

WHITE PAPER

The Value of Using a Logical Approach to Data Management in Financial Services and Insurance

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INTRODUCTION – ASPIRING TO BECOME DATA-DRIVEN

Executives now see data, BI and AI as mission critical to their business

Executives in most companies today, recognise that data and analytics have become central, if not mission critical in helping their business run smarter. Their expectation of what data, business intelligence, machine learning and artificial intelligence (AI) can do for them is huge. They see it as the way in which their companies can cut costs, improve efficiency, reduce risk, and seize opportunity by making timelier, more accurate decisions. They also see it as the way they will disrupt the markets they compete in and uncover new opportunities in new markets with new products and business models.

A high quality, secure and compliant data foundation of business-ready data needs to be created to shorten time to value

For this to happen, companies need to build a high quality, secure and compliant data foundation upon which such competitive insights can be created. Data needs to be ‘business-ready’ and available to share across the enterprise and beyond to help shorten time to value.

Data complexity is a major barrier to success

However, there are barriers in the way of success. One of the main challenges is data complexity caused by more and more data sources and more data stores that exist on-premises, in multiple clouds, in software-as-a-service (SaaS) application provider data centres and at the edge. Many companies now have data persisted across a truly hybrid, multi-cloud distributed data estate, as shown in Figure 1. Data is stored in cloud and on-premises relational databases, NoSQL databases, cloud storage, file systems, and content management systems. It may also be streaming in from edge devices and ingested from multiple external data providers via many different mechanisms such as data marketplaces and data cleanrooms. So, we have a dilemma: on one hand, executive expectation is that data and AI means the company will be more agile and move at speed, but on the other hand, the data needed to make it happen is becoming harder to find and integrate.

Many companies now have a hybrid, multi-cloud distributed data estate

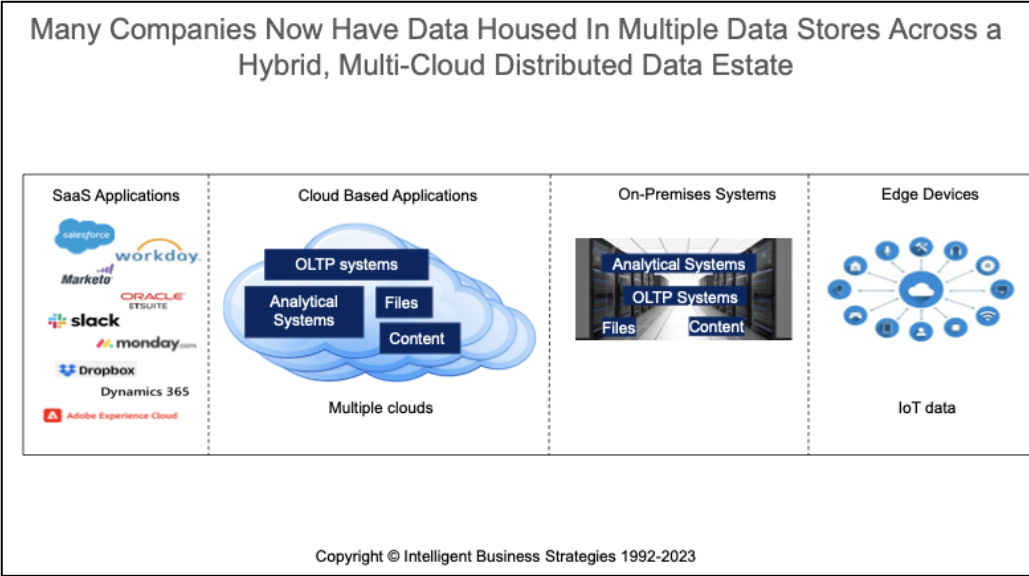


Figure 1

This paper looks at this problem and at how data virtualisation can provide a platform to help solve it so that Financial Services and Insurance companies can shorten time to value, meet executive expectations and achieve their goal of becoming data-driven enterprises.

HIDING THE COMPLEXITY – THE NEED FOR DATA FABRIC

Given the data complexity that many companies are facing, there are some critical technology components that need to be in place to speed up the creation of a data foundation that enables companies to build insights, predictions, recommendations, and AI-automation to help create a data-driven enterprise. This includes the need for data fabric software.

