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ACCG3055: INFORMATION SYSTEMS FOR MANAGEMENT

Case Study / Report: Data Fabric

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Introduction

Due to the pandemic, cloud computing surged in 2020, although the majority of enterprises still use on-premises architecture for numerous systems. Many people believed that the cloud's agility and the possibility of using it without physical access were even more enticing than its economic benefits. However, if all software-as-a-service (SaaS) applications and the major platform-as-a-service (PaaS) suppliers are included, the majority of businesses employ cloud services from numerous, and even large number of clouds, as opposed to using a mono cloud platform for all of their needs (Medford Information Today, 2020). The importance of data has never been more clear. However, data is often compartmentalised within apps, meaning it is not being used as efficiently as it could be. Today, the majority of businesses use hybrid and multi-cloud data infrastructures, which results in more difficult data management tasks.

Forward-thinking organisations are figuring out how to maximise the value of the data dispersed throughout their multi-cloud and hybrid systems. One approach is to build a logical data fabric, which is an architecture and collection of services that enable consistent and unified access to data, delivery, and management. Data fabric connects data across systems and people, making it accessible wherever it is required. It can understand what data is being utilised via advanced analytics reading metadata. Its true worth lies in its capacity to propose added, diverse, and better data, significantly decreasing data administration (Groombridge, 2022).

Technology – '*Data Fabric*'

Overview

As organisations in the business intelligence space depend heavily on big data analytics to take actions, there has never been a greater demand for dependable and effective solutions for managing data. Data fabric supplies a novel approach to managing and processing massive data, making it an excellent option for organisations wishing to increase their analytical skills. Data fabric architectural style is a technique of managing data that is increasingly being employed in big data analytics. Previously, traditional data management grouped the data into tables and columns within a database. This arrangement made data movement and sharing across systems challenging. Data fabric architecture divides data into fabrics and groupings of related data that are easily transferrable and shareable between systems (Athena Information Solutions Pvt. Ltd, 2022).

What challenges does 'Data Fabric' aim to solve?

Considering the significant developments in big data and cloud technology, data is still compartmentalised across on-premises and cloud platforms, maintained in disparate data formats, and not unified in delivering a comprehensive view of the company. Businesses invest more time incorporating data through legacy extract, convert, and load procedures than evaluating data or generating value from it. Since organisations cannot manage across disparate data sources, this has an impact not only on organisational agility but also on data governance. Organisations no longer have the privilege of devoting far too much effort to data integration as they adopt innovative technologies such as cloud computing, edge computing, and machine learning/artificial intelligence initiatives. Organisations must be able to integrate data in real time in order to provide speedy data supply while adhering to stringent data governance (Chatham Information Today, 2020).

Storage of data has appeared as a serious challenge in the technological environment. Though IT firms are getting a large market share, the difficulties around information storage have expanded as well. In recent times, concerns like as data shortages, implementation faults, increased usage, and cyber-attacks have become more prevalent (Express Computer, 2020). As a result, businesses of all shapes and sizes are much more concerned about running out of storage space. There are several factors that restrict data ability, including information and network protocols, hardware utilised, geographic regions, performance, and digital storage type.

These issues have emphasised the importance of next-generation data management methodologies and technologies, prompting top financial institutions such as Citigroup, Goldman Sachs, and JPMorgan to resort towards data fabrics for

addressing these problems using their data management infrastructures (InterSystems, 2021). Data fabric is becoming increasingly important as far as how banks and other financial institutions use their data.

