Zensar

Batch Processing of data is a passé

Elevate to Streaming Analytics for continuous business insights

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Index

Executive Summary

Streaming analytics is the latest advancement in the ever-growing arena of data analytics and its applications. It allows businesses to further the speed and accuracy of critical decisions and actions. Moving away from traditional batch processing of data, which does not quite support proactive and predictive processes, businesses are fast adopting this as the new paradigm. With the right strategy, tools, and resources to equip their teams with, businesses worldwide can gain a competitive edge, as well as stay ahead of the digital transformation curve by implementing new-age technologies such as artificial intelligence (AI), machine learning (ML), internet of things (IoT), big data, and cloud infrastructure. For all of these, streaming analytics is the primary source of insights, where the decision-making onus is on data that's current to the millisecond. In a real sense, streaming analytics is already a big part of everyday use cases such as ride-sharing, where instantaneous data processing plays a pivotal role. What comes next is the operationalizing of this mode of data capturing and analysis for a wider set of business processes and customer experiences.

This paper unpacks the growing demand for streaming analytics and explores the real-world applications and feasibility of this phenomenon.

Introduction

In today's big data-powered world, streaming analytics is the latest buzzword. It refers to the processing and analysis of data records continuously in real-time, rather than in batches. Also known as event stream processing, this provides a non-stop flow of data that can be stored, processed, and acted upon. This is especially useful in cases where the data generated is low in volume and size, and aids in continuous business insight. Businesses too are rethinking the way they make decisions, in order to leverage the speed and accuracy that streaming analytics can power. In fact, the global streaming analytics market was valued at $7,740.0 million in 2019 and is projected to reach $52,190.0 million by 2027, growing at a CAGR of 26.8% from 2020 to 2027. And this change is in no small part driven by the Internet of Things and the growth of AI and the accelerated digital transformation of businesses after the COVID-19 pandemic. **Figure 1** illustrates the differences in data flow and architecture between batch and stream data processing. Streaming analytics allows enterprises to understand what is happening now, in real-time, by analyzing data from multiple real-time data sources. This can then be analyzed to track real-time performance and make instantaneous business decisions accordingly.