Data fabric is data management platform software that is capable of connecting to the wide range of data stores and sources across a hybrid, multi-cloud distributed data estate. It offers the full capabilities to support automated data and relationship discovery, data classification, governance, cleansing, transformation, and integration of data. It can be used by multiple IT professional and citizen data engineers to develop orchestrated pipelines that produce business-ready data products available for sharing securely across the enterprise in a compliant manner.

Data fabric software includes support for secure connectivity to a broad range of data sources, a data catalogue, collaborative development, support for DataOps, performance and scalability, extensibility, unified data governance and a data marketplace.

Its job is to hide the complexity, simplify data access and accelerate the development of data engineering pipelines to produce reusable data products that can be consumed to create machine learning models and a data warehouse to support business intelligence analysis and reporting. This is shown in Figure 2.

Data fabric software connects to data across a distributed estate enabling companies to find, engineer and govern data

It often includes a data catalogue, support for collaborative development of DataOps pipelines and a data marketplace

It hides the complexity of a distributed data estate

Multiple teams of data producers can use common data fabric to build pipelines that integrate data to produce reusable data products

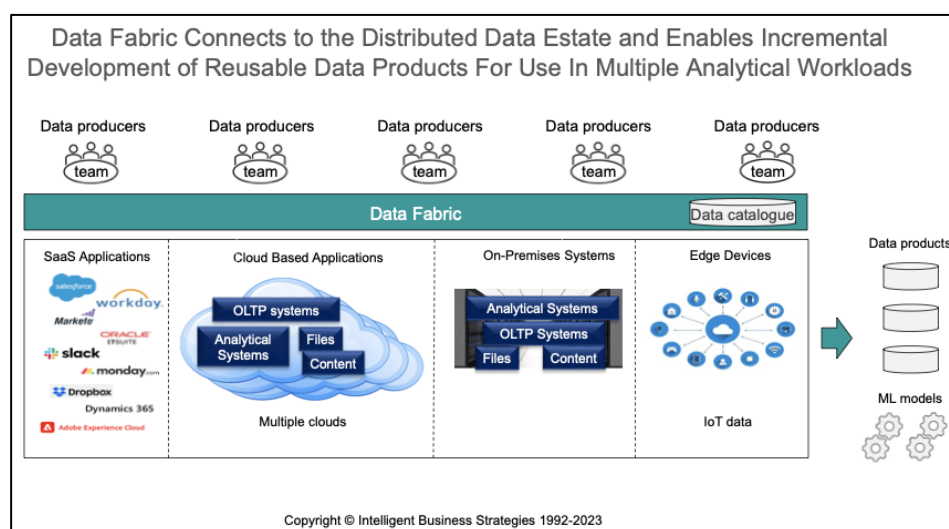


Figure 2

A LOGICAL DATA FABRIC FOR THE DATA DRIVEN ENTERPRISE

Logical data fabric technology is software that can be used as a platform to create virtual data products from data in multiple underlying data stores.

Data products can be created by defining virtual views of data entities using common business data names defined in a business glossary. The platform's data catalogue provides business glossary capabilities together with metadata

on source data needed to create each data product. Identified data in multiple data sources can then be mapped to the schema of each virtual view describing a data product. This approach allows you to *incrementally* create a layer of semantically linked virtual data products that can be:

Logical data fabric enables virtual data products to be created and consumed for different analytical use cases

- Rapidly assembled into different virtual schema optimised for different analytical workloads e.g., data warehouse, data marts, data science.
- Queried to provide feature data for machine learning model development in data science.
- Used as input to create other virtual data products.
- Consumed via different interfaces e.g., SQL, REST, ODATA, GraphQL

This is shown in Figure 3.

Layers of virtual views can be defined that help to rapidly integrate data from multiple sources and make it available in business terms for consumption

