

PubNub

Time is Money

How Real-time Data Drives
Business Success

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Time is Money: How Real-time Data Drives Business Success

Today, as we've grown accustomed to more collaborative and interactive environments, communication can be carried out in bite-size bits at the speed of light. Social media platforms, instant messaging apps, and various digital tools have made it possible to share thoughts, ideas, and updates almost instantaneously. This rapid exchange of information has created a culture of immediacy, where waiting for a response feels like an eternity. Data value is increasingly short-lived, **making time the most indispensable asset businesses can claim in this fast-paced digital landscape.**

How valuable is data?

Information decay is the rate at which the value of a piece of information decreases over time. The sheer volume of information being delivered continues to grow exponentially, and as a result, the value of each individual piece of data diminishes. This phenomenon means that the real power now lies in immediate access to aggregated information, where the ability to synthesize and analyze data quickly can lead to better decision-making.

For businesses, this situation is both a blessing and a curse. It's a blessing because organizations are empowered to deliver innovative products and features faster than ever, supporting businesses in making better data-driven decisions. [Accessing real-time data](#) allows companies to respond to market changes, customer preferences, and emerging trends with agility. However, the flip side is that end users' desire for truly real-time data is insatiable. They want their data, updates, and immersive connected experiences now and don't want to miss anything. This expectation pressures businesses to keep up with the relentless demand for timely information.

For modern businesses, this means that time is everything. To stay competitive, continue to innovate, and deliver on expectations, businesses must take advantage of their time and squeeze every ounce of value from a short window. This urgency requires organizations to rethink their strategies and **invest in technologies that enable faster data processing and delivery.**

What's in this eBook

This eBook provides a **comprehensive look at why time is a valuable asset to organizations**, the dangers of businesses losing time, and what technologies and design patterns businesses can harness to maximize time. It will explore various aspects of time management in data delivery, customer engagement, and operational efficiency.

Why is time the most vital asset to a business?

From consumer apps to analytics, and eCommerce to financial trading, the most successful and innovative businesses understand and have embraced time as their top asset. They recognize that in today's fast-paced world, the ability to act quickly can make all the difference between success and failure.

In the consumer world, consumers crave the instant gratification of receiving goods or information in real-time when it's most relevant. They expect seamless experiences, whether shopping online, accessing information, or engaging with brands. Companies meeting these expectations will likely build strong customer loyalty and drive repeat business. Analytics and reporting companies' primary success factor is delivering the most relevant and up-to-date data information to anyone subscribed. Providing timely and actionable insights is crucial for businesses seeking a competitive edge.

Across all businesses, engaging customers at the right time and making decisions based on accurate, up-to-the-second data is the one true differentiator. **Companies that can harness the power of real-time data are better positioned to respond to customer needs, adapt to market changes, and seize new opportunities.** This agility is essential in a landscape where consumer preferences can shift overnight, and new competitors emerge seemingly out of nowhere.

What it comes down to is: Do we have or have we delivered the most valuable, current data available right now? And how can we utilize the time we have to make the most impact? These questions are at the forefront of every successful business strategy. Organizations must prioritize data collection, analysis, and dissemination to ensure they always operate with the most relevant information at their fingertips.

What Businesses Lose When They Lose Time

The 2014 book *Flash Boys* chronicles two entrepreneurs' quest to lay a fiber-optic cable between the Chicago Stock Exchange and the New York Stock Exchange: 827 miles in the straightest, most direct way possible. This ambitious project meant cutting through mountains rather than going around them and traversing rivers rather than going under them. Why would they take such drastic measures?

Every millisecond matters in the world of high-frequency trading. **The goal is to be faster than the rest of the market.** The faster the data flows, the higher the likelihood of profiting off a trade. That cable is where all the magic happened, shaving milliseconds off what any other connection could achieve.

This is where the world stands now—the more time you lose, the less successful your business is, down to the tenth of a millisecond. Burning valuable time has significant implications that directly affect a business's bottom line.

Loss of Revenue

Whether your business provides or consumes data, your revenue is affected whenever time is wasted moving information from its source to the algorithms and systems it will drive.

For businesses that deliver data, time is everything. Customers choose them because they can provide the most accurate and up-to-date information. The provider's job is to get that data from point A to point B, and customers place their trust in timeliness and reliability. If a business fails to deliver on time, it risks losing customers to competitors who can.