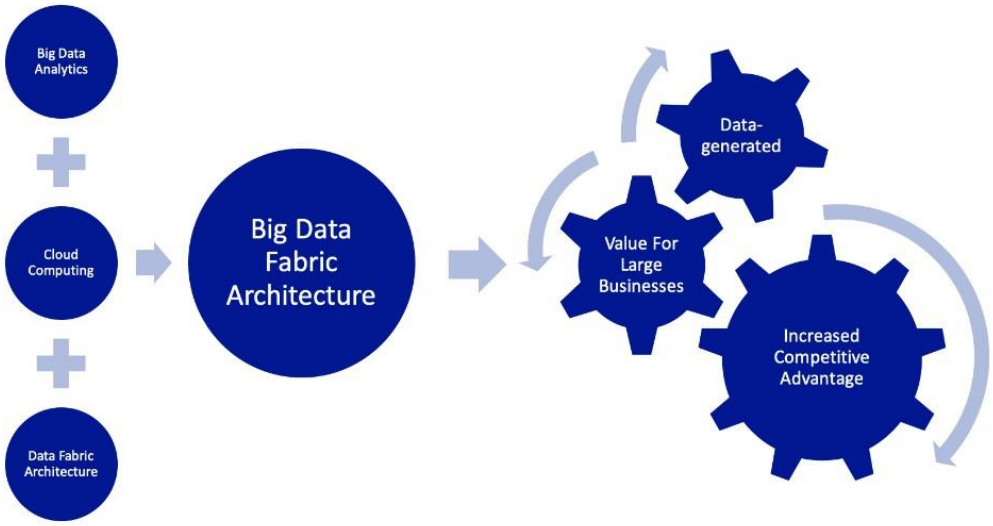


Figure 2. Elements that comprise Big Data Fabric Architecture to generate new competitive advantage.

Overcoming Challenges

Data fabric has appeared as a uniform approach to all of these data-related issues, it is evolving as a method to address the growing need for data and the information technology sphere. Organisations employ a range of programs to access various sorts of data in numerous ways. The data fabric is an architectural approach to data administration that accelerates and streamlines accessibility to diverse data throughout the enterprise while avoiding data duplication and the creation of new data silos (Lichtenberg, 2022). On demand, it retrieves, transforms, and synergises data from numerous sources to make it useful and effective for a wide range of organisational applications. Organisations may expand these capabilities even further by installing smart data fabrics, which include a variety of strong analytics capabilities, including as data discovery, actionable insights, business logic, natural language processing, user access, data extraction, and machine learning, right into the fabric. The smart data fabric keeps current legacy applications and data in place, cutting the requirement to relocate data, reducing structural complications, and providing significantly greater, real-time performance. As a result, logical data fabric in collaboration with data virtualisation gives the ability of uninterrupted access to data without redundancy for optimal agility and configurable organisational data governance (Dooley, 2018).

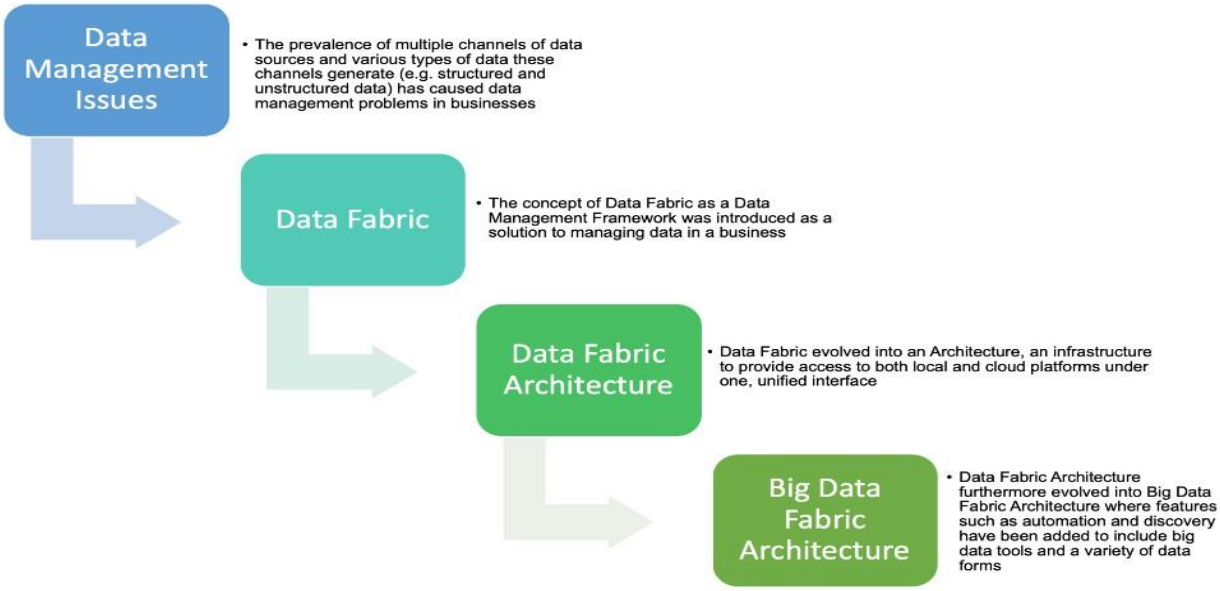


Figure 1. Building Blocks of Big Data Fabric Architecture. Data Management Issues from McDaniel (2019), Data Fabric from Raza (2018), Data Fabric Architecture from Morrell (2017), Big Data Fabric Architecture from Yuhanna, Leganza, Warrier, and Izzi (2016).