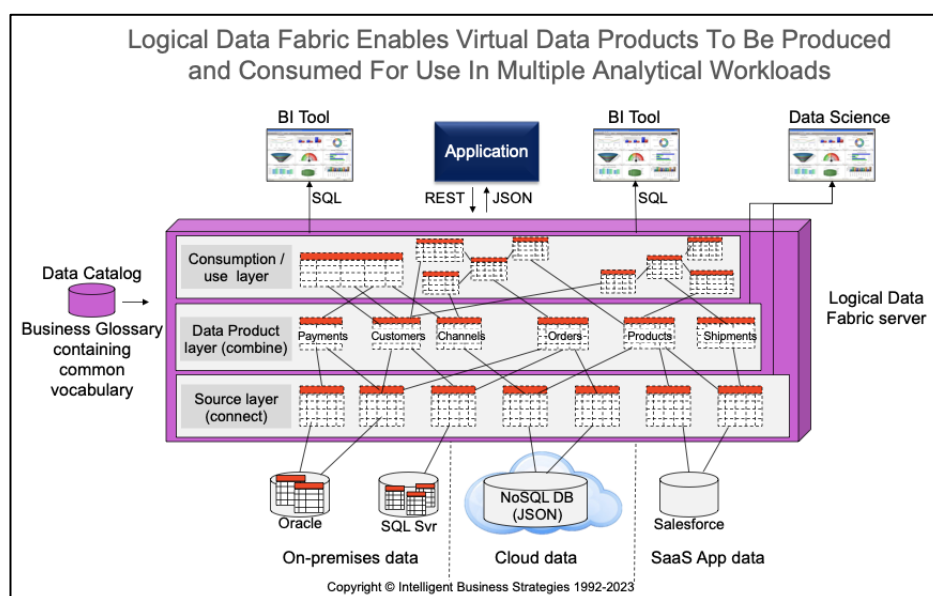


Figure 3

Data products can be quickly combined to create other virtual data structures

Data can also be persisted, if required

Note that this ability to quickly 'assemble' semantically linked data products to create other virtual schema signals a major step change in productivity that increases agility and shortens time to value. It provides business-ready data to jumpstart multiple analytical projects as well as enabling component-based schema development. In addition, it enables a common semantic layer to be created so that all tools and applications are served data with the same common business data names.

CROSS INDUSTRY USE CASES

Logical data fabric can be used by companies in any vertical industry

Logical data fabric can be used in a number of ways that would apply to every industry. Popular use cases would include using platform data virtualisation capabilities to integrate data from multiple underlying data sources:

- To create a customer data platform for an omni-channel customer intelligent front office
- To produce the data needed for timely regulatory reporting associated with compliance obligations in one or more legal jurisdictions
- Modernise data warehouses

Let's look at these in a little more detail.

USING LOGICAL DATA FABRIC TO CREATE A CUSTOMER DATA PLATFORM

A very popular use case is to use it to integrate data to create a 360° view of a customer

To compete in a digital economy, companies need a lot more data on customers than is stored in their transaction processing application databases and data warehouses. Today, companies have to know not only who their customers are, and their transaction activity but also all their interactions with your company and what their opinions are, to provide an understanding of their online behaviour, customer location and product or service usage behaviour. This means that you need more data from both inside and outside the enterprise.

Creating a single view of the customer in a customer data platform using logical data fabric means data can be analysed using machine learning to drive consistent personalised recommendations across all front-office applications for each customer. A detailed understanding of how to create a customer data platform using a logical data fabric can be found [here](#).

USING LOGICAL DATA FABRIC FOR REGULATORY REPORTING

Logical data fabric can also integrate data and make it available via a virtual view to simplify regulatory reporting

Logical data fabric can also be used to quickly connect to multiple data sources and integrate data for regulatory reporting. Also, virtual views can be created on the platform to integrate the data needed to provide reporting for each different regulation in one or more legal jurisdictions. This dramatically simplifies the regulatory reporting task. Also, data snapshots can be kept that represent data at specific points in time and data in virtual views will always be up to date. Also, by using common data names in virtual views, a common semantic layer can be created for regulatory reporting that is consistent across all reporting tools used.

USING LOGICAL DATA FABRIC TO MODERNISE DATA WAREHOUSES

Another popular use case is data warehouse modernisation

Logical data fabric can be used to modernise data warehouses. For example, it can be used to break the dependency between business users using self-service BI tools and the physical schema of a data warehouse and / or data marts. This enables data warehouses and data marts to be migrated to the cloud while shielding business users from any structural changes in the data or changes in DBMS software that have occurred as a result of the migration.

In addition, data warehouse architecture can be modernised and simplified by using the data virtualisation capability of logical data fabric software to replace physical data marts with virtual data marts. This can be done in a non-disruptive way and makes it possible to reduce the number of data stores in the end-to-end data warehouse architecture.