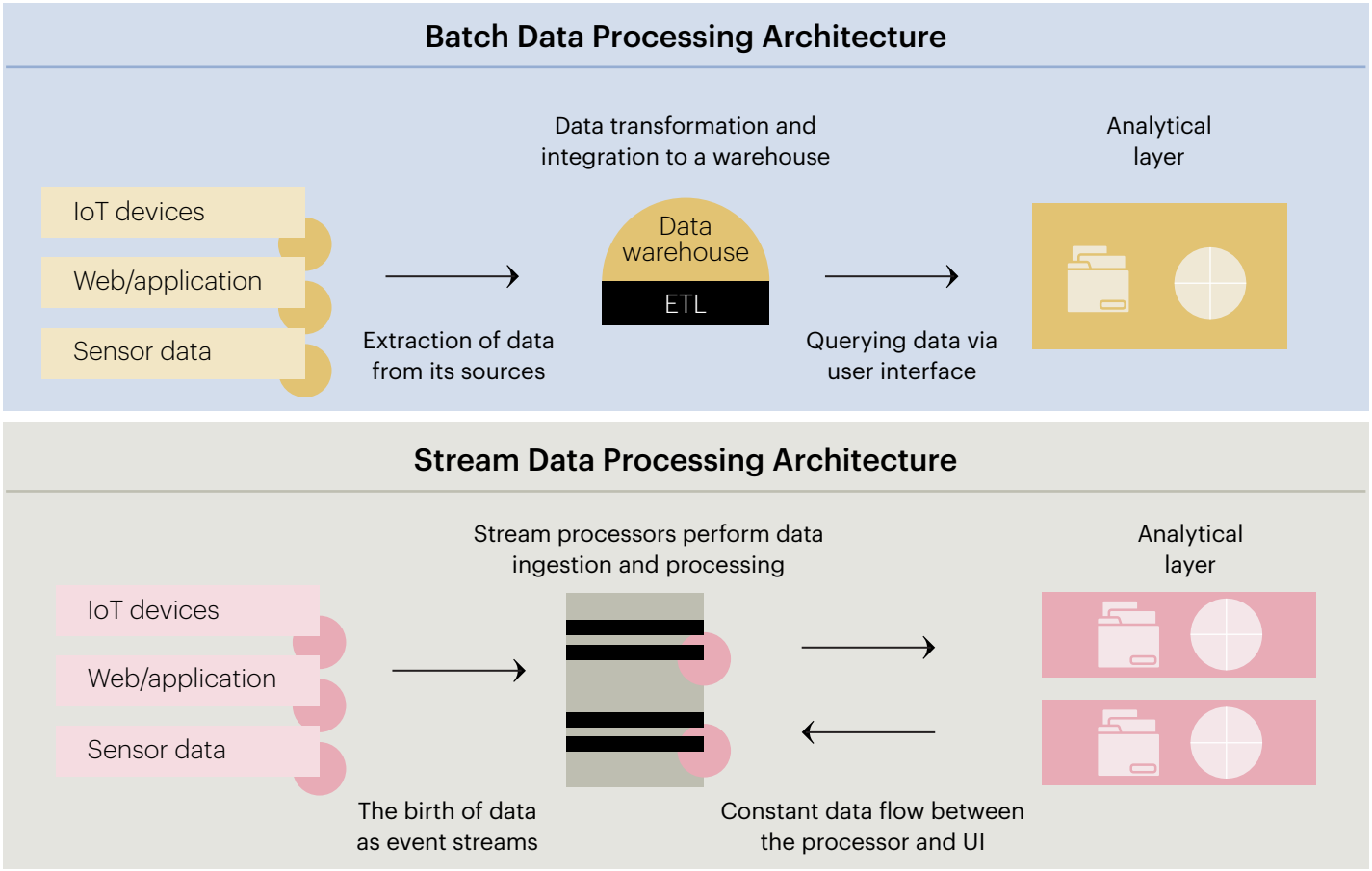
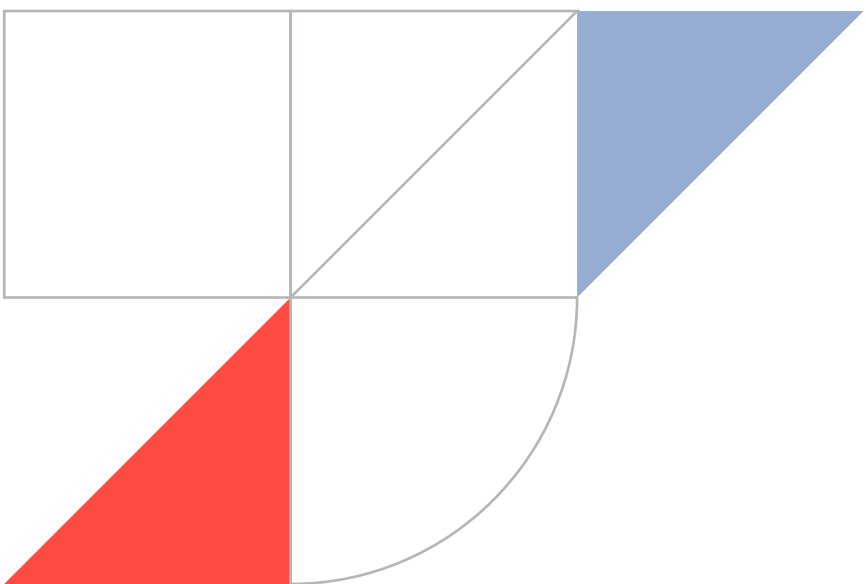


Figure 1: Batch data processing architecture vs stream data processing architecture

Upgrading the data analytics status quo

Business Intelligence and data-driven processes have been a staple of every organization for a long time now. However, the advent of big data and the addition of an infinite amount of data sources have made it challenging to control and streamline the flow and structure of data signals. Moreover, every business wants to gain a strong data-backed competitive edge, which puts the onus on business intelligence systems to overcome these new challenges. Batch processing of data no longer makes the cut. In fact, data that is more than a few milliseconds old is already considered stale in a lot of industry use cases, such as tracking in ride-sharing and hyperlocal delivery services. This makes real-time corrective action and continuous improvement a challenge. It can be likened to driving a car while looking at the road behind the vehicle, rather than ahead. The need of the hour is to have a steady stream of truly current data flowing in, that can be processed and utilized by businesses. This is where streaming data plays a vital role.