But it's not just about delivering the data; it's also about the sophisticated systems that enrich the information while it's in motion. **Leading providers can manipulate, filter, and act on data before it even reaches the end user, enhancing the value of information without losing time or money processing it in a central location.** This capability is crucial in a world where every second counts.

Utilizing real-time data provides an unquestionable competitive advantage for data-driven organizations, allowing them to do innovative things with the data at hand. Organizations can better understand customers, detect what's successful and not, use current activity to confidently predict what's coming next, and even make [real-time changes in the app](#), affecting the entire user experience. These predictive capabilities can lead to better decision-making and ultimately drive revenue growth.

Loss of Customer Engagement Opportunities

Real-time data is massively valuable for customer engagement. It's often said that to be successful, you need to engage the customer with the right message at the right time. The key to recognizing "the right time" is to tap into what your customers are doing and their actions as they happen. By extrapolating insights from real-time data, businesses can drive new and exciting ways to engage with their customers.

When businesses fail to act quickly, they miss meaningful opportunities to connect with customers. For example, if a customer is browsing a website and shows interest in a product, a timely notification or offer can make all the difference. However, if the business takes too long to respond, the customer may lose interest and move on to a competitor.

Moreover, the ability to engage customers in real time can lead to increased loyalty and repeat business. Customers appreciate when businesses understand their needs and respond promptly. This responsiveness can create a positive feedback loop, where satisfied customers are likelier to return and recommend the business to others.

Loss of Competitive Edge

In today's fast-paced digital landscape, businesses that fail to manage time effectively risk losing their competitive edge. The market is constantly evolving, and consumer preferences can shift overnight. Companies that can harness the power of real-time data are better positioned to respond to these changes and seize new opportunities.

For instance, consider a retail business that tracks customer purchasing behavior in real time. By analyzing this data, the business can quickly identify trends and adjust its inventory. If a particular product is flying off the shelves, the business can restock it immediately, ensuring it meets customer demand. Conversely, if a product is not selling well, the business can pivot its marketing strategy or discount the item to clear inventory.

In contrast, businesses that lag in their data management may be outpaced by competitors who are quicker to adapt. This can lead to lost market share and diminished brand reputation. In a world where consumers have countless options, being slow to respond can be detrimental.

Loss of Innovation

Time is also a critical factor in driving innovation. Businesses that can quickly analyze data and respond to market changes are more likely to develop new products and services that meet customer needs. However, if inefficient data management processes bog down a business, it may struggle to innovate.

For example, a tech company that relies on outdated systems to analyze user feedback may miss out on valuable insights that could inform product development. When the company finally acts on this feedback, competitors may have launched similar products, leaving the original company playing catch-up.

In contrast, businesses prioritizing real-time data analysis can stay ahead of the curve.

They can quickly identify gaps in the market and develop solutions that address those needs. This agility not only drives innovation but also enhances the overall customer experience.

Another example is a running app. When a user decides to go out for a run, their application collects a wealth of powerful insights about their activity. This includes crucial geolocation data, which tracks where they are running, and information about what time of day they typically exercise. The app can also monitor the miles the user has logged to a specific pair of running shoes. Imagine a scenario where the manufacturer or distributor sends an alert when the user reaches 300 miles on those shoes. This alert could include a compelling offer to purchase a new pair of shoes tailored specifically to the user's preferences and needs. This kind of real-time data is essential for acquiring valuable insights, and these insights serve as the fuel that drives innovation in the industry.

The loss of time can have far-reaching consequences for businesses. From revenue loss to missed customer engagement opportunities, the implications are significant. Companies that fail to manage time effectively risk losing their competitive edge and stifling innovation.

Real-Time Data in Fintech: Meeting Customer Expectations

In the fintech industry, customer [expectations for real-time services](#) have never been higher. Whether it's instant transactions, real-time account updates, or live investment tracking, consumers expect their financial data to be available immediately, without delays or errors. This growing demand for immediacy is driven by the increasing reliance on digital financial services and the shift towards more mobile and online banking experiences. In this hyper-competitive space, a few seconds of lag time can result in dissatisfied customers, diminished trust, and, ultimately, lost business.

