

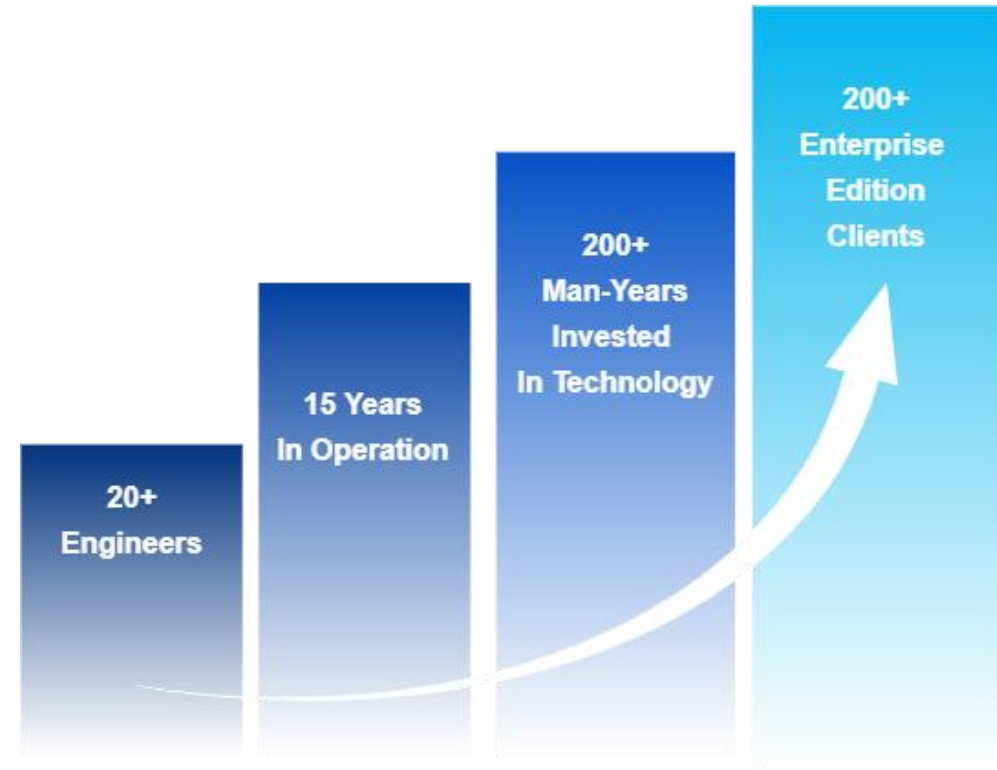


EVENT-ORIENTED  
HIGH PERFORMANCE  
TIME-SERIES DATABASE  
MESSAGING MIDDLEWARE

TimeBase is a high-performance time-series database, streaming system and messaging middleware developed by [EPAM Real Time Computing Lab](#).

As a standalone product and as a part of the [Deltix](#) product suite TimeBase leverages over 15 years of product history and hundreds of active clients, including industry-leading hedge funds, brokers, exchanges and banks on both buy and sell sides of the financial market.

TimeBase [R&D team](#) counts more than 20 developers, including all of the original creators of TimeBase.



Our 200 man-years long journey is far from being over. In 2020, TimeBase was acquired by [EPAM](#) and became a member of an [open-source community](#). We are excited to take on new challenges and open new horizons creating a product that brings value and makes a difference.