Impact of data fabric on stakeholders

Organisations

Data fabric is widely utilised in a wide range of businesses. Financial institutions, for instance, employ data fabric to handle and analyse massive amounts of client data. This allows businesses to design more successful merchandise and marketing strategies by better comprehending client behaviour and patterns . Data fabric and big data analytics are also being used by medical professionals to improve patient care. Clinicians and medics can better comprehend patients' biological histories and detect probable health hazards by evaluating data from digitized health records. This enables them to give better treatment and preventative care to their patients (Instablogs, 2022).

Retailers may establish customised advertising campaigns and enhance the efficacy of their website architecture by evaluating data on consumer demography, financial data, and online interactions. Data fabric is used by manufacturers to enhance product quality and develop new goods and services. Manufacturers can uncover process bottlenecks and improve production schedules by evaluating data gathered by detectors on assembly plants and in facilities.

NetApp, a firm providing hybrid cloud data services and management has introduced new data fabric products and services that provide enterprises with the tools for data management they want to enhance performance in the hybrid era of cloud

computing. In a rapidly changing technological context, firms must administer electronic data in order to develop quicker and exploit new income possibilities. NetApp's Data Fabric vision, solutions, and services enable businesses achieve the full potential of hybrid cloud, enabling them to accelerate and expand while balancing cost and risk. NetApp has also announced the extension of its cloud provider ties, becoming a Google Cloud Platform Technology Partner (Express Computers, 2015).

Employees and Users

Data Fabric can assist users in discovering data assets which are automatically enriched with information and interpretation, allowing users to identify and comprehend the data (IBM Hybrid Data Management, 2021). It also allows for local metadata management and governance while supporting a universal uniform perspective and regulation compliance. Policies are automatically applied to data assets in compliance with local and global standards and advanced capabilities are used to handle data asset categorisation and curation. It creates query-able accessibility for any catalogued assets for greater data activation.

Furthermore, data fabric automates flow and pipeline development across remote data sources to speed up a data engineer's work. It allows for self-service data input and access to any data, as well as local and worldwide deep enforcement of data protection regulations. It automatically identifies best - fitting implementation through efficient workload allocation, self-tuning, and model drifting correction. Data fabrication also allows for the creation, development, administration, and management of data pipelines. It incorporates intelligent automation into the data lifespan to computerise tasks, self-tune, self-heal, and diagnose data source changes, allowing for automatically generated updates (IBM Hybrid Data Management, 2021).

Society and Communities

As part of a comprehensive cybersecurity environment, data fabric serves as the basis around which data is built. When utilised effectively, data fabric increases data safety and efficiency by including the appropriate protective techniques. Many people are concerned about the cybersecurity implications of data fabric since it serves as a central entity for all data. The majority of open-source security flaws have a certified remedy that must be applied (Gartner, 2020). However, many attackers exploit such entryways before the general public have the opportunity to update their applications. Organisations that use data fabric might leverage from cybersecurity mesh in order to integrate mechanisation with a comprehensive security approach.

Drivers of Change

P*olitical factors****:***

Governmental agencies devote enormous money and efforts to ensuring that their services and applications work optimally. This is particularly true for operation programmes that process an increasing volume of data as the public base expands or to satisfy unforeseen peak use demands. To meet these needs, governmental agencies invest in cloud storage technologies that provide the appropriate performance levels (Göran Granholm, 2017). Similarly, the software or service may turn into a legacy system of the future, reducing the use demand correspondingly. It also integrates data from throughout the organisation to allow actual searches for compliance and statuary reports or ad hoc inquiries, as well as reliable data lineage tracing. Agencies may implement these features and optimise their data expenditures dependent upon shifting app use requirements with data fabric, thus accelerating its use in the technological environment as well as for the general public also.

