

# Mission Critical Data: Accurate, Available, Secure

Flurry Analytics reports that time spent in apps grew only 6% in 2017, down from 11% growth the previous year. Competing for attention is getting tougher as the consumer internet begins to saturate. Viral apps grow by word-of-mouth and other out-of-channel means as users recommend apps based on the quality of their experience. One of the biggest risks a fledgling consumer app faces is not being able to keep pace with success.

At worldwide scale even niche services have to be prepared for an onslaught of traffic. But building out new infrastructure for every new app is prohibitively expensive. Mobile device users uninstall apps that feel slow, so reducing lag times by distributing data geographically is necessary to compete in the worldwide market. Even while competition for speed is intensifying, users are coming to expect engagement beyond the app in the form of social sharing, product tie-ins and live events.

All of this innovation is accelerated by the move to shared services, containerization, and patterns like serverless compute. Of all components in the stack, the database layer has been last to move to robust, distributed, commodity hardware. Cloud databases have lacked the integrity and scale to deliver enterprise-grade workloads like identity management, social payments and user activity feeds. Some key database related challenges include:

- **Enforcing Data Consistency:** Ensuring strong consistency of data in realtime, so users never experience stale data
- **Scalability On-Demand:** Delivering high throughput, low latency experiences to global audiences, no matter what device they're on

- **Availability and Reliability:** Making critical data available to interactive and analytic workloads 24x7 without sacrificing reliability or performance, while running on commodity infrastructure
- **Data Flexibility:** Evolve your data model as you learn which features of your app users engage with most
- **Security and Governance:** Data must be secure to prevent breaches from becoming leaks

Thus far, consumer internet companies have been forced to give up on consistency to achieve the speed and scale users demand, creating new sources of development time and complexity. Adding metrics and transactional features to an eventually consistent backend requires patching together solutions from traditional databases along with queueing middleware to integrate analytic systems. But that limits innovation.

## INTRODUCING FAUNADB

### TRANSACTIONAL MISSION CRITICAL NOSQL

FaunaDB is a NoSQL database that combines the transactional correctness of a relational database with the flexibility and scalability of NoSQL systems. It is designed to simplify development of distributed applications while making database operations dramatically easier.

The core capabilities of FaunaDB include:

- **Transactionality:** ACID transactions commit across all replicas, enabling application servers to run nearby your users, without lag or inconsistency

- **Interface Flexibility:** Document-relational model makes it easy to store and query data in the format best suited to its use, and evolve as requirements change
- **Row-Level Security:** Object level access control so that your database can model your application rules in order to simplify your stack or provide defense in-depth
- **Horizontal Scalability:** Add and remove nodes without interrupting application performance within the same site or across global data centers
- **Fault Tolerance / Reliability:** Designed for the webscale era, FaunaDB continues processing transactions even as nodes fail
- **Temporality:** A snapshot based storage engine retains historical data for a configurable period and permits correction of data errors in snapshots, making undo and rollback easy to implement
- **Multi-tenancy:** Secure and QoS-based workload isolation ensures data and connections can't interfere with one another
- **Operational Simplicity:** Start in the cloud, or run anywhere you can run a JVM, with built-in cluster management and replication to eliminate the pain of traditional database operations

The combination of these capabilities make FaunaDB the best platform for modern apps to store user content and metadata. We explore some of the specific use cases in the following section.

## FAUNA STREAMLINES DEVELOPING REAL-TIME APPS

FaunaDB is used by app developers to address some of the most critical business problems. Some of these applications include:

### OPERATIONAL DATABASE FOR THE APP ERA

Mobile apps are increasingly the primary channel for your online presence. The best way to ensure that all your features are available across all of your platforms is to share a backend data layer across them. Simplifying your stack increases your productivity and lowers the surface area where bugs and security holes can hide. FaunaDB is well suited for direct client access, complete with mobile and web drivers, the API can be accessed securely from Android and iOS app code or the browser. Object-level security enforces your data access rules in the database so you can connect directly from your app layer or operate with defense-in-depth. FaunaDB runs in any cloud or on-premise, and a single FaunaDB installation can serve as many apps as you like, making it easy to enable your teams to innovate.

