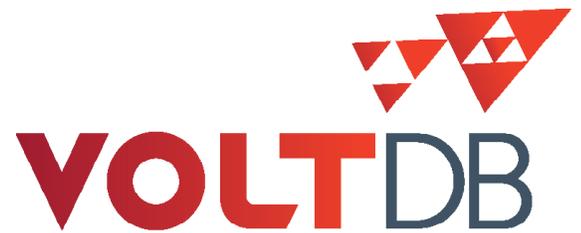


SMART DATA FAST.™



PEAK GAMES IMPLEMENTS VOLTDB FOR REAL-TIME SEGMENTATION & PERSONALIZATION

CASE STUDY

TAKING ACTION BASED ON REAL-TIME PLAYER BEHAVIORS

[Peak Games](#) is already a household name in the mobile gaming industry. It has successfully built a global user base for its community-based, multiplayer board and card games as well as innovative casual puzzle games. Current major titles include Spades Plus, Gin Rummy Plus, 101 Okey Plus and Toy Blast, and over 300 million users globally have already installed at least one of its products. This innovative game developer turned to [VoltDB](#) to deliver a low-latency, high-throughput transactional database that simplified the Peak Games architecture and delivers real-time actionable data that increases player engagement.



Figure 1: Peak Games creates and publishes games that are community-based, multiplayer synchronous and totally engaging.

INCREASING GAMING INTERACTIONS

At any given moment, millions of people worldwide are playing online games. But how do you enhance their experiences and increase retention by making sure each player is both challenged and engaged? The answer is data. Understanding what's happening to each player in every game in real time enables game developers to apply actionable insight in a matter of seconds to core operations such as product development, marketing and CRM. Peak Games has implemented VoltDB and is now improving overall player engagement levels and interacting with players more effectively.

The abilities to understand real-time A/B testing, manage marketing programs, tailor pricing and send out push notifications are allowing Peak Games to more effectively build long-lasting advantages in the mobile gaming industry. Peak Games had previously relied on an internal service with data processed in the company's data warehouse, with events aggregated incrementally and loaded into the engine at regular intervals. But the company needed to evolve its architecture to support real-time, in-game transactions. "Our previous solution was a temporary one because we were always planning to implement a real-time stream processing and segmentation capability," said Serdar Şahin, Head of Cloud & Big Data Services at Peak Games.

Peak Games by the Numbers

Installs	300 million
Countries where users reside	150+
Concurrent players	300,000+
Games in top grossing lists	4
Active marketing campaigns	176+ every day

The company considered Apache Spark and Apache Storm, but this approach did not provide a native interface for persistence and did not support exactly-once semantics. Peak Games also eliminated all other scalable databases because they lacked either JOIN support or stream processing capabilities. After an extended search, Peak Games selected VoltDB to power its real-time user segmentation services. VoltDB, the only database purpose-built for fast data applications, is enabling Peak Games to complete real-time stream processing with ACID (Atomicity, Consistency, Isolation, Durability) properties, ensuring players receive the most relevant, personalized content at the right moment.

Game player information flows through Amazon Kinesis, which Peak Games uses as a platform for streaming data on Amazon Web Services (AWS). These real-time streams are ingested by VoltDB and then stored for historical analysis in the company's massively parallel processing (MPP) database and also utilized by the company's internal services so that offers, notifications and other feedback can be fed back to game players in near real-time.