# KEY FEATURES

## COMPLETE ECOSYSTEM

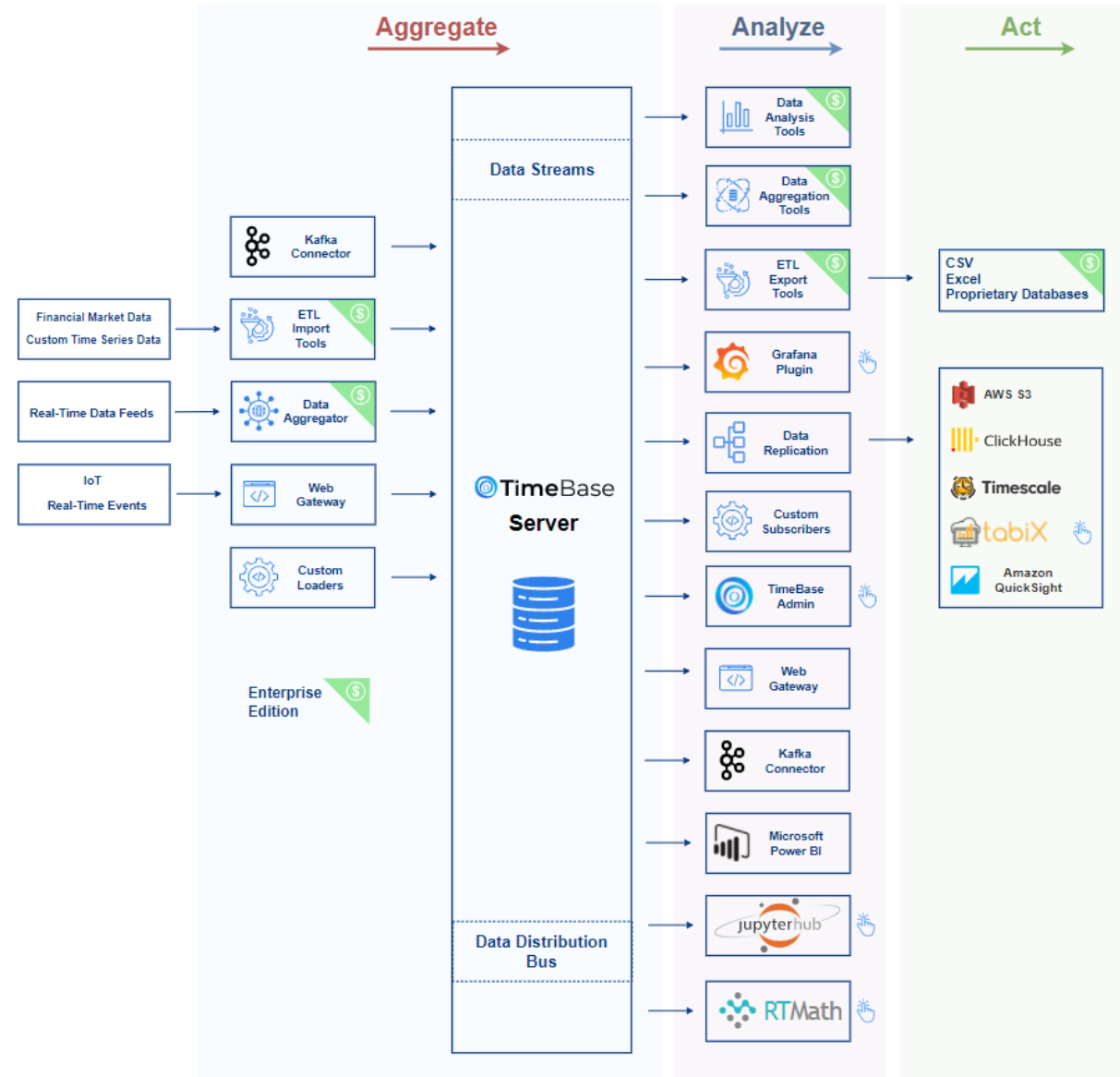
Any real-time data processing system deploys, one way or another, what we call a

**A3 (< aggregate | analyze | act >) Paradigm.**

Data is aggregated, stored, analyzed and is acted upon.

TimeBase offers an [open-source ecosystem](#) allowing to build a 3A model with market-winning performance and at a [reasonable cost](#). You do not need to reinvent the wheel or re-code existing software. We offer ready-to-use technology and tools you can use right away and with a minimum friction.