While the world is familiar with use cases of streaming analytics across real-time location tracking, fraud detection, and in the BFSI sector for use cases like stock trading, streaming analytics is not just limited to pattern identification and alerts. It can be integrated into full-scale business analytics to monitor business performance in real-time. In fact, marketing and sales as a segment dominated the market in 2019 with a 28.3% share, thanks to the increasing usage of streaming analytics in delivering better customer engagement by employing customer profiling, campaign management, demographic analysis and other such techniques. It can guide businesses in proactive decision-making based on business value indicators, as opposed to reactive course correction based on past data.



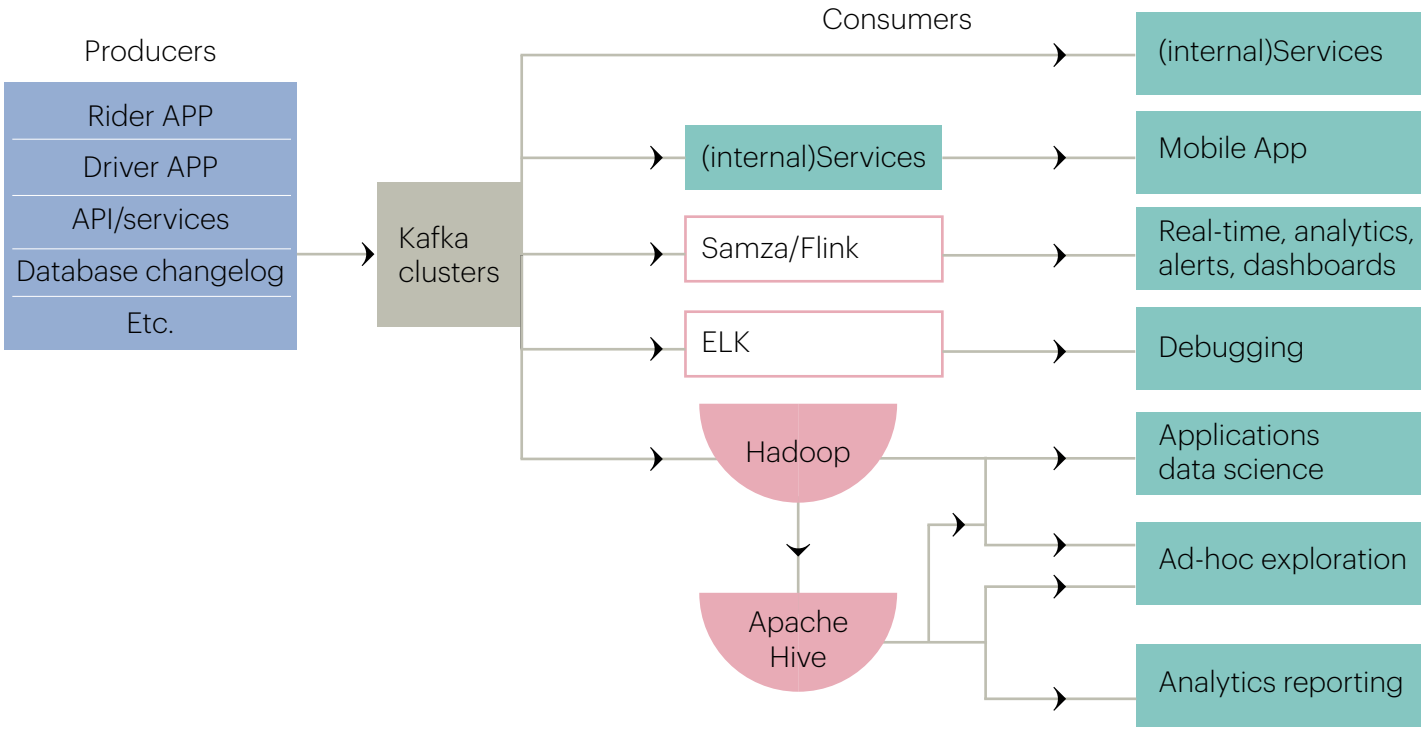


Figure 2: Traditional Streaming Analytics

The above architecture diagram (Figure 2) depicts data signals that have been captured in small streams using Kafka message broker, and then processed in another layer of Hadoop, Elasticsearch, and other technologies, and finally passed on to the business application for insights. With recent developments, however, data can be processed in data streams, and utilized for insights right as they are captured.