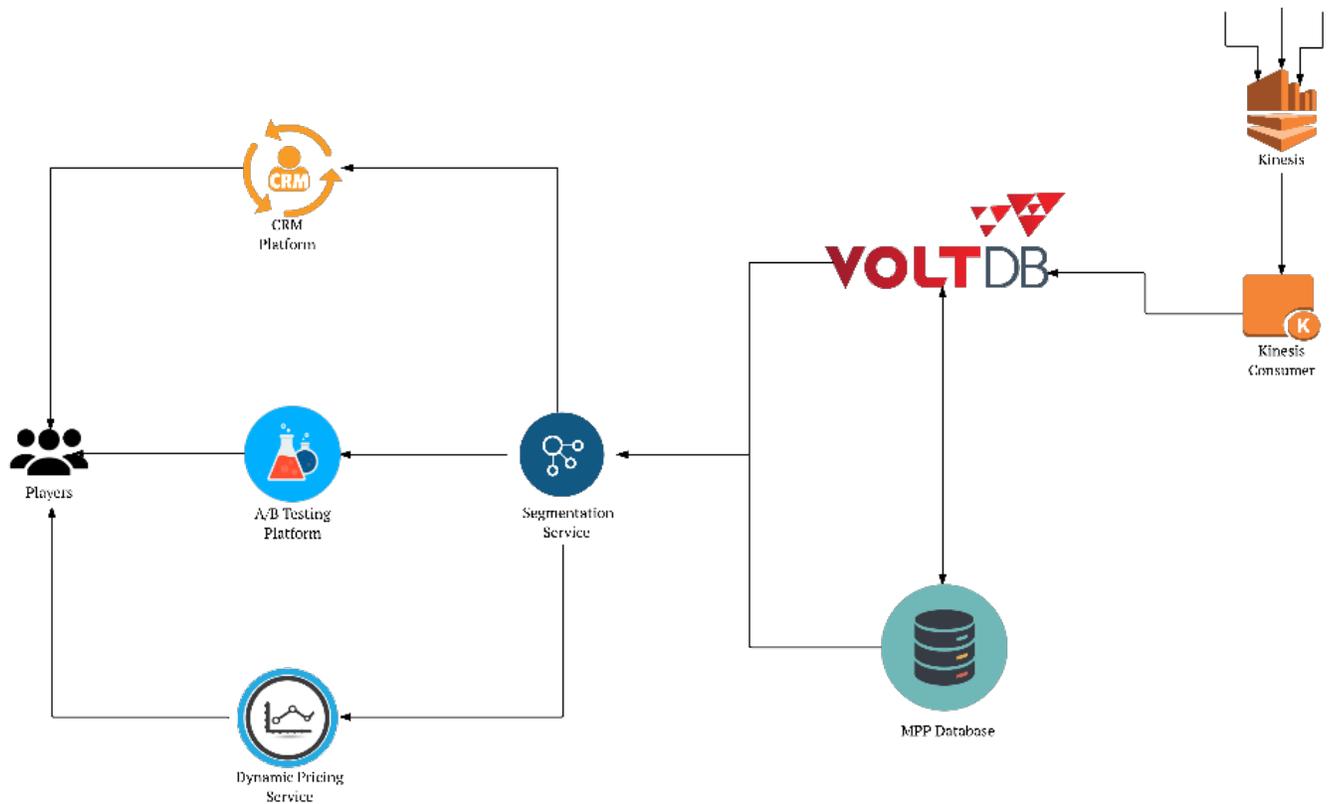


Figure 2: VoltDB allows Peak Games to take automated actions in milliseconds to increase the value of each player experience.

By ingesting, analyzing and acting on incoming data streams in real-time, VoltDB enables Peak Games to make smart, fully consistent decisions in milliseconds, increasing the value of each customer interaction. “Whenever we evaluated technology solutions, we typically had to select two or three complementary products to deliver the features we wanted,” said Şahin. “But VoltDB provided us with real-time segmentation and personalization capabilities that met all of our needs.”

VoltDB provides Peak Games with a scale-out database, and allows Peak Games to leverage stored procedures for processing the game events. Processing occurs where Peak Games stores the data, and the company is able to implement exactly-once semantics that ensure that events are not over or under counted. The company has been able to replicate its legacy data model in VoltDB, and every user action is recorded and represented as a stored procedure.

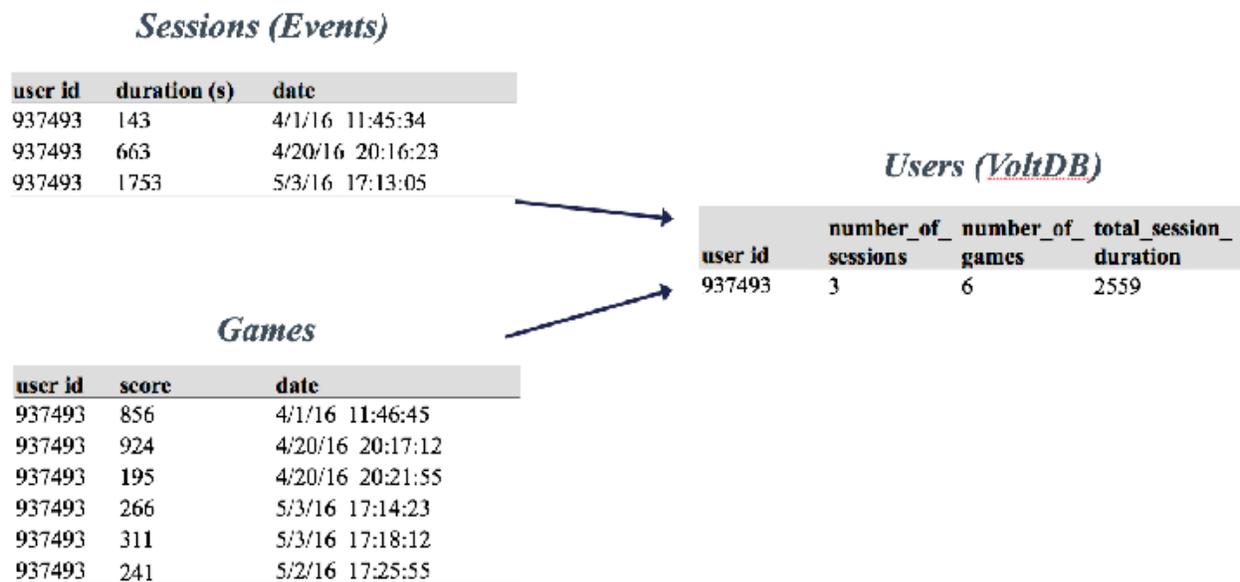


Figure 3: Every event is recorded, and data from sessions and games are correlated with users to enable per-user segmentation across all of the company's games.