[LEARN MORE](#)



# KEY FEATURES

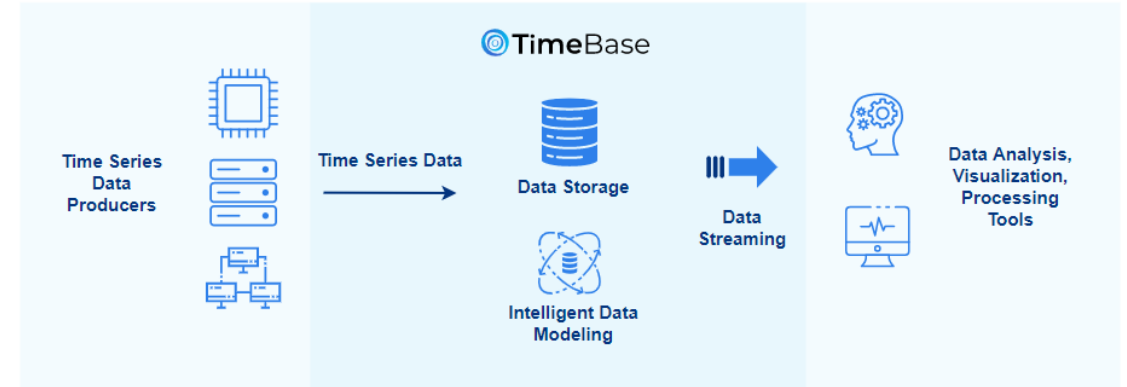
## DESIGNED FOR ANALYTICS

In the 3A (Aggregate, Analyze, Act) paradigm, TimeBase enables flexible data modeling, storage and streaming time series data to analytical and actionable tiers.

TimeBase is specifically designed for streaming analytics in the following use cases:

- Fast historical data playback for simulators. TimeBase from the very inception was designed to deliver data to run multiple experiments on large historical data sets with maximum throughput and minimal delay.
- Streaming analytics with minimal latencies for real-time analysis and decision-making. Analyze your data as it is coming in with minimal or no delay. This is an ideal solution for data-driven businesses.

[LEARN MORE](#)



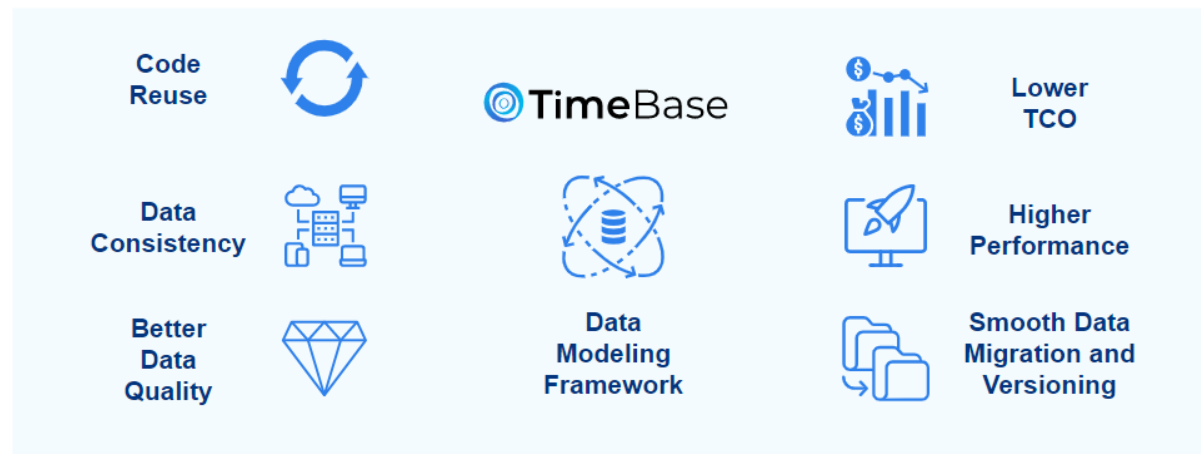
# KEY FEATURES

## INTELLIGENT DATA MODELING

TimeBase is a **3-In-1** solution: time series database, message broker and **data modeling framework**. Our powerful data modeling framework supports primitive and complex data types like enumerations, arrays, objects, integers, strings, booleans, decimal numbers, IEEE 754 floats, binary, small alphanumeric codes, timestamps with up to a nanosecond resolution.

TimeBase is a schema-based system with proprietary and available out-of-the-box binary serialization/deserialization engine that can support all the specific data modeling cases like multi-level objects nesting (more than 2 levels) and polymorphic nesting.