THE VALUE OF A LOGICAL DATA MANAGEMENT APPROACH IN FINANCIAL SERVICES AND INSURANCE

Financial Services and Insurance companies can benefit from the use of data fabric software

To understand the value of a logical data management approach in Financial Services and Insurance it is first important to understand current problems in the industry, what the business priorities are, the insights needed to help solve these problems, the relevant data sources and how logical data fabric can be used to integrate data from these sources to enable required insights to be easily produced.

PROBLEMS IN FINANCIAL SERVICES AND INSURANCE

Financial Services and Insurance companies need to simplify customer journeys

One of the key problems financial services are dealing with is the complexity of customer journeys when looking to buy a product e.g., to apply for a mortgage, open a savings account, and become a new customer. The journey can be different for customers in different segments wanting to buy different products and services across different customer touchpoints. For example, customers may encounter a website, then customer self-service content, then interact with a chatbot and finally an employee at a particular touchpoint. But when that occurs, it is often the case that applications, chatbots and people involved in that journey at different touchpoints are not 'customer intelligent'. They do not have common access to a fully up to date "living customer intelligence profile" for each customer they interact with. They may therefore be blind the journey so far (e.g., no analysis of clickstream to understand on-line behaviour) and may not have on-demand access to existing historical intelligence for existing customers as opposed to a prospect. Also, personalised recommendations may happen in some channels but not others. It is a classic case of a fractured customer data, no customer data platform, and no common prescriptive ML services available to all applications across all customer facing front-office applications.

Living customer intelligence profiles need to exist and be available across all channels for better customer personalisation and service

Customer retention and growth is also important. Again, the problem is lack of integrated data to provide "living customer intelligence profiles" analysed by common ML models that are available as services.

Credit risk management is increasingly important in the current economic climate

Credit risk is also a concern despite stronger regulations imposed on financial services after the 2008 crisis to ensure they can withstand pressures. The challenge now is an economic climate in which the Ukraine war has fuelled high energy costs, putting businesses under pressure, and driving up inflation. Businesses in almost every industry have been impacted. In addition, government subsidies put in place to shield enterprises and consumers from high energy bills are now ending or being curtailed. This, coupled with higher interest rates means mortgage and loan books could be under threat as business and consumer customers struggle with higher outgoings.

Climate change is having an impact on property underwriting as risk profiles change

Climate related financial risk is also an issue. Catastrophe modelling and analysis is becoming increasingly important with respect to risk ratios in property insurance, for example.

The persistent threat of cybersecurity, sensitive data access, and data breaches are also major concerns. New data is needed from many different sources to conquer cybersecurity problems as the data needed is not in one place. This includes machine generated infrastructure log files, online clickstream, and much more. Data catalogues also help because of their ability to automatically

Cybersecurity is a major problem as criminals become more sophisticated and data estates become more distributed

discover the location of sensitive data across an increasingly complex distributed data estate. Data governance policies need to be defined in a common place and enforced across a hybrid, multi-cloud, distributed data estate to mask, encrypt and govern access to sensitive data, to govern data loss prevention and avoid unauthorised and accidental oversharing. Universal access control across multiple data stores is now a requirement to simplify and strengthen data access security.

Fraud remains a challenge as digital payment methods evolve, and identity theft rises

Fraud also remains a constant problem. In banking it encompasses application fraud on mortgages, loans and credit cards, bust-out fraud, account takeover, fraudulent transactions, money laundering and organised crime. Identity theft can also lead to account takeover, fraudulent transactions, and money laundering under false identity. The volume, variety, and velocity of data and the number of data sources needed to tackle this is now significant.

Application fraud is causing premium leakage in insurance

In insurance, underwriting fraud occurs when people provide false information on insurance applications to obtain cover at reduced premiums. This results in 'premium leakage' which is estimated to cost insurers billions. Fraud from overstating losses in claims is also a problem. In addition, underwriting fraud is often a major indicator for fraudulent claims. Poor data quality can also result in claims being incorrectly flagged as genuine when they are not.

Banking as a service increases transaction rates and the need for automated decisions through indirect channels

More needs to be done in digital transformation to enable digital lending, digital account opening, and banking as a service (BaaS). Also, integration of banking services with other businesses to enable indirect sales, and monetise other services (e.g., credit risk, reporting services etc) is needed.

