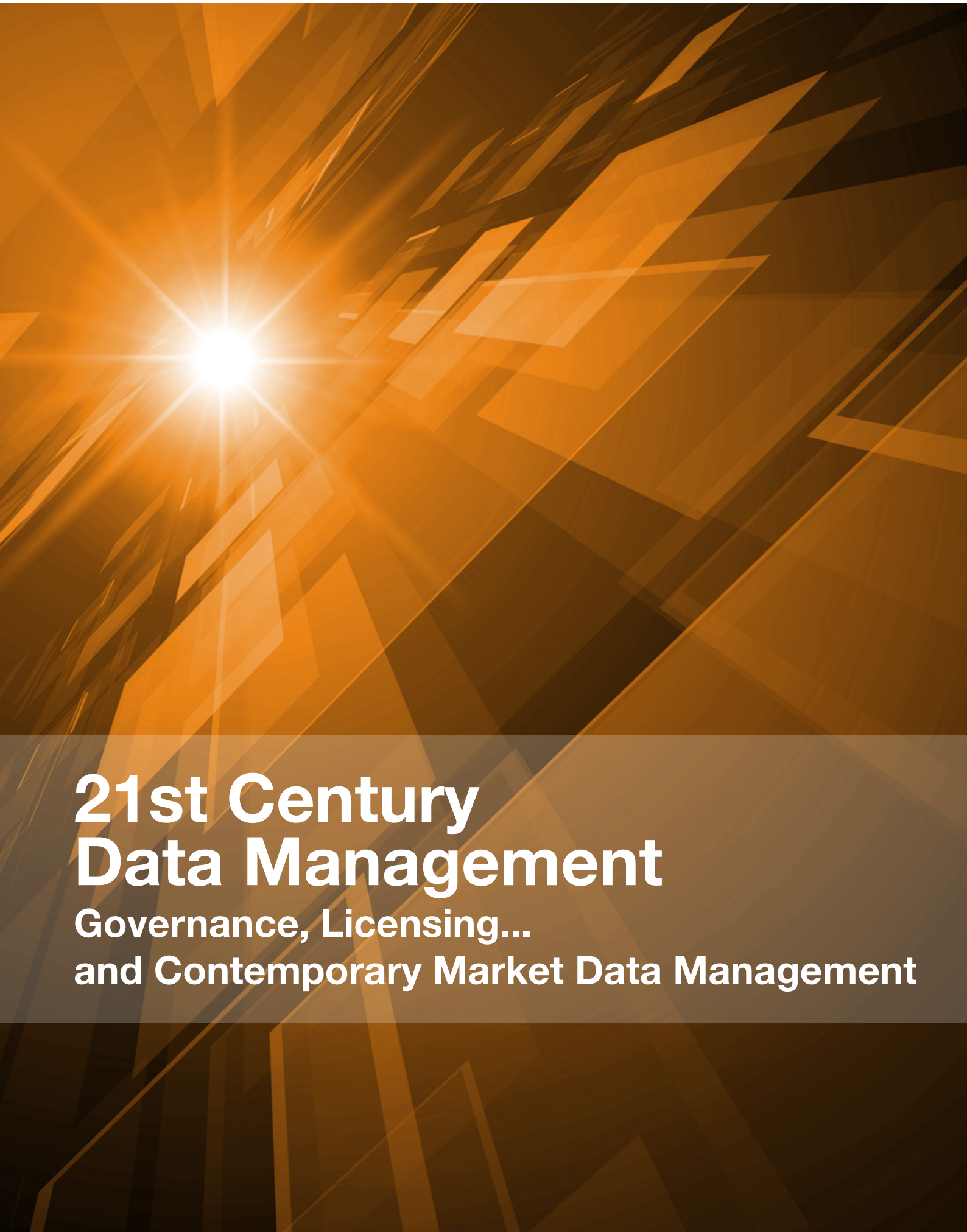

21st Century Data Management

Governance, Licensing... and Contemporary Market Data Management

Executive Summary

- Data is widely recognized as critical to the functioning of a financial institution. Yet financial firms don't own much of the external data they consume, creating issues around control and commercial / operational usage.
- Furthermore, legacy approaches are hindering efforts by firms to optimize their data usage, establish control over data services and ensure compliance with licensing agreements, regulations and internal governance policies.
- The broad acceptance of digital data services has expanded data usage beyond the front office and into the middle office and across the enterprise. The legacy separation of data types has inhibited firms' ability to take a holistic view of the services they consume.
- Meanwhile, capital markets firms are under pressure to gain control and consistency of their data to satisfy regulators anxious to avoid a repetition of the 2008 Credit Crisis.
- The result is a requirement for full understanding of data lineage in order to ensure consistency across applications, compliance with licensing contracts and accurate risk and regulatory reporting. Firms succeeding in the implementation of true data management and control may also realise major operational risk and cost benefits.
- But the complexity of data sourcing and the volume of data services – resulting from an explosion in research, strategy data, algorithmic trading, regulatory reporting and the use of derivatives – is making data management a challenge for many firms.
- Market data inventory management, and adoption of enterprise data hubs, are positive first steps in operational data management. However, these have limitations in the form of a lack of intelligence on application data usage, reporting and compliance from a data licensing perspective.

- What is needed is a next-generation approach to market data management that ensures licensing compliance and mitigates the operational risk inherent in using data illegally.
- By adopting a holistic approach to data management – by establishing true data governance that extends to all data sets consumed by the organization – financial institutions can fulfill their contractual, licensing and regulatory obligations while at the same time reducing direct data costs and mitigating operational risk from inconsistent, incomplete data that is in breach of the IP rights of the data originator.

Introduction

Data management has become a serious subject for both regulators and capital market firms as they strive to avoid another financial crisis and P&L losses. It is increasingly difficult for large firms to manage complex, multi-asset class datasets across numerous trading and risk systems while maintaining data integrity, completeness and timeliness. Organizations expect fewer people to work on projects with tighter deadlines, while expectations for data quality remain very high. Regulations make matters even worse as specific – sometimes newer – data-sets are required for specific analysis and/or reporting.