[LEARN MORE](#)



# KEY FEATURES

## SUPERIOR PERFORMANCE

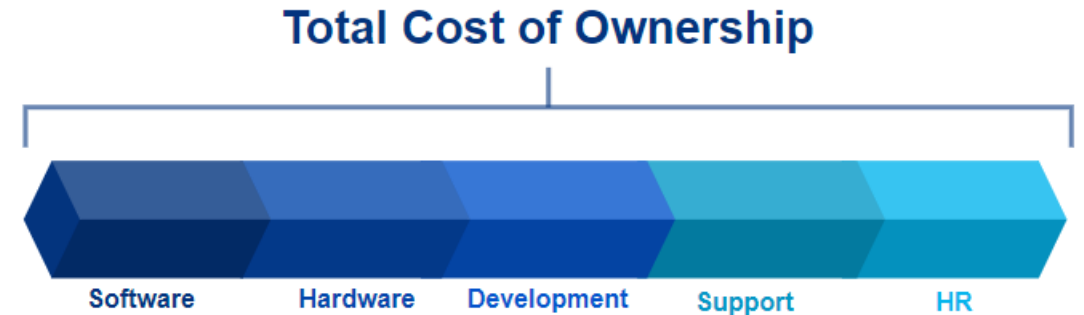
TimeBase is incredibly fast providing explosive throughput (2 million events per core per second) and predictable latencies (100us) in both standalone and cluster mode, which has been proven in real-life use cases.

## COST-EFFICIENT SCALING

TimeBase from the very inception was designed to offer a fully-functional product, that could be easily [deployed and mastered at a moderate cost.](#)

## MULTI-LANGUAGE API

TimeBase offers open source, simple, performance-oriented and ready-to-use APIs in several languages. TimeBase APIs follow allocation-free development patterns and have been specifically designed to enable low-latency systems development.



[LEARN MORE](#)

# USE AREAS

## FINANCIAL MARKETS

TimeBase, from inception, was designed as a time series database, streaming engine and messaging middleware for the [financial markets](#) domain. It was designed to solve business goals for both buy-side and sell-side institutions. Time-series processing is in our DNA.

### TimeBase

can be applied to any business model on both sides of the market

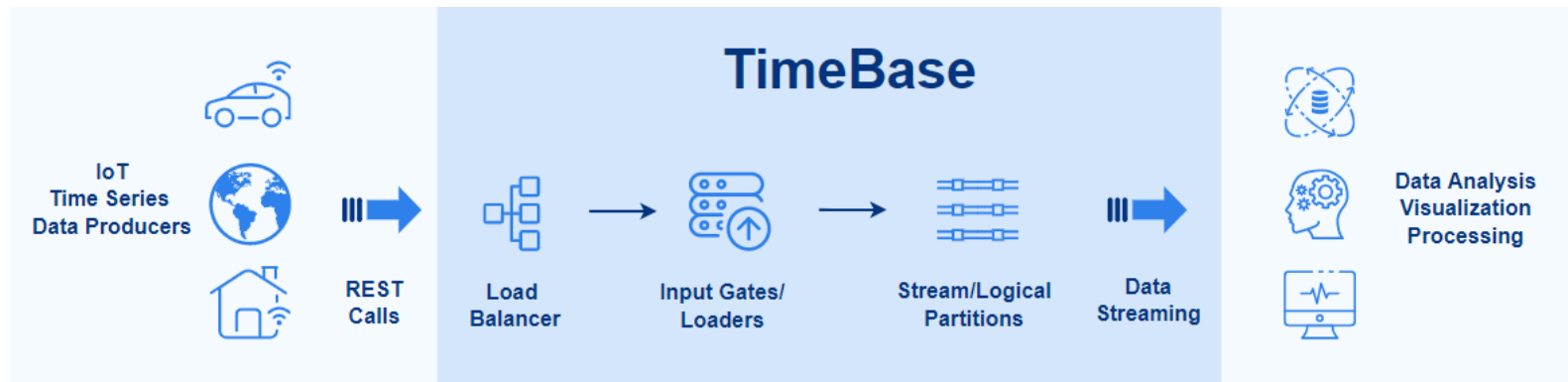


TimeBase has been built on the idea of very fast population and retrieval of massive volumes of time-series data and delivering that data for subsequent use by both in-house and third-party software. TimeBase was developed to meet requirements of a wide range of businesses (from individual traders to a sophisticated enterprise-level trading platforms). We designed the architecture of TimeBase to easily scale up and down with linear performance scaling. Being a professional solution for financial markets, TimeBase supports [MiFID II](#) legislative framework and, thus, is capable of providing superior timestamp resolution up to nano-seconds. We also support [IEEE64](#) format for Decimal data types by default.