Regulatory reporting and regulatory change continue to be a challenge

Finally, there is regulatory change. This can be from changes to existing regulations (e.g., PSD2) or from the emergence of new regulations. Data privacy is a good example of the latter especially for global banks because more and more countries and regions are introducing data privacy legislation. For example, in Europe today, 27 countries are governed by GDPR. In the US, each state has privacy legislation. Other countries like Canada, Australia, UAE, and Japan have also introduced privacy legislation. This means that the same types of personally sensitive information (PII) may need to be governed by different policies depending on the jurisdiction that data was created in. Then there are all the other financial regulations. Regulatory change is becoming a significant burden because almost always, the data needed to provide regulatory reports is not in one place. Also reporting needs to be done in a finite amount of time and on a regular basis. The ability to be able to integrate data from multiple underlying systems in a timely manner is critical to solving this problem.

HIGH PRIORITIES IN FINANCIAL SERVICES AND INSURANCE

Given these problems, Financial Services and Insurance companies have currently prioritised the following areas:

Priority Area	Reasoning
Customer Experience	• "Living customer profiles" • Omnichannel – personalisation at every touchpoint and seamless customer experiences across all touchpoints • More self-service e.g., onboarding • "More human" chatbots • Service agent ability to "know who customer is" • Retain customer loyalty

Improving customer experience, compliance, tackling cybersecurity, preventing fraud, digital transformation and greater efficiency are all priorities in financial services

	• Cross-sell / up-sell • Be more competitive
Regulatory Compliance	Remain compliant with GDPR, Basel II, III and IV, changes to the Payment Services Directive (PSD2), and many other regulations
Cybersecurity, data protection	Advanced security, AI, automated actions
Fraud detection	Prevent fraud, minimise risk Rapid detection and blockage of fraudulent transactions as they happen (e.g., real-time streaming data and machine learning), fraud ring detection (graph databases) and AML
Digital Transformation	Digital lending, digital account opening, APIs, Banking as a Service (BaaS) to integrate services into other organisation applications Integrate AI & ML into applications and services to automate decisions
Operational Efficiency	Improve productivity, reduce costs, and increase profitability, AI automation, data management and analytics

INSIGHTS ARE NEEDED TO SOLVE FINANCIAL SERVICES AND INSURANCE PROBLEMS

To solve these problems and meet priorities, Financial Services and Insurance companies need to utilise data to produce richer and more comprehensive insights to support decision making in each of the aforementioned high priority areas. That means creating insights associated with the following use cases:

The creation of a customer 360° data platform with living customer profiles to improve marketing, risk management and personalisation

Data discovery and sensitive data classification, governing data access, data sharing and data loss prevention are all critical to closing off vulnerabilities when implementing cyber security

- Customers
 - Customer segmentation for more effective marketing campaigns
 - To predict propensity to churn
 - To identify and predict high risk customers
 - To create integrated, living customer intelligence profiles.
- Cyber security
 - Sensitive data types and their location
 - Sensitive data access requests and failures
 - Data vulnerabilities e.g., unprotected sensitive data and locations
 - Application incidents e.g., blocked sensitive data downloads/exports
 - Privacy policies triggered most frequently
 - Data sharing requests, denials, and usage tracking
 - User notifications requiring actions to protect sensitive data
 - Number of user notifications not acted upon
 - Number of cross-border data share requests
 - Number of blocks by data loss prevention
 - Number of actual and attempted security incidents, time to detect, time to respond to an incident, method of attack etc.
 - Mean-time to repair after a security incident
- Fraud
 - This includes insights to prevent, detect, investigate, and respond to fraudulent activity such as:
 - Watchlists and blacklists

Insights are needed in real-time to detect and prevent fraudulent transactions

Insights are also needed on on-line customer behaviour, payment transaction flows, devices, targeted documents, and fraud rings

- Realtime transaction scoring to detect and prevent in-flight fraudulent transactions across all channels
- Fraudulent transaction history, patterns, and predicted patterns
- Customer journey history and on-line behaviour profiles to detect anomalies and identity theft
- Suspicious activity – e.g., large cash transactions, currency transactions, anomalies in account usage patterns, closed accounts
- Payment behaviour between customers and 3rd parties across addresses and accounts
- Repeat attacks, fraud ring identification and predicted evolution
- Document and biometric fraud rates
- Most active times and devices for each type of fraudulent activity
- Event types and type frequency triggering fraudulent activity
- Insurance portfolio management to understand risk by line of business
- Insurance broker performance to rank the business value of brokers
- Catastrophe analysis including impact and risk of extreme weather
- Claims analysis
- Non-performing loans and bad debt
- Financial services related ESG metrics