Adapting to real-time analytics

Data collection is only the tip of the analytics iceberg. Making sense of this data to feed into business processes and business decisions is key. Any company that deals with big data could find it advantageous to implement streaming analytics for continuous, real-time data processing. For example, retail inventory data gets processed in batches to track revenue and sales patterns. Data from the store, warehouse, and supply chain feed into this analysis. Imagine being able to see this data in real-time, as moving inventory or supply chain activity, for example. With this data, it would be possible to make adjustments or changes to any touchpoint in the supply chain, rather than make reactive decisions later.

While this may sound ideal, businesses need to first identify KPIs that make the most sense for them to track. Also important is to acknowledge data sources that cannot be tracked in real-time, and plan around these gaps.

Using the same retail example as above, these data streams could be:

Real-time inventory movement, to track what times of the day are busy and what parts of the retail catalog are popular among customers

Revenue metrics, to discover actual speed of meeting business targets and planning future targets

Coupon codes and offers redeemed, to get a sense of which ones are performing well, what needs to be promoted, and what needs to be rebalanced

Other use cases where this level of granular data streaming would be critical are real-time personalization of app or web experiences, anomaly and fraud detection in online transaction systems, real-time health monitoring, and proactive healthcare.

With about 90% of companies believing that investing in real-time data technologies will be the key to remaining competitive, the case for this shift is made. But 66% find it hard to reduce time to value from their data, due to culture and the lack of people and skills. Becoming a streaming analytics-led business is a large-scale change in strategy, and it is important to start small and flexible.

The first step is identifying real-time business indicators and near-real-time business indicators that are mission-critical. Examples of real-time indicators are the number of SKUs sold, the location of the ride-share driver, revenue generated, and media being consumed on entertainment and social media platforms. Near-real-time indicators could look like ticket inventory on online ticketing platforms, and payroll processing data. In essence, these indicators might be momentary, but upon aggregating, they serve to guide major business decisions. Monitoring and analyzing streaming data can greatly improve operational efficiency and shed light on business challenges and opportunities.