The establishing and re-energising of Data Management programmes has become a priority in the past decade with many Data Management frameworks being built around the operational enablement of Enterprise Data Management operations and technology. However, with reference to priority objectives around Data Governance, Data Quality and Supply Management, traditional Market Data functions play a key role in supporting or compromising those objectives.

The majority of Market Data functions are operating anachronistically under legacy parameters that date back 20 to 30 years.

This paper discusses the challenges and issues of modern market data management and its opportunity to be friend or foe in meeting strategic Data Management objectives.

Data is information; information is a corporate asset.

We've heard it all before in so many contexts, but for financial and commodity markets it really has become a financial and legal reality; and there is no stronger hold than those twin bonds.

Market and reference data originates within the market infra-structure of exchanges and trading venues, index providers, ratings agencies and recognised market makers across different asset classes. Every data element consumed by a client subscriber is owned by these originating institutions, or in some cases there

is shared ownership with intermediary data aggregators. These institutions protect the asset of their data by leasing data to the consumer, through the vehicle of a licensing agreement clearly constructed to authenticate their IP (Intellectual Property) and protect their revenues.

In turn, consuming firms transform this data into valuable information. Through various trade and portfolio life-cycles our markets use this data to manufacture products, assess risk, research industries, value holdings, make markets, mark-to-mark positions and settle liabilities at market value; just a few of the many, many market data dependent functions.

In order to optimally realise the value of these information assets, banks, fund managers and other financial and commodity markets firms employ the necessary infrastructure to extract, transform and deliver into their corporate applications and functions as necessary.

This juxta-positioning of corporate information assets based on the same underlying data owned and licensed by originating firms – and not the consuming entities - creates commercial and operational problems. This is where our consideration begins...

The Salad Daze - 1990 to 2004....

Often forgotten is the fact that data in digital form is still relatively young. Electronic connectivity linking the markets in the form of digitized, delivered and processed data only arrived in the late '80s and matured in nascent form during the 1990's. Key infra-structure such as direct exchange connectivity and market data distribution platforms (MDDP), are considered de facto nowadays, but at the time were leading edge and cost $$Millions to implement and maintain.