REQUIRED DATA SOURCES

The number of data sources needed to provide data to support these analyses is increasing and includes:

The number of data sources now needed by Financial Services and Insurance companies to provide data for analysis is increasing rapidly

The ability to integrate this data in a timely manner is now a mission critical requirement

- Customer, product and third-party master data
- Agreements and customer account data
- Location data
- Cross channel customer transaction activity data on different products
- Customer interaction data e.g., email, webchat, voice
- Customer behaviour data e.g., online clickstream, device, location
- Social data e.g., opinions, relationships
- Ultimate beneficial owners (UBOs)
- Politically exposed person (PEPs) lists
- Sanctions lists – individuals and organisations subject to sanctions
- Watch lists – individuals and organisations
- Event data – loan product applications, account creations / closures, change of address, change of contact details, large withdrawals etc.
- Computer asset data (e.g., endpoints, servers, network equipment)
- Infrastructure, system log files and network data
- Data intelligence from data catalogues
- Financial ERP system data (invoices, payments, costs)
- Insurance quote and decision history
- Insurance risk data e.g., property data, vehicle data
- External data such as threat intelligence, social network data, markets data, credit ratings, open government data, weather data etc.

The data required to support analytical workloads is scattered across a hybrid, multi-cloud distributed data estate

Note also, that in many cases, more and more of the transaction applications in use are SaaS applications. Therefore, data needed can be scattered across multiple SaaS applications, on-premises data stores, different data stores in multiple different clouds as well as a huge amount of live streaming data coming off financial markets and clickstream data. It is exactly like the distributed data estate shown in Figure 1.

USING LOGICAL DATA FABRIC TO INTEGRATE DATA FOR ANALYSIS IN FINANCIAL SERVICES AND INSURANCE

The major challenge to overcome is the ability to engineer and integrate data quickly

Looking at the insights needed in Financial Services and Insurance and the growing number of data sources that Financial Services and Insurance companies need data from, one of the most significant challenges that has to be overcome is the ability to engineer and integrate data quickly.

On-demand data integration is needed in every area whether it be customer 360° live profiles, customer journey, marketing, cybersecurity, fraud, catastrophe modelling, credit risk modelling, bad debt or claims optimisation.

Data fabric software with data virtualisation capability enables on-demand data integration

Data fabric software can connect to the broad range of required data sources to integrate data needed by specific kinds of analyses (see Figure 2).

This is where the data virtualisation capabilities of logical data fabric play a vital role. These capabilities help to integrate the data needed to provide insights in all of the Financial Services and Insurance use cases mentioned. Let's look at a few examples.

Fraud

Figure 4 shows how data from disparate data sources can be integrated using logical data fabric data virtualisation capabilities to help prevent fraud in Financial Services and Insurance companies. It can be done using a layered approach in Figure 3 that includes the creation of data products or as a logical data warehouse integrating multiple analytical systems or a combination of both.

Fraud demands the integration of historical and real-time transaction data, account history, watch lists, device, and network data for analysis, reporting and real-time scoring