Streaming analytics in IoT: the new normal

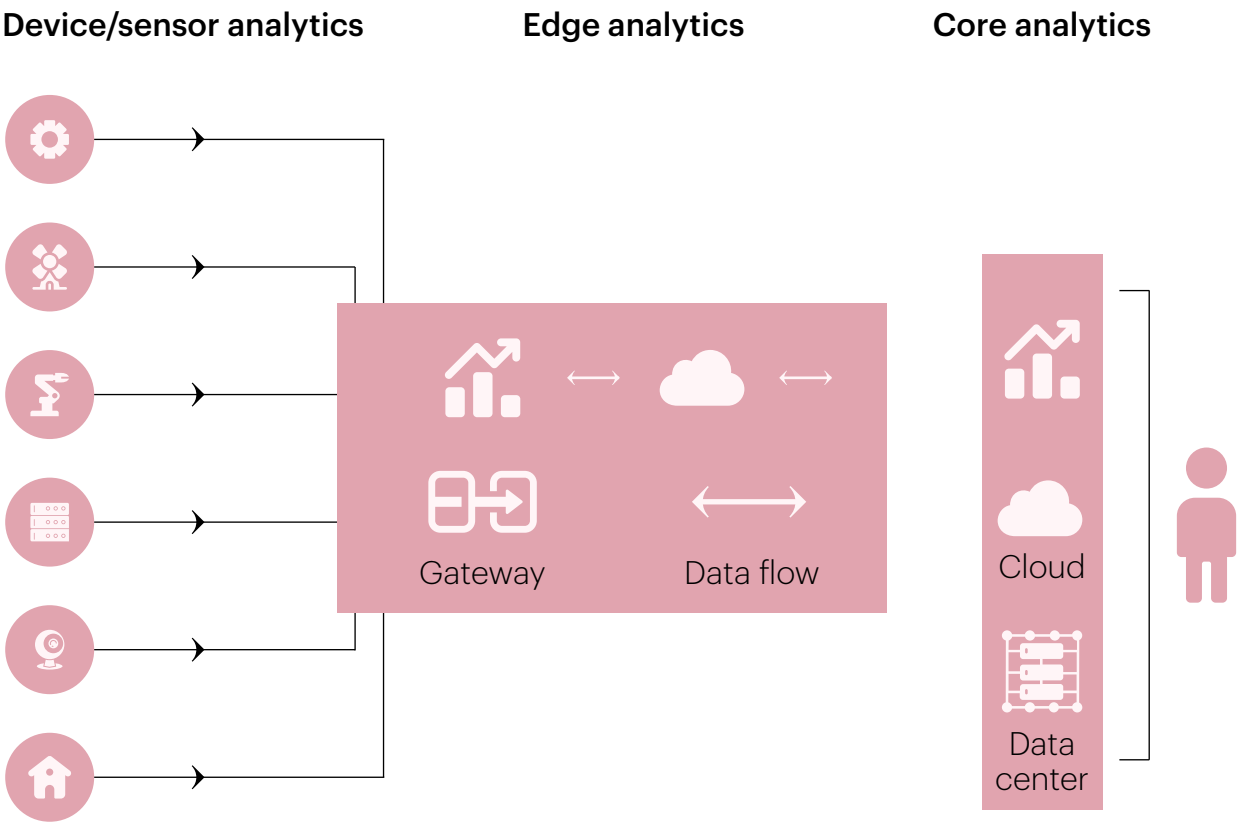


Figure 3: The flow of data in streaming analytics

The above architecture diagram (Figure 3) depicts the flow of real-time business indicators that help in monitoring and anticipating the realization of business targets. This continuous flow of data can help prevent untoward situations and enable businesses to take corrective action.

- With the use of streaming analytics, as depicted above, patterns and relationships can be identified in the data extracted from multiple input sources — such as devices and internal systems — across various business functions, applications, and more.
- These patterns can be used to trigger actions and initiate workflows such as creating alerts, feeding information into a reporting tool, or storing transformed data for later use. Today, there are open-source bundles and COTS cloud tools that can help businesses perform these actions.

A peek at the future: use cases for streaming analytics

Connected Devices (IoT)

Monitor usage and activity on consumer devices to raise automated requests or alarms. In business-facing devices, this can reduce latency and streamline inventory and supply chain.

- **Connected homes:** Automated lighting and appliance shutoff, as well as intruder detection and alerts that can enable the homeowner to trigger safety measures.
- **Connected automobiles:** Automation of navigation features and real-time traffic monitoring to optimize driving routes.
- **Consumer IoT:** Automatic triggers to place purchase orders or maintenance requests based on data collected.
- **Wearable technology:** Streamed monitoring of vitals and proactive alerts on fitness and healthcare measures.
- **Enterprise IoT:** Real-time product lifecycle management and strategy mapping.
- **Industrial IoT:** Real-time monitoring of machinery for proactive maintenance and prevention of wear-and-tear.

Financial services

Monitor account activity to detect anomalies and generate a security alert for abnormal activity or usage.

Investment services

Track market changes and adjust customer portfolios based on configured constraints, such as selling when a certain stock value is reached.

E-commerce

Analyze user clickstream data to optimize and personalize the shopping experience with real-time pricing, promotions, product recommendations.

Media and entertainment

Real-time analysis of video data for object tracking and understanding audience interaction, to provide more personalized experiences.

Retail

Analyzing real-time POS data, and matching it with purchase history, customer behavior, and loyalty card performance to improve customer experience.

Cybersecurity

Monitor online activity and trigger cybersecurity alarms when certain rules have been breached or frauds committed. This could be especially useful to social media platforms.

Conclusion

Streaming analytics is becoming the new paradigm, with businesses being able to leverage continuous, real-time data, agnostic of industry. While traditional business analytics may have its benefits and a stronghold over legacy business processes, streaming analytics is fast becoming the way of the future. The need for real-time decision-making has made it absolutely necessary for firms to turn to streaming data for advanced insights, in order to stay truly competitive. Knowing that all data is current and accurate can be a great way to boost confidence levels in business decisions.