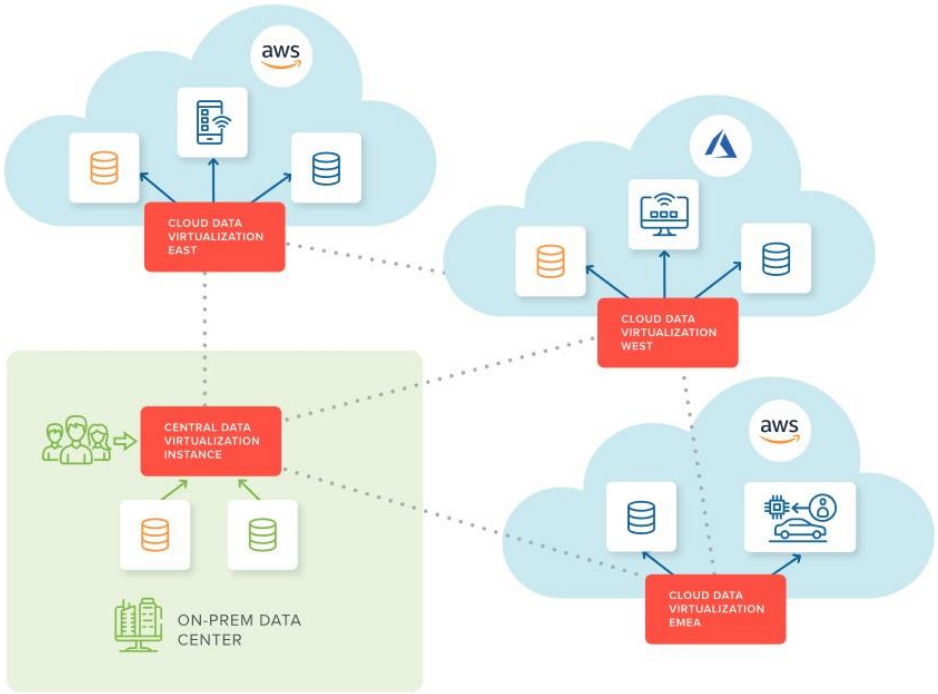
E*conomic factors:*

The organisations are dealing with a variety of data-related issues. On the contrary side, as the number of apps and users grows, IT infrastructure is becoming more complicated. Data fabric can provide organisations with the flexibility to manage multiple platforms while preserving current services and applications. Organizations are increasingly using data fabric because to its properties and benefits. In addition, with the increasing trend of digital time, the need for data fabric is expected to rise. However, the unexpected entrance of the epidemic has caused havoc in every business. Nonetheless, corporations are doing all in their power to preserve economic development.

S*ocial factors:*

Expenditure on researching and development has increased over the previous decades, and there are increasingly important societal ramifications on the way as data fabric is integrated into systems. Additional customization is on the way as data fabric drives internet behemoths like Google, Alibaba, and Amazon to provide more personalised experiences to its consumers (Pestle Analysis, SWOT and Business Analysis Tools, 2020). It will enable providers to communicate with their consumers, gaining more users, and even possibilities in ways they have never done before. Some of the functions that data fabric can provide are currently available, but they are most likely to be improved as technological revolution progresses.

Data Virtualization Hybrid Multi-Cloud Architecture



***T**echnological factors:*

Data can be leveraged to automate operations in modern enterprises, particularly decision-making. A bank, for example, can employ automated decision-making to sift through clients' finances, credit histories, and determine who is eligible for a loan. However, in order for automated processes to be effective and for consumers to accept the outcomes, businesses must comprehend how automated systems make judgments relying on accessible data. Establish the tools that will utilise the collected data first, then build powerful data pathways to handle the data. Analytics may then be automated to evaluate the data, producing insights and solutions for individual operators faster. If such happens, the mechanisation results in uniform and consistent responses based on standardised data. People gain trust because they know the autonomous procedures produce accurate outcomes based on dependable sources of data (Smykay, 2022).

Data fabric offers several time-saving and efficiency techniques. Automation results in greater work output. The fast implementation of data fabric and machine learning into enterprises carries significant operational concerns. Extensive research and a well-planned approach can help to reduce these vulnerabilities. Disruptive technology may not always imply issues, it may even stimulate creativity. It is conceivable to minimise expenses by implementing data fabric and eventually enhancing customer outreach if executed with purposeful aims in mind (Pestle Analysis, SWOT and Business Analysis Tools, 2020).