Financial services are no longer seen as simply transactional; they are part of the broader digital ecosystem where user experience reigns supreme. The expectation for instant access to up-to-date information has become the norm. Customers expect to see the latest balance as soon as they complete a transaction, to receive real-time notifications of account activities, and to track investments with up-to-the-second accuracy. Delays, even in milliseconds, can make customers feel out of control of their financial situation, which erodes trust—a crucial element in any financial relationship.

Moreover, real-time data isn't just about convenience; it's also about empowerment. Consumers rely on real-time updates to make informed financial decisions on the fly, from managing budgets to buying and selling stocks. For example, real-time access to stock prices and market data is essential for traders, who depend on instant insights to act at the right moment. A delay in data can lead to missed opportunities or financial losses. Similarly, consumers managing their finances expect immediate updates when making payments or transferring money to avoid overdrafts or missing payment deadlines.

For fintech businesses, real-time data delivery is the **baseline for building trust and loyalty**. Offering real-time services helps build customer confidence by ensuring transparency and control over their financial lives. Furthermore, real-time data can significantly enhance customer engagement. For instance, by using real-time alerts and notifications, businesses can inform customers about their transactions, investment milestones, or unusual activity in their accounts. This immediate feedback fosters a sense of security, satisfaction, and connection to the service.

As competition in the fintech sector intensifies, real-time data becomes a key differentiator for businesses. Startups and established financial institutions must leverage real-time capabilities to stay relevant in a market where consumers have many options. Companies that can't deliver real-time experiences risk losing customers to competitors who can meet these demands more efficiently. Beyond retaining customers, real-time services also open the door to innovation, allowing businesses to offer personalized, responsive, and predictive services based on users' current behaviors and needs.

Real-Time Payments: The Future of Fintech Innovation

One of the most exciting areas of fintech innovation is [real-time payments \(RTP\)](#). The traditional banking model, where transactions often take hours or even days to settle, becomes obsolete as consumer and business expectations shift toward instant financial interactions. Consumers now expect the same immediacy from their financial services that they experience with other digital services, such as messaging, shopping, or social media. **Real-time payments are reshaping the financial landscape by providing faster, more efficient ways to transfer money, whether for personal transactions, payroll disbursements, or cross-border payments.**

For consumers, the appeal of real-time payments is clear: there's no need to wait for a transaction to process. From paying friends for dinner to managing urgent financial needs, RTP allows individuals to move money instantly, giving them full control over their financial lives. The speed and immediacy of RTP also bring a sense of security and convenience, especially when timing is crucial, such as sending emergency funds or making immediate bill payments to avoid penalties.

Businesses, too, are benefiting greatly from the emergence of RTP. Payroll disbursements, which traditionally happen bi-weekly or monthly, can now be completed instantly, offering employees access to their wages when they need them most. This flexibility is especially valuable for gig workers and freelancers who may require quick payment access after completing jobs. Additionally, businesses can improve liquidity management and optimize cash flow by reducing the time it takes for funds to transfer between accounts. This increases operational efficiency, strengthens financial planning, and reduces the risk of overdrafts or late payments.

In the realm of cross-border transactions, RTP has the potential to drastically reduce the complexities and inefficiencies associated with international money transfers. Traditional cross-border payments can be slow and costly, often involving multiple intermediaries that introduce delays and fees. **Real-time payment systems simplify the process, enabling individuals and businesses to transfer money across borders almost instantaneously, at a lower cost, and with greater transparency.** This is particularly significant for international trade, remittances, and global business operations, where timely payments are critical.

Adopting RTP systems is more than just a response to customer demand for fintech companies—it's an opportunity for differentiation. RTP systems reduce the friction and delays still common in traditional payment processes.

REAL-TIME PAYMENTS

By offering fast and seamless payment solutions, fintech businesses can position themselves as forward-thinking innovators, providing customers with a superior user experience. This capability attracts new users and deepens engagement with existing customers who value speed and convenience in their financial transactions.

Moreover, the regulatory environment is also shifting in favor of RTP. Governments and financial institutions worldwide recognize the benefits of real-time payments and encourage their adoption. In many regions, central banks are implementing frameworks that support real-time settlement and payment infrastructure, further accelerating the trend. This regulatory support provides fintech businesses with more opportunities to expand their RTP offerings and tap into new markets, contributing to the overall growth of the fintech ecosystem.

The scalability of real-time payment systems also means they can accommodate a broad range of financial transactions. Whether it's peer-to-peer payments, business-to-business transfers, or government-to-citizen disbursements, RTP is versatile enough to meet the needs of various users and use cases. As the demand for real-time transactions grows, fintech companies will increasingly need to adopt and optimize their systems to handle higher volumes of real-time data and ensure uninterrupted service.