With the arrival of digital data, faster networks and more powerful hardware, the opportunity arose to broaden data processing out of the exchanges and front-offices of investment banks into all functions and departments of the trading and investment management community. More general purpose technology in the form of Messaging-Oriented Middleware (MOM) and Enterprise Data platforms (popularised at the time by products such as Asset Control and FAME) underpinned the Enterprise Application Integration (EAI) era, which has directly led to the contemporary data management challenges we face today (see below).

From a technology perspective it was the beginning of Enterprise Data and Application management, but from a financial markets perspective it was an emancipating value-chain linkage from direct market access to straight-through processing of trades and orders with intra-day finance, risk and product control (the Mid-Office) all part of a data-linked enterprise.

During this evolving process, three distinct data genres were kept operationally separate;

- Real-time Market Data,
- Reference Data,
- Application data (derived and processed for internal use).

This operational divide and its unintended consequences are only just beginning to be revisited and resolved. At no point, as expensive and tightly embedded processes and technology were being constructed and implemented, was any attempt made to architect and manage the state of data as it passed through the enterprise. The legacy of this state of management oversight is now felt painfully

as the challenges of data lineage threaten to undermine compliance to market regulation, the rights policies of the data owners, and the objective of world-class data governance that many companies are now aspiring to achieve.

Contemporary Data Management: 2004 and beyond

Scale and Volume: the change factors

An apparently trite statistic quoted by Thomson Reuters and Gartner around 2008 was that market/reference data consumption had increased by 17000% since 1994.

We can consider briefly the validity of such a claim by contemplating the macro factors that have possibly caused this incredible inflation in data usage…

- **The rise of the Buy-side**
  Not only in terms of technological investment but in the sheer scale of data and research consumption in the search for Alpha and other aspects of investment and portfolio management.
- **Hedge Funds**
  Surviving the market shocks and crashes of 2000 and 2007, post consolidation and convergence has settled leaving thousands of alternative investment strategies consuming prodigious amounts of data.
- **Algorithmic trading**
  Smaller block sizes and more frequent trades leading to an exponential increase in volumes.
- **Regulation and reporting**
  Specific datasets (for example, ratings and given benchmarks/ reference rates) required to fulfill the reporting mandates of the regulators and competent authorities as they target closure on market abuse and endemic risk.

- **The rise of credit derivatives**
  A market now infamously associated with the financial markets crash of 2007/8, but a legitimate market that evolved over two decades adding trillions of dollars in notional trades and associated market data volumes.

Add other inflationary factors such as indices and ETFs, a natural scaling in underlying data and new research approaches, plus the use of compound data sets in ever more sophisticated risk management functions and the suggested scale of data consumption increase over 15 years is probably correct.

The Legacy Approach to Market Data Management

In direct correlation and response to these factors behind the rise in market data consumption was the number of new, specialised data vendors and services. As of 2016 the estimated number of core data – and technology related vendors, stands at around 800 (and that excludes the 2-300 exchanges and trading venues). Market data services, at between two and four thousand (depending on the extent and granularity of what determines a service). This explosion in vendors/services started taking place in the mid-nineties as the 'supermarket' approach to data provision through large aggregators such as Bloomberg and (as was then) Reuters, failed to provide the leading edge quality in many, many areas of the markets and the demand for new data-types.

In response to the challenge of rising vendor services, contracts and costs, the market data commercial function was formed with the market data inventory the linchpin of the financial administration and service management aspects of data management.

'Who's on First Base?'

Market data inventories are the first stop in implementing control and compliance processes around market data. Whilst much of the value is derived from the financial administration they provide around market data services (MDS), they also provide a highly maintained (at some cost it should be stated) and reliable inventory of users, services and - to some degree – applications, together with some consolidated reporting facilities mandated by exchanges and vendors as part of the service agreements.

One of the legacy issues we mention later in this report is the 'fire and forget' approach to market data distribution that arose in the 1990s. Technical obsession with connectivity with exchanges and brokers, and the requirement for declarations on real-time data, have rendered market data inventories and real-time permissioning systems insufficient against the challenge of enterprise reporting that requires data of all types to be tracked, catalogued and reported.