ENHANCING PLAYER ENGAGEMENT

Peak Games has successfully built a global user base for its community-based, multiplayer synchronous board and card games and single-player puzzle games for iOS and Android platforms. The company reaches millions of daily active users, and within its multiplayer synchronous games, it serves hundreds of thousands of concurrent players at any given time. The engagement and user experience of this vast user base is key to the long-term success of the games. VoltDB enables Peak Games to increase engagements by providing each user customized notifications, offers and in-game content through fast analysis and segmentation of large volume of user activity data streams.

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and acting on incoming data streams in real-time, VoltDB enables Peak Games applications to make smart, fully consistent decisions in milliseconds, increasing the value of each customer interaction.

A comprehensive platform, VoltDB provides Peak Games with a low-latency, high-throughput transactional in-memory database offering real-time analytics on live streams of data to help the organization harness the power of fast data, or data in motion. By building fast data pipelines that combine the capabilities of an operational database, real-time analytics, stream processing and transactions in a single integrated platform, organizations like Peak Games can analyze and act on data in the moment to improve efficiency and drive greater customer value.

VoltDB's in-memory SQL database combines streaming analytics with transaction processing in a single, horizontal scale-out platform. Customers like Peak Games use VoltDB to build applications that

process streaming data the instant it arrives to make immediate, per-event, context-aware decisions. By delivering real-time, in-transaction analytics that always produce correct results, VoltDB is enabling Peak Games to better capture economic value.

“In online gaming there is no room for slow data analysis or poor interaction,” explained Şahin.

“Players expect offers and gaming environments that are tailored to their experience, skill level and status during their in-game play. Our opportunities to connect with players diminish rapidly if we don’t deliver real-time interaction.”

LEVERAGING FAST DATA TO IMPROVE THE PLAYER EXPERIENCE

Peak Games has evolved its architecture to be more scalable and service-oriented while supporting real-time interactions. “We reach millions of players in different geographies every day,” said Şahin. “In our multiplayer synchronous games, we can reach hundreds-of-thousands of concurrent players. Our target is having APIs that can deliver response times of less than 100ms while managing real-time data regardless of the size of our user base.”

The company is building out its big data and fast data infrastructure. It offers its gaming platform to its studios as a service supported by SDKs and libraries,

and shares player information across games. “We take many actions depending on the in-game behavior of the players to keep them engaged, and we built our own omnichannel CRM platform and A/B Testing tool to implement real-time, personalized actions for our most sophisticated customer segments,” said Şahin. “One of our biggest challenges was incorporating a real-time segmentation service. If we want to send a new offer or gift when users are leveling up, for example, it should happen as quickly as possible. In the rapidly-changing gaming environment, VoltDB enables us to perform real-time segmentation and decision-making that improves the user engagement and experience.”

Many of its self-service internal services require player segmentation. “We always target specific player segments on these platforms,” stated Şahin. “VoltDB is in the heart of this segmentation service, which allows us to implement real-time stream processing with ACID properties. VoltDB is not only processing the stream, it is also allowing us to store the data in the same place where we process it and also lets us handle complex event processing (CEP). If we need the data somewhere else, we just use the export-only tables and leverage the same data in different environments. VoltDB offers us a compact and scalable solution for a variety of business use cases.”

DELIVERING AUTOMATED ACTIONS BASED ON PLAYER BEHAVIOR

VoltDB allows Peak Games to take automated actions based on player behavior. VoltDB is integrated with the company's omni-channel CRM platform, and the services Peak Games utilizes to personalize a player's experience during game play include:

- A/B Testing, so Peak Games can automatically change game content for a specific user segment, test new features and evaluate alternative in-game offers to increase retention
- Dynamic Pricing that optimizes in-app store pricing and content
- Push notifications
- Emails
- Facebook notifications
- In-game messages
- Retargeting programs that target churned users on ad networks to reduce user acquisition costs
- Cross-promotion activities

All of these services have been developed based on rules defined by Peak Games and integrated with VoltDB to allow the organization to segment the user base to optimize retention and revenue generation. According to Şahin, "One of the most challenging parts of these internal services is having a real-time segmentation engine. For example, if we want to show an offer it has to be delivered as soon as the player is qualified for that offer. We can't wait several minutes to deliver a time-sensitive offer because relevancy is very important in the fast-changing gaming environment."

The segmentation is implemented by processing historical data, answering both batch and real-time queries, and running arbitrary queries that allow Peak Games to prepare and enrich the user data for use by internal business intelligence, user acquisition and analytics teams. "We can track more than 100 variables per user, and deliver automated actions based on player behaviors and demographic analysis," said Şahin.

He continued, "We need to collect and process as much data as we can because our games cater to a wide demographic, with broad geographic coverage and players interested in family-oriented, casual game titles. Toy Blast, for example, has a huge following in the United States among women over 25, while 101 Plus is one of the most popular mobile games in Turkey. Understanding the preferences of a diverse audience base and segmenting features and offers accordingly allows us to better monetize the game player experience. VoltDB allows us to segment users quickly, which is particularly challenging when you have tens of millions of users."