# USE AREAS

## INTERNET OF THINGS

TimeBase from the very inception was designed as a time series database, streaming engine and messaging middleware, which sets it apart from the multitude of adopted products on the market.



Our battle-tested system offers only proven functionality that is required to effectively work with high volumes of time series [IoT](#) data, including support of [MQTT](#) industry-standard protocol:

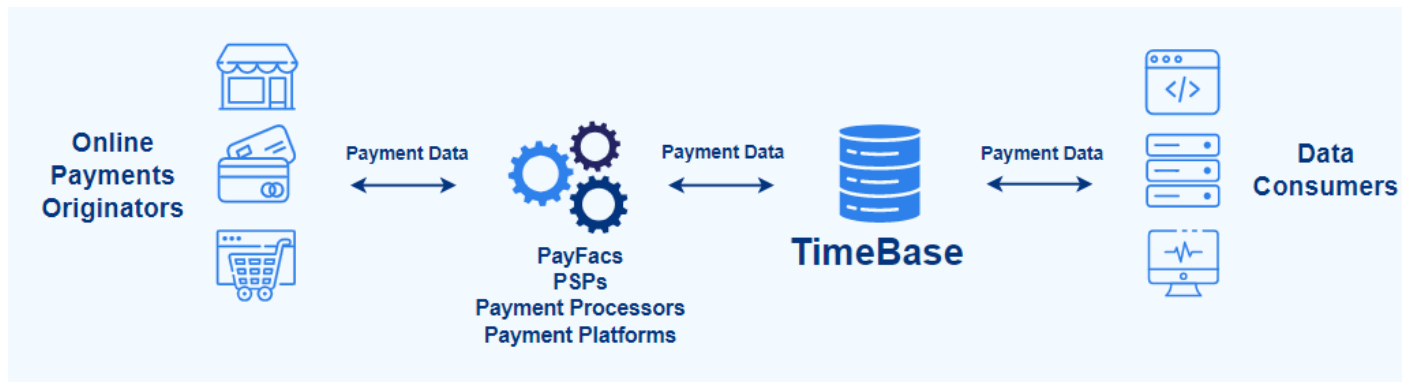
- TimeBase can be configured to aggregate time series data of all sorts from numerous devices, store data, consolidate and stream it live to multiple data consumers.
- Flexible data modeling allows following unique data patterns not limited to one-size-fits-all kinds of solutions.
- Superior performance can be achieved even on a moderate hardware, reaching a throughput measured in millions of messages per second.
- Unified code base allows working with historical and real time data simultaneously, which is indispensable for testing, analytics and forecasting



# USE AREAS

## INSTANT PAYMENTS

TimeBase allows you to implement a payment processing technology with a powerful time series streaming database and messaging middleware, capable of processing millions of messages per second per core with a nanosecond timestamp resolution. Our powerful system can easily [scale](#) up and down with linear scaling of performance to meet constantly fluctuating payment industry demand. This saves on computing resources but scales up ability during unexpected demand spikes.



We understand the market and designed our system to be both powerful and affordable to a wide range of business models. To run TimeBase, you do not need any specific hardware. The system can be easily deployed on commodity hardware. TimeBase is a cloud-ready solution with unlimited data storage, cluster nodes and performance for both Community and Enterprise Editions.

# USE AREAS

## TECHNOLOGY HEALTH AND WELLNESS MONITORING

TimeBase technology can be applied to a vast variety of areas as a technology alert and monitoring tool that can work with server and application performance metrics, network data, sensor data, custom messages and more.