Following from this we should also be clear that the term 'market data inventory' does not simply apply to managing traditional services of real-time market data and desktop services. The blend and inter-leaving of traditional market data and enterprise data services that include ratings, risk data-sets, corporate actions, credit research, end-of-day pricing, etc. are all services covered administratively and contractually by market data inventories. Ironically, the functional extension into enterprise data management begins and ends there for market data inventories (a fact directly recognized by the MDS inventory suppliers who refer to themselves as 'Expense Management' vendors). This limitation is an indirect cause (explained later) for some of the root issues being seen in resolving key data management challenges.

The Limitations of Market Data Administration

So, given the stated necessity (above) of market data administration and the role of 'the inventory', what are the limiting factors when we consider our core objectives of:

- Data providing value into the enterprise as information and operationally fit for purpose,
- Data Governance,
- Licensing compliance and reduced operational risk,
- Cost control.

Despite the richness of features and many benefits of market data inventory systems (as exemplified by such systems as MDM, FITS, InfoMatch, FinOffice and others), they are simply not complete enough to act effectively in a data management context. They have:

- NO data content intelligence or recording behind the services managed,
- NO market intelligence linking services as competitors and alternatives,
- NO detailed profiling of services in terms of data coverage and functionality,
- NO inherent business intelligence on vendors, from a compliance or financial perspective,
- NO cross industry price-benchmarking for comparative and optimisation purposes,
- NO details on the rights-policies of exchanges and vendors,
- NO detailed view on the applications and functions utilising the services,
- NO declarations or reporting as required by the vendors for application derived and/or distributed data.

Market data administration processes based around a market data inventory simply do not provide a consummate function for enterprise and market data commercial management. Further, the advisories and controls required for compliance and governance are simply too limited to address the key data management demands.

The Modern Market Data Management Domain

In response to these increasing demands then of market and enterprise data management, we have naturally seen the development of new tools; each one fulfilling more of the decision support, data recording and reporting facilities required. An integrated view of the advanced and enriched data management domain is depicted below:

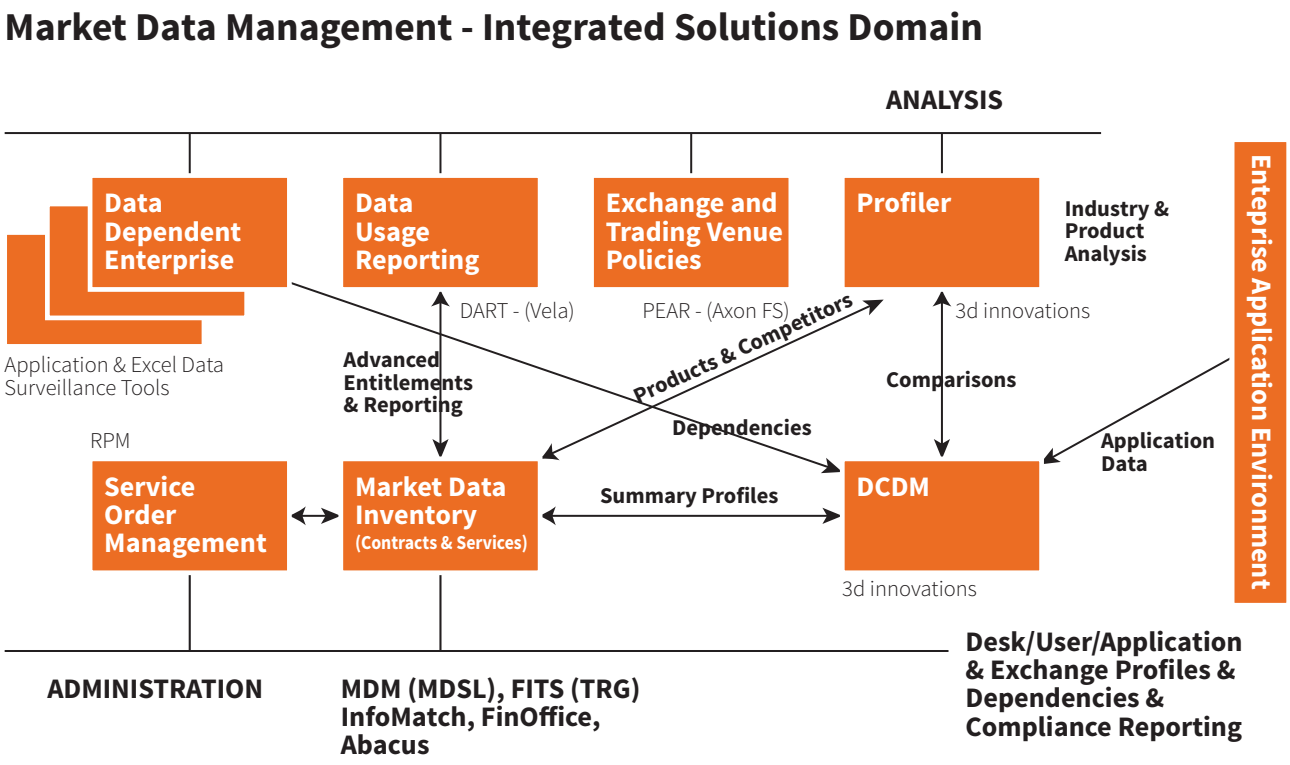

Figure 1

Licensing Compliance and Reduced Operational Risk

In considering the enrichment – at cost – of moving toward a more sophisticated data management domain as illustrated above, we need to consider the malaise that is being remedied, and the overall objective that is being met.

Our consideration of licensing compliance and reduced operational risk has to start with defining the problem domain, and the genesis of the paradigm shift in vendor licensing.

The malaise of vendor licensing compliance has its roots in the original – and simple - exchange and vendor licensing models of the 1990's. Once a data source was secured, through a desktop service, data-feed or otherwise – use of the data was at the liberty and discretion of the consuming firm. The phrase 'fire and forget' was often used in the 1990's to describe the value of data freely available on enterprise networks. This led to an explosion of Enterprise Application Integration with market and reference data being readily available to expedite straight-through-processing, order management, market risk management, and other investment and trading operations.

In time the major data vendors caught on to the increased value of their data as it was being used, and altered their licensing accordingly and as appropriate for a profit maximizing firm. Unfortunately consuming firms have been left with an entrenchment of data throughout the enterprise and little capacity to re-engineer to capture the state and lineage of data as it pertains to vendor licensing. It is a continued example of the endemic gap between the capability and instantiation of technology and the IP and commercial reality associated with externally procured data.

The specifics of the enterprise licensing models that exchanges and other data vendors have introduced over the past 10-12 years have been in direct response to increased use of data and its value in our investment and trading markets. The licensing of data has become far more sophisticated and demanding in terms of accurate declarations and surveillance of true data usage. No more ' buy once, use anywhere'; revenue protection is at the heart of vendor licensing strategy.

Generally speaking, contemporary license types can now be categorised as follows:

- **Standard form contracts** – Typically covering presentation devices and database subscriptions by numbers of licensed users. They also often cover data-feeds of raw data in terms of their initial batched or streamed point-of-entry to the consumer;
- **Non-display Agreements** – A general 'leasing' agreement for applications using exchange and vendor data;
- **Distribution and Redistribution Agreements** – Covering the limitations and costs associated of disseminating data inside and outside the organisation;
- **Derived data licenses** – Covering off everything from cloning and creation of works based on given data items, to simple price improvements (such as spreads) and development of data into reports and compound data-sets.

The Data Licensing Continuum (Example)