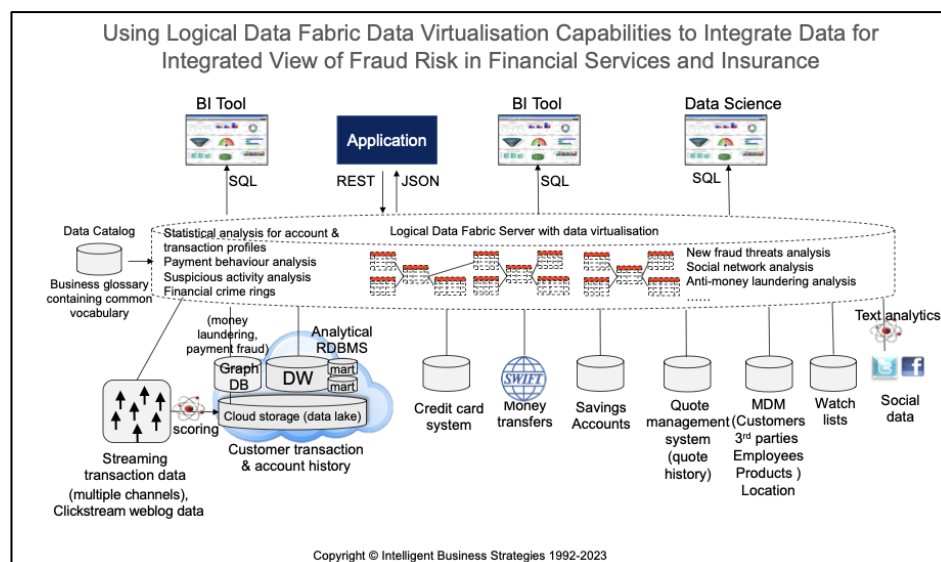


Figure 4

Here you can see how data can be accessed on:

- Watch lists

Logical data fabric can help financial services and insurance companies, prevent, and reduce fraud

- Customers
- A history of data changes to customer addresses and contact details
- Customer transaction history to understand past transaction patterns e.g., deposits, withdrawals, payments, direct debits, electronic money transfers
- Customer account history to understand past account usage patterns
- Access security audit trails from system logs
- Employee data to understand roles, data access rights, privileged users
- Devices including IP address and browser used to make the transaction
- Network data e.g., location, internet service provider

and brought together to enable patterns to be recognised and to identify behaviours that do not conform to a correct pattern.

Multiple different analyses can be carried out on a rich set of integrated data available on-demand to tackle fraud

Existing analytical systems may already exist, such as a data warehouse and/or a graph database representing a fraud network. However, data from operational and analytical data sources can be integrated and virtual views created to provide holistic and near-real-time views to support different analyses such as:

- Statistical analysis for account and transaction profiles
- Unauthorised payment fraud analysis (account takeover) including looking at device identification and user device interaction (behavioural biometrics)
- Suspicious activity analysis
- Financial crime ring analysis
- New fraud threat analysis (e.g., digital payment options like digital wallets)
- Social network analysis
- Anti-money laundering analysis – payment patterns, money mules

Credit Risk Management

Logical data fabric can also be used to provide holistic virtual data views for credit risk management

Figure 5 shows the use of data needed to manage and evaluate credit risk as well as meet regulatory and legislative requirements. The objective is to build a comprehensive view of a borrower's creditworthiness, assess the risk of extending credit to a borrower, to minimise bad debt with respect to loan and credit card products and provide integrated data needed for regulatory reporting.

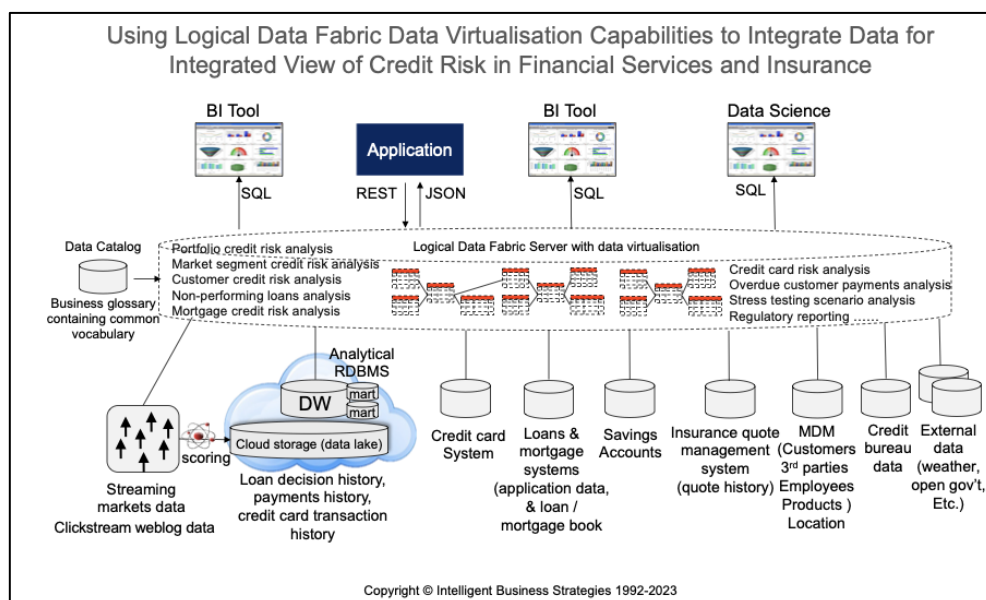


Figure 5

Here you can see how historical and real-time data on:

Data is needed to profile borrowers, understand past loan decisions, and loan payments, understand credit scores and credit history, and to understand the impact of events

- Borrowers including borrower demographics, current and past employment data, business borrower financial performance, borrower income and outgoings, borrower assets and outstanding debts
- Loan decision history
- Loan payments data and payment history
- Credit bureau credit scores and credit history
- Markets data e.g., interest rates, foreign exchange rates etc.
- Events data e.g., late payments, direct debit cancellations, life events (such as divorce), market events (such as interest rate rises, energy price rises)
- Loan parameters

Holistic virtual data views can be created to enable trained ML models to predict credit risk before it happens

This data can be brought together to support loan evaluation decisions and to enable risk analysts to quickly provide reports to management (e.g., line of business risk managers, Chief Risk Officer) and regulatory bodies as well as to roll up risk reports associated with different lines of business to provide integrated and aggregated enterprise and groupwide views. Such capabilities provide support for regulations like Basel II, Basel III, and Basel IV across multiple jurisdictions.

The ability to integrate historical and real-time data provides a holistic view of credit risk and enables financial services organisations to analyse credit risk to understand exposure, support stress testing and to understand and predict earnings volatility due to credit loss variations. Also, data science can create machine learning models to predict prospective borrowers that are not suitable for credit, existing customers that are likely to default on payments and/or customers who may become credit risks. Different virtual views can be created to support different types of analysis looking at ratio of credit exposure, the number of non-performing accounts, security to credit ratios etc. Analyses include:

Virtual data views can be created to support different types of analysis end-to-end credit risk management as well as regulatory reporting

- Portfolio credit risk analysis
- Market segment credit risk analysis
- Customer credit risk analysis
- Non-performing loans analysis
- Mortgage credit risk analysis
- Credit card risk analysis
- Overdue customer payments analysis
- Stress testing scenario analysis
- Regulatory reporting

Virtual data views can also be created to support customer 360° marketing, sales, and service, cybersecurity, claims management and more

In addition to these examples, many other kinds of analyses can be undertaken in financial services and insurance by discovering and integrating data using logical data fabric. This includes marketing, sales, and customer service oriented analyses using data in a customer 360° data platform, claims management, cybersecurity analyses, using logical data fabric that integrates all data needed for access via a single platform.

CONCLUSIONS

Financial Services and Insurance companies must be able to integrate data from multiple data sources in a timely manner if they are to become data and AI driven enterprises

If Financial Services and Insurance companies are to become data and AI driven, their future is heavily dependent on their ability to integrate data from an increasing number of data sources in a timely manner. This requirement is now becoming mission critical to building a high quality, secure, compliant, and rich data foundation to help produce new insights, recommendations, and predictions. It is this foundation that will enable them to create the insights they need to provide living customer profiles, manage credit risk, prevent, and reduce fraud, tackle financial crimes, protect data, tackle cybersecurity, attract new customers, and offer better customer service.

Logical data fabric hides the complexity of a distributed data estate, improves agility, and can expedite data integration

The main challenge is overcoming the complexity caused by an ever-increasing number of data sources and data stores scattered across a truly hybrid, multi-cloud distributed data estate. Implementing data fabric that can connect to these data sources and enables the building of virtual data products while allowing source data to stay where it is, will help improve agility, overcome the bottleneck in data engineering and incrementally deliver the insights needed to improve business outcomes.

Multiple teams of data producers can create reusable virtual data views that shorten time to value

Logical data fabric offers these capabilities and is therefore a candidate technology that Financial Services and Insurance companies should shortlist when selecting data management technology for a data-driven enterprise.

About Intelligent Business Strategies

Intelligent Business Strategies is an independent research, education, and consulting company whose goal is to help companies understand and exploit new developments in business intelligence, machine learning, advanced analytics, data management, big data, and enterprise business integration. Together, these technologies help an organisation become an *intelligent business*.

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