The system can be configured to consume data from multiple sources with [superior throughput](#) measured in millions of messages per second. Aggregated and consolidated data is supplied to a consumer for further analysis and processing.

We can support custom connectors with industry standard protocols like [JMX](#), [SNMP](#) to bridge your custom data into the TimeBase, including [Spring Boot Actuator](#) integration support. [Out-of-the-box integrations](#) with popular tools like [Grafana](#), [ClickHouse](#) and other facilitate data monitoring, visualization and analysis.

Up to a nanosecond timestamp resolution allows to effectively process even high granularity data.

# TIME-SERIES DBS COMPARISON

	TimeBase	KDB+	InfluxDB	Prometheus	TimescaleDB	OneTick TSDB
Query Language						
Timestamp Resolution (us)						
Complex Data Format						
Administration Complexity	low	high	medium	medium	high	medium
Built-In Schema Migration						
Clustering						
Cloud Ready						
Historical Data Modification						
Supported Languages	Java .NET C++ Python	Java .NET	Java .NET C++ Go and more	Java Ruby Python Go	Java .NET C++ Python and more	Java .NET C++ Python and more
Licensing	Open Source/ Commercial	Commercial	Open Source	Open Source	Open Source	Commercial
TCO	\$	\$\$\$	\$\$	\$\$	\$\$	\$\$\$

Specific use cases (e.g., storing petabytes of data, using very specific hardware, indexing data or other) may favor one solutions over the other. TimeBase offers integrations with external systems, processing and data analysis tools that may be utilized to extend the system functionality and performance in case it may be required.

\*Timestamp resolution = at least us  
\*TCO = hardware, license, maintenance, development

	TimeBase	Kafka	RabbitMQ	Pulsar	ActiveMQ	Google Cloud Pub/Sub	Amazon Kinesis	Azure Service Bus
Clustering	🟡	🟡	🟢	🟡	🟢	🟢	🟢	🟢
No Vendor Lock-In	🟢	🟢	🟢	🟢	🟢	🟠	🟠	🟠
Cloud Ready	🟢	🟠	🟢	🟢	🟠	🟢	🟢	🟢
Stable Sub-ms Latency	🟢	🟠	🟠	🟠	🟠	🟠	🟠	🟠
Schemaful	🟢	🟠	🟠	🟠	🟠	🟠	🟠	🟠
Administration Complexity	medium	high	medium	high	high	low (SaaS)	low (SaaS)	low (SaaS)
Supported Languages	Java Python C++ .NET	C++ Go Java .NET Python Scala and more	Java .NET C++ Ruby Python PHP JavaScript Scala and more	Java Go Python C++	Java Go C++ Python and more	Java Go Python Ruby Node.js .NET PHP	Java .NET Python Ruby Node.js	.NET Java
Order Guarantee	🟢	🟢	🟢	🟢	🟢	🟠	🟠	🟢
Delivery Guarantee	at-least-once	at-least-once, at-most-once, exactly-once	at-least-once, at-most-once	at-least-once, at-most-once, exactly-once	at-most-once, exactly-once	at-least-once	at-least-once	at-least-once, at-most-once
Licensing	Open Source/ Commercial	Open Source	Open Source	Open Source	Open Source	Commercial	Commercial	Commercial
TCO	\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$	\$	\$	\$

## MESSAGE BROKERS COMPARISON

	Community Edition	Enterprise Edition
Data Queries	✓	✓
TimeBase Admin	Web	Web/Desktop
Tools and Apps	Command Line Interface	Command Line Interface/Desktop
Data Storage, Cluster Nodes, Performance	Unlimited	Unlimited
Downstream Connectors	ClickHouse, TimeScale, S3, Kafka	ClickHouse, TimeScale, S3, Kafka
Data Source Connectors	✗	100+ Connections Including various trading venues
Domain-Specific Data Models and Extensions Support	✗	✓
Data Modification/Insertion Mode	✗	✓
Topics (ultra-low latency UDP multicast)	✗	✓
Technical Support	Via GitHub	Via Custom Agreement
Licencing	Open Source Apache 2.0 Licence	Commercial Licence