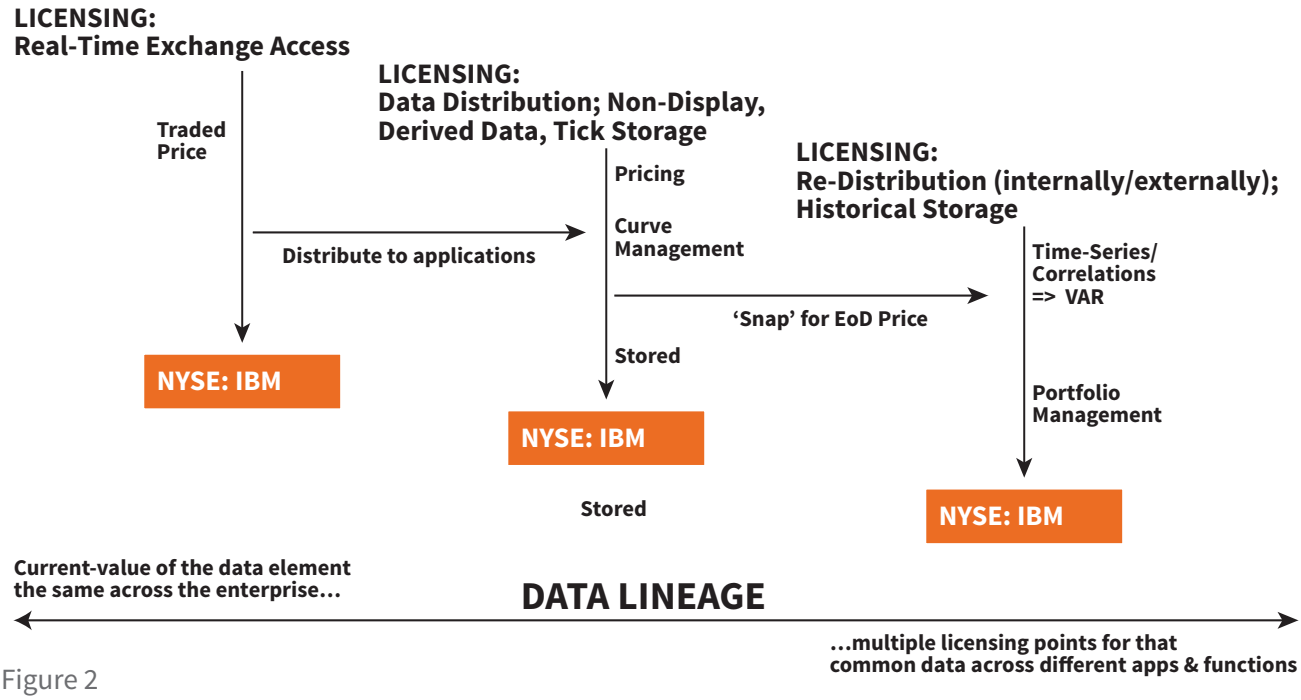

Figure 2

There is huge operational risk in using unlicensed data and licensing compliance has to become part of the key governance objectives of financial markets firms. This cultural problem of consuming firms such as banks and investment managers treating the data as 'freely available' on the back of an initial contracted subscription is being slowly addressed from a policy and process perspective. However, without the right tools and enterprise acceptance – and understanding - of the vendors' rights policies, data that is technically available 'on the wire' will continue to be open for illegal consumption by applications, spread-sheets, web-browsers with scraping functions, etc.

Legally, data is leased from information providers and data originators such as Exchanges and Index providers. So from a data vendor standpoint, the overriding issue lies in seeing data used in accordance with the contractual and licensing constraints clearly laid out in the product and service agreements. Failure to comply often results in fines and punitive licensing costs from the vendors. In extreme circumstances services may even be disconnected, threatening an operation's business continuity.

Data Governance

Self-governance does not mean no one is responsible. It means everyone is.

There are so many moving parts in the Data Governance mission that it is easy to see why some aspects are working well toward Data Management objectives and others not so much.

The Enterprise Data Management (EDM) Council defines Data Governance along the lines of policies, process, measurements and metrics, and (particularly pertinent to market data) supply chain control in the form of permissions and approvals.

The problem with aligning strategic programmes such as Data Governance with operating model specifics, is well documented and understood in practice by most professionals. No surprise then

that for Data Operations, the providence and permissioning of data is burdened by legacy, capacity and funding constraints that compromise the Data Governance framework.

One of the operating definitions of Data Governance is that it should be aligned with legal and compliance data policy. We have already discussed above, the flaws in data licensing surveillance, compliance and the inherent operational risk and financial exposure as a consequence. A peer flaw often applies to the sourcing of data, where legacy practices call into question the providence of externally procured data and whether it is fit for purpose.

The authors of this paper have regularly seen procured data-sets that fail to meet the data quality principles of being fit for purpose and of value to the business:

- A major fund management company taking data with incorrect Bond Durations.
- A major Tier-1 bank recreating Bloomberg VWAP via another data source – and the computation was wrong.
- A global investment manager basing its valuations of non-listed and illiquid assets on a model that used an inflationary field that was simply wrong in computation and delivery from the external data source.
- A Hedge Fund using a data source with off-market skews and volatilities for its interest-rate option based strategies.