Beyond speed and convenience, RTP also brings greater transparency to financial transactions. With instant payments, both parties can immediately see when a transaction is completed, reducing uncertainty and the need for follow-ups. This transparency builds trust between users and service providers, fostering better relationships and improving overall customer satisfaction.

RTP enhances user experiences and sets new expectations for financial services by eliminating waiting periods and offering seamless money transfers. For fintech businesses, RTP is a critical opportunity to innovate, differentiate, and capture a larger share of the market by meeting the growing demand for instant, reliable, and secure financial transactions.

How Successful Businesses Take Action... **Now**

Utilizing information before it decays is fundamental to effective business operations. Simply delivering data without extracting insights or taking action does not meet the demands of today's fast-paced business environment. Technologies like serverless computing and event-driven architecture help businesses go beyond simple data-driven decision-making. They open up opportunities to extract more value from each piece of data. This can involve manipulating the data to work seamlessly with other systems, connecting the data stream to third-party computation offerings, or automatically triggering valuable tasks in other systems.

The shift from request/response architecture to real-time data streaming systems has fundamentally changed delivery speeds and the value and applicability of data. Popular protocols to facilitate this include [long polling](#), [MQTT](#), [WebSockets](#), frameworks like [Socket.IO](#), and infrastructure providers like PubNub. These technologies enable software designers to establish a network connection through which data can be streamed bidirectionally, quickly, and reliably between any number of connected devices or systems. This real-time innovation has ushered in new technologies and design patterns that take advantage of the ever-shortening window of opportunity.

Functions and Serverless Compute

Functions allow you to run and execute business logic on your data as it is in motion. You may have encountered Functions-as-a-Service (FaaS) offerings, where a vendor provides a scalable 'virtual server' model for running your code. Whether you choose to build your own serverless Functions from scratch or opt for a serverless compute vendor like AWS Lambda or [PubNub Functions](#), the concept of executing your code without the need to provision any additional servers to perform the actual computations is a game changer for many businesses.

Serverless compute takes real-time data streaming to the next level, enabling systems to accomplish more in a shorter amount of time with the data they handle. Beyond merely sending and receiving data or continuously pinging additional servers or external services, functions bring the business logic directly into your data streams. This integration allows for more efficient information processing, leading to quicker responses and actions based on the data received.

HOW SUCCESSFUL BUSINESSES TAKE ACTION

There are broad use cases for this, including:



Real-Time Analytics

Businesses can analyze data as it comes in, allowing immediate insights to inform decision-making.



Automated Responses

Functions can trigger automated actions based on specific data inputs, enhancing operational efficiency.



Enhanced Customer Experiences

By processing data in real-time, businesses can tailor their offerings to meet customer needs instantly, improving satisfaction and loyalty.

Leveraging real-time data through serverless computing and functions transforms how businesses operate. It allows them to respond more swiftly to changes in the market and customer behavior than ever before. This agility is crucial in a world where every second counts and the ability to act on insights immediately can make all the difference.

Functions and Serverless Compute Use Cases

Manipulate the data in motion: It is essential to filter, augment, translate, enrich, and transform data before it reaches its intended destination. This process can be as straightforward as translating a chat message from English to Spanish, ensuring clear communication across language barriers. On the other hand, it can also involve more complex tasks, such as ingesting a massive firehose of social media data. In this scenario, the system analyzes messages for their sentiment, categorizing each message based on the perceived emotion. This capability allows businesses to understand public opinion and respond accordingly, enhancing their engagement strategies.

Connect third-party services: Serverless functions are loosely coupled, so they can easily integrate with third-party services. This flexibility allows teams to execute business logic through these services without spinning up additional infrastructure. For instance, powerful third-party services—such as cognitive and machine learning offerings from Amazon, Microsoft, and Watson—can be seamlessly incorporated into the functions. This integration delivers the capabilities of these advanced services directly within your application, all through a lightweight API request. As a result, businesses can leverage sophisticated technologies without the burden of managing complex infrastructure.

