



**“Couchbase is a mature, robust, and mobile-ready platform that can provide the security we need for HIPAA compliance.”**

— Daniel Beeler  
Chief Technology Officer,  
SyncThink

## Building new insight into brain injury

### Improving assessment and recovery for top-tier athletes

Awareness is growing about the serious long-term effects of concussions. From college football teams to branches of the military, more and more organizations are now looking for ways to improve concussion assessment and monitoring so they can minimize the damage caused by these traumatic brain injuries. SyncThink is developing innovative technology that can help address these needs. Through collaboration with the Brain Trauma Foundation and the U.S. Department of Defense, SyncThink developed EYE-SYNC – an eye-tracking platform that uses a virtual reality (VR) headset plus a tablet to rapidly identify eye tracking impairment at the point of injury.



**The Challenge: Build an innovative medical device on a robust, mature data platform**

SyncThink is dedicated to reducing the subjectivity in concussion assessment. Its innovative device uses eye tracking to generate objective measurements for evaluating whether someone has sustained impairment after potential injury. “Our assessment paradigm is fairly simple,” says Daniel Beeler, chief technology officer at SyncThink. “The subject wears a VR headset and watches a target moving in a circle. Infrared cameras within the headset track eye movements. Deviations from the predicted eye movement provide an objective measurement for gauging impairment.”

Though the paradigm might be simple, the solution integrates a variety of cutting-edge technologies, from the VR headset and an Android tablet to the application, backend data platform, and Microsoft Azure cloud services that the company uses. “Getting all of those technologies to cooperate and work together can be challenging,” says Beeler. “Using robust, mature technologies helps reduce potential issues.”

When searching for a data platform to support its solution, the company also had additional priorities. For example, the data platform had to provide an offline mode to accommodate environments where connectivity might be spotty, such as in football stadiums. “In large stadiums, tens of thousands of fans might be using smartphones, and that can reduce available bandwidth,” says Beeler. “We need a data platform with offline functionality so team doctors can conduct assessments on the sidelines and then seamlessly sync with the Microsoft Azure cloud environment when sufficient bandwidth becomes available.”

The data platform also had to provide the security to meet rigorous patient privacy regulations. “EYE-SYNC is an FDA-cleared device,” says Beeler. “We need a data platform with security capabilities that enables us to meet HIPAA privacy regulations.”





## The Solution: Gaining offline functionality and achieving compliance with Couchbase

### To support its innovative medical device solution, SyncThink needs a data platform that can:

- Offer robust, mature technology that will integrate well with other cutting-edge solutions
- Provide offline functionality to deliver a seamless experience even when connectivity is poor
- Facilitate compliance with rigorous HIPAA regulations as data is collected and transferred

After evaluating a range of other data platforms, the SyncThink team selected Couchbase for its EYE-SYNC solution. “We wanted a NoSQL data platform, and there was only one that met all of our requirements,” says Beeler. “Couchbase is a mature, robust, and mobile-ready platform that can provide the security we need for HIPAA compliance.”

After a successful in-house proof of concept, the SyncThink team engaged Couchbase and a Couchbase partner to deploy the platform in production. The company implemented a HIPAA-compliant instance of Couchbase Server on the Microsoft Azure cloud service, and put protocols into place to help ensure data protection. Couchbase Mobile runs on the Android tablets that accompany the VR headsets. The tablets run in offline mode when necessary and then sync with Couchbase Server when connectivity is available. “It just works – and that’s what we were looking for,” says Beeler.

Since deploying Couchbase, the company’s appreciation for the platform has grown. “We continue to explore more of the robust set of features Couchbase offers, and we’ve been very pleased,” says Beeler. “For example, we’ve found that maintenance and accessibility capabilities are definitely in line with our needs