There are hundreds more previously seen and currently in existence. How does this happen?

One of the factors we believe that occurs in sourcing data is in the protracted commercial aspects resulting from RFPs or reviewing too many alternatives, and the contractual/legal overhead prior to selection. Due to funding and capacity issues – and the natural outcome of review fatigue – final evaluation of data seems constantly to come up short in due diligence. Market data analysts, business analysts, business managers and the end users themselves often lose sight of the detail in the final furlong to get the service across the line and operational.

We could discuss ad infinitum the causes and remedies relating to superior sourcing approaches. Yet, if we again consider the advanced Market Data Management domain (figure 1) we will note that there are tools available that if implemented and integrated correctly can enrich and accelerate the sourcing of data at the vendor selection level. That in turns frees capacity in all its forms for deeper due diligence at the granular data levels; simples.

This is just another example of aspects of market data management that could be improved greatly to provide more professional value in the Data Governance framework, the overall Data Management operation and the reduction of operational and vendor risk.

Know-Your-Vendor (KYV)

Supply Management is a key factor in Data Governance, and recent legislative guidelines are tying Data Supplier management ever closer to firms' Third Party Oversight offices, and to compliance and legal in general.

The most recent global financial crisis put a greater focus on risk mitigation. The US Consumer Financial Protection Bureau (CFPB) issued a bulletin in 2012 that requires banks with retail businesses to ensure their service providers are compliant with consumer laws. Each of the "prudential regulators" (OCC, FDIC, FRB) have all issued recent guidance (around 2013) about developing third party vendor relationships.

"A bank should adopt risk management processes commensurate with the level of risk and complexity of its third-party relationships"

The guidance from each of the regulators (and others like the SEC and CFTC) includes differing levels of detail against a background of common risk themes. More recently, it has become apparent that there is a need to broaden the scope by including fourth party risk and vendor specific idiosyncratic fine-tuning within certain

services that are known to be prone to higher risk (i.e. derivatives). Against such a background, the CFTC, for example, is proposing new regulations on financial market utilities, such as clearing houses and swap execution facilities (SEFs), to make sure that third parties raise their risk assessment.

Other regulations such as the delayed MiFID 2, EMIR, FATCA and Dodd-Frank implicitly suggest a higher level of care towards vender due diligence. Indeed, the Panama Papers incident earlier in 2016 also renewed interest particularly around beneficial ownership and corporate governance within KYV.

The authors of this paper envisage that the boundaries between pure KYV scoring and more general regulatory oversight could become further intertwined as regulators look to exploit synergies within the vast regulations that banks are having to comply with.

Changing Dynamics Within Vendor Risk Management

Firms are all asking the same questions about their vendors:

- How well do you know the supplier you are dealing with?
- Are they a financially sound company to deal with?
- Is their infra-structure robust and mature?
- What kind of contingency plans do they offer?
- What flexibility is there in their underlying business model and service levels?
- Is their corporate strategy potentially detrimental to your plans with actual or potential conflicts of interest?

Furthermore, it's even more crucial now to consider ethics and corporate governance starting right at the very top at board level. Is a code of ethics adopted? Are any professional industry guidelines adhered to? Analysis of the answers to such questions provides insights into the risk culture of a supplier and an enterprise view of the risks faced. Ultimately, firms need to know one thing - what is the likelihood that a vendor remains a going concern in the near future?

KYV requirements are yet another example of the increasing sophistication and demands on data management functions – which have by far the greatest burden of third party management in any organisation. There are notably tools and frameworks available that can help firms navigate financial vendor due diligence requirements while also monitoring global regulations shaping the evolving KYV landscape.

About 3d innovations

A data management software & services company with offices in the UK and US. 3di specialises in three distinct areas of financial services data; market, reference and computational/derived data. 3di uses its global markets knowledge to offer investment banks, brokerages, central banks, investment managers, hedge funds, private banks, commodity trading houses and wealth managers best practice data management advisory and consultancy services.

3d innovations
1177 Avenue of the Americas
New York, NY 10036

The Broadgate Tower
20 Primrose Street
London EC2A 2EW

www.3di-ltd.com

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