Getting started with streaming analytics is not just a passing trend. This could be a crucial movie for a business that defines their growth for the next decade. The key is to develop a solid business case for the shift and work with a realistic and agile plan. Going live with a hybrid model and periodically reviewing the system will help operationalize this landmark phenomenon in data analytics.

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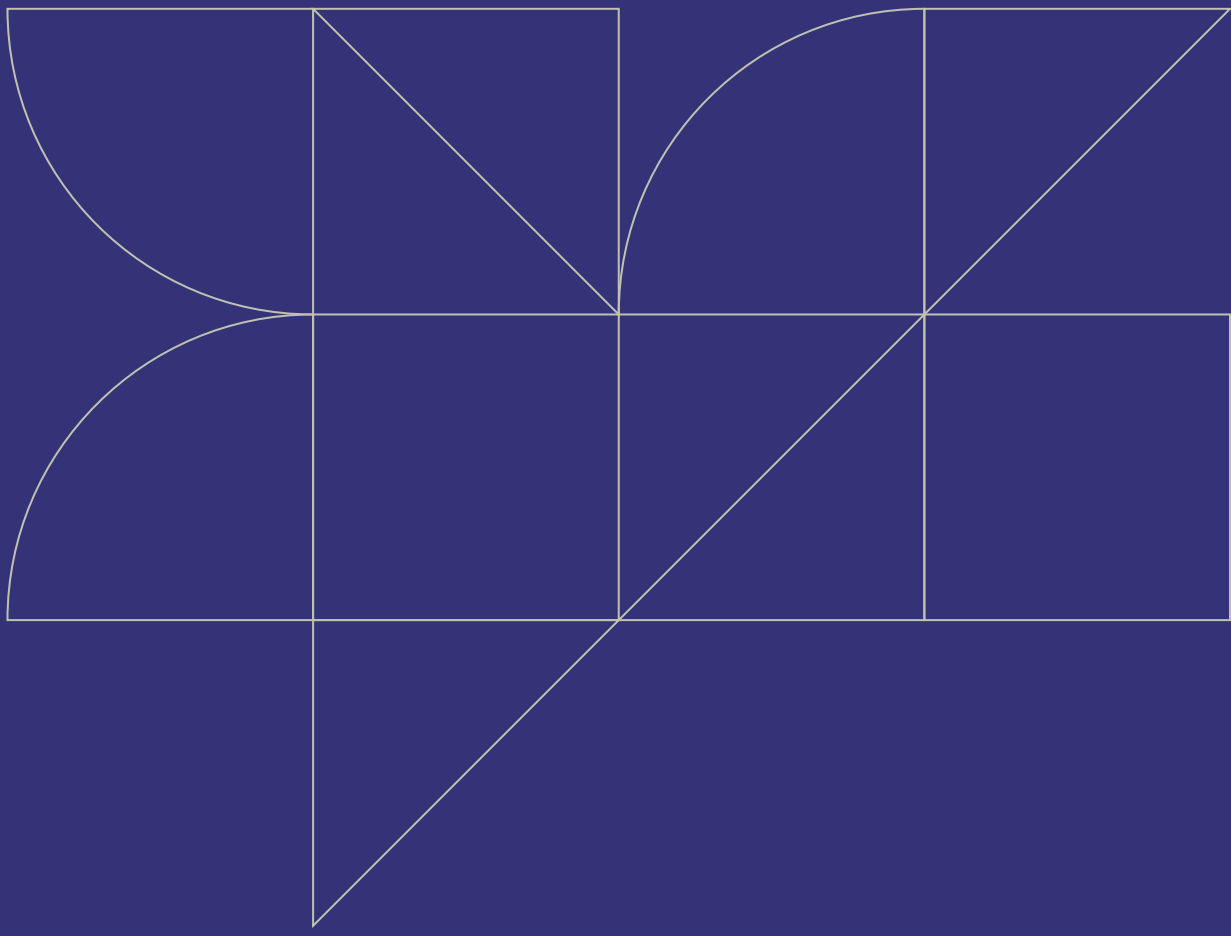

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