### IDENTITY AND PERSONALIZATION

Users expect their preferences and identity to flow seamlessly across the experiences your brand offers. Identity systems are critical because they play a role in every API request your system receives. Any issues can create widespread inconsistencies or performance bottlenecks. A shared identity and access management service can become the foundation for delighting your users. Best-of-breed identity management features are supported natively by FaunaDB: automatic role provisioning for fine grained access control, password management and consistent ACID transactions. Shared identity management services are simplified by FaunaDB's support for multi-tenancy coupled with capabilities such as scalability, QoS-based resource scheduling and hybrid Cloud deployments, enabling all your applications to interact with a common customer identity repository. FaunaDB's distributed architecture means you can keep user data geographically close without sacrificing consistency.

### SOCIAL PAYMENTS

Mary Meeker's Internet Trends report highlights that transactions are being embedded in the frontend as part of the user experience. New social commerce opportunities from in-search restaurant reservations to in-ad purchases are redefining the shopping cart. Validating, synchronizing and normalizing in-app payments across app stores requires

transactional integrity at global scale, and can be greatly simplified with NoSQL documents. FaunaDB's powerful query language is suited to express transactional logic across complex and varying data, taking the pain out of working with multiple payment methods so your users have a consistent experience. The entire payments stack, from tracking payment requests via upstream APIs, to backend account balance ledgers, benefits from FaunaDB's ACID transactions.

## ACTIVITY FEEDS

A common pattern in consumer applications is to show users a feed of interesting items from their social group. While it's a simple idea, building high-performance activity feeds is a challenge, as anyone who's seen the growing pains of successful social networks is familiar with. Fauna was founded by the team that scaled Twitter, so we know what it takes. FaunaDB's flexible documents can store any semi-structured data which can then be adapted over time. FaunaDB's built-in authorization and authentication features are easy to integrate with Facebook login and other third-party authentication providers. Object-level access control means that once authenticated, devices and browsers can safely query the database directly, simplifying your application stack. Social activity feeds are easily supported by the FaunaDB query language with its temporal and graph features.

## REAL-TIME ANALYTICS

Customer and community metrics can help you target the right demographics and sources of new users. Performance metrics can identify technical problems before they impact experience. Feature usage metrics can help you iteratively improve retention and engagement. Hybrid transactional/analytical processing (HTAP) means business intelligence queries can run on your interactive transactional data without impacting user experience. FaunaDB supports HTAP at multiple levels, allowing you to prioritize workloads on both the connection and database level. Quality-of-service (QoS) management means your high-priority interactive clients

are never impacted by analytics jobs. Reporting directly on the system of record eliminates errors and lag introduced by copying to downstream systems. And FaunaDB's event-driven interfaces can push the latest changes to analytics pipelines as they happen, allowing for real-time processing.

## MULTI-TENANT SHARED SERVICES

Operational simplicity is increasingly critical in a world of interconnected services. With one database to support all of your applications and abstract over commodity hardware, the more heterogeneous your workloads, the more you can utilize your capacity. FaunaDB's multi-tenancy allows shared services to benefit from securely sharing data and operational capacity. With connection level prioritization, as well as hierarchical database container security and QoS isolation, a single FaunaDB cluster is happy to serve as many apps as your like. This allows you to experiment without the operational overhead of creating new backend environments. You can use the same cluster for production traffic, intranet and line-of-business apps and developer sandboxes.

## CONCLUSION

FaunaDB is built from ground up to address the database challenges that hamper app development and adoption. It blends the transactional benefits of big-iron SQL systems with the scalability of NoSQL systems, while introducing new innovations that dramatically simplify the lives of both developers and operators. Available as a managed cloud as well as on-premises deployment, FaunaDB is infrastructure agnostic, multi-cloud and easy to get started with. Funded by leaders like GV (formerly Google Ventures), Point72 Ventures, Capital One Growth Ventures and others, Fauna is a foundation for your digital transformation.

Please reach us at [priority@fauna.com](mailto:priority@fauna.com) for details or get started today at [www.fauna.com](http://www.fauna.com). Expect more from your database.