L*egal factors:*

Data fabric may incorporate both private as well as technical data. From a legislative standpoint, the key dangers include prejudice, privacy breaches, and chilling effects, as well as data governance and copyright in the instance of technical data. Because data fabric technology is global, programs and technologies that consume data sources, store, or produce new data, or organizations must adhere with a plethora of various norms and standards (Bart van der Sloot, 2016). Data Fabric bring a fairly modern technology, law is currently behind and differs by authority. In the United States, for example, there is no one, comprehensive federal law governing the collecting and use of private data, but rather a plethora of federal state rules and guidelines that may overlay or conflict one another (Data Protection in the United States: Overview, 2022).

Data fabric, if in included part of the legal profession, establishes conditions that enable professionals to streamline the job done by entry-level attorneys or paralegals. In certain circumstances, data fabric technology may even improve the accuracy of contract evaluations. It allows lawyers to adopt greater data-driven strategies to their professions. Overall, it is efficient. Finding keywords in massive amounts of data and documents is one of the lesser chores it may help with. When properly developed, it is additionally competent of filling out forms.

E*nvironmental factors:*

Since environmental concerns are quite a significant societal focus, sustainability, eco-friendly goods and services, and business responsibility become critical strategic considerations. Climate change may have an impact on agriculture and forestry by altering the circumstances for agricultural development and, as a result, food supply, putting additional strain on soil and water availability, as well as agricultural systems that rely on fertilisers or various synthetic compounds (European Commission, 2009). The rising demand for food, energy, and materials derived from ecological resources has met or beyond sustainable constraints in many locations. Inordinate fishing, increased water usage, and degradation of forests must all be addressed. Water use and soil deterioration are significant agricultural concerns (European Commission, 2008).

Biodiversity has more than just environmental benefit. The livelihoods of a huge majority of the world's impoverished would be primarily affected by biodiversity loss. Analysis, collection of data and data fabric technologies could be used to track impacts and assure that operations still are within sustainable boundaries (Göran Granholm, 2017).

Projections

Given the clear need for organisations to accomplish more with their data, data fabrics, with their potential to consolidate data from both external and internal references on demand without producing supplemental storage facilities, and provide precise and streamlined entry to that data, are poised to perform a vital role in managing data (AWS, 2021).

Having able to exploit extensive past data more effectively can present organisations with a variety of options. Data fabric may help organisations be more agile, inventive, and customer centric by allowing the line of business to freely access, analyse, and exploit this data. This can aid them in creating or streamlining procedures, identifying complementary services to supply and monetize, and even enabling secure consumer data access via interfaces for application programming (Lichtenberg, 2022). A data fabric does have ability to transform data into insights, which has the potential to speed the innovation process and aid organisations in gaining or maintaining a competitive edge in what may be a difficult market. Consequently, no product or single solution can be used to construct a smart data network. It includes a number of data management, integration, and analytics technologies.

However, for organisations wishing to follow the lead of prominent institutions and embrace this upcoming information management approach, collaborating with competent tech suppliers and partners might give the best road ahead. Organisations will progress their 'offensive' or aggressive data management techniques by installing and using data fabrics, altering their organisations. The road to digitalisation is one of ongoing innovation and change. Many of the hurdles to organisations becoming much more data-driven and effectively using the vast powers of analysis tools are removed by data fabric (Gartner, 2020).

Conclusion

A distributed system of streaming alterations is the era of data management, where data from trustworthy publishers propagates swiftly across the network model and is always easily accessible for judgement calls, automation, and AI/ML. The majority of the technologies necessary to create this view a reality are already available or within grasp, but an attitude shift is also needed for data-centric fields of study to give up the local optima of ignoring data's temporal dimension, of managing data as simple binary blobs, consistently forfeiting, and reworking our digital past. Data Fabric is an attempt to attain this condition by first describing the data qualities we desire and then developing a system surrounding them.

In the near future, data fabric has the potential to become one of the pillars of the next generation of digital democracy, serving as the primary distribution chain for systematic data that is easily consumable by peer-to-peer internet procedures and delivers credible factual data to blockchain smart contracts in order to build a better, more connected world.

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