Big data ingestion and analysis: For organizations that generate massive amounts of data, such as an industrial IoT company with thousands of sensors deployed in the field, serverless functions play a crucial role. They help make sense of the data and deliver rapid insights and analysis. By processing data in real-time, these functions enable organizations to respond quickly to changing conditions, ensuring they remain competitive in their respective markets. This capability is vital in industries where timely decision-making can significantly impact operational efficiency and profitability.

Serverless compute is massively beneficial for allowing applications and organizations to deliver more value in a fraction of the time. In addition to the value delivered, serverless functions reduce costs and provide a more loosely coupled architecture. This flexibility makes your application more adaptable to changing business needs and opens the doors to more innovation. By minimizing the overhead associated with traditional server management, businesses can focus on developing and deploying new features that enhance user experiences.

Edge Computing

With the explosion of data stream-based applications—those that rely on vast amounts of data points being sent and received by devices—and the growing expectation of real-time experiences from end users, [edge computing](#) has gained both adoption and importance. This shift reflects a fundamental change in how we think about data processing and application performance.

To deliver these types of applications and meet the demands of end users, traditional request/response models simply cannot keep up. With devices and end users constantly emitting and consuming large data streams and serious security considerations, edge computing addresses these challenges effectively. It allows data processing closer to the source, reducing latency and improving response times.

In a nutshell, **edge computing refers to computing that takes place as close to the data source as possible**. Compared to cloud computing, where all data passes through centralized data centers, edge computing provides a faster, more efficient way to act on data. This is particularly important in scenarios where immediate responses are critical, such as autonomous vehicles or real-time monitoring systems.

Relying solely on cloud computing to process data is too slow for many applications. Latency aside, the cloud often struggles to keep pace with the massive data volume and velocity generated by data-intensive deployments, such as large-scale chat applications or IoT systems. By processing data at the edge, organizations can significantly reduce the time it takes to derive insights and take action.

Gathering, processing, and storing data at edge devices greatly alleviates potential bandwidth bottlenecks in the network. Not every bit of data needs to be sent to the cloud, and the cloud doesn't need to be consulted for every minor decision. This localized processing not only speeds up response times but also reduces the load on network infrastructure, allowing for more efficient use of resources.

While cloud computing should not be eliminated entirely, as it and the traditional 'data warehouse' model are still necessary for situations requiring heavy computing and storage resources—such as big data analytics on historical data—moving data processing and serverless function execution to the edge greatly increases the speed at which organizations can deliver insights and experiences to end users. This hybrid approach allows businesses to leverage the strengths of edge and cloud computing, ensuring they can respond to real-time demands while benefiting from the extensive capabilities of cloud resources.

Event-Driven Architecture

Event-driven architecture allows systems to react to events in real time, enabling more dynamic and responsive applications. In an [event-driven architecture](#), components communicate through events, which can trigger specific actions or workflows. This model is particularly effective when user interactions and data changes occur frequently.

By adopting this architecture, organizations can create more resilient and scalable applications. For example, when a user interacts with an app, an event is generated, which can then trigger a series of functions to process that interaction. This allows for immediate feedback and enhances the overall user experience. Additionally, event-driven systems can handle spikes in traffic more effectively, as they can scale up or down based on the volume of incoming events.

Moreover, event-driven architecture aligns well with serverless computing. Events can trigger functions, allowing for seamless business logic integration into data streams. This capability enables organizations to automate processes and respond to real-time changes, enhancing operational efficiency. For instance, if a user places an order on an e-commerce platform, an event can trigger functions that handle payment processing, inventory management, and shipping notifications—all without manual intervention.

The combination of serverless computing, edge computing, and event-driven architecture is transforming how businesses operate. These technologies enable organizations to leverage real-time data, automate processes, and deliver exceptional user experiences. As the demand for faster, more responsive applications grows, embracing these innovations will be crucial for staying competitive in today's fast-paced digital landscape.

Conclusion

Whether providing real-time data, enhancing customer engagement, or driving innovation, businesses that can harness the power of immediacy stand to gain a significant competitive edge. With technologies like serverless computing, edge computing, and event-driven architecture, companies can unlock the full potential of their data by processing and acting on it in real-time. This ability **allows businesses to deliver seamless, personalized experiences, drive efficiency, and foster innovation.**

To stay ahead, organizations must prioritize real-time capabilities in their strategy. PubNub is a full lifecycle platform that makes it fast, easy, and cost-efficient to build, manage, and optimize interactive real-time experiences in any app, regardless of purpose, scale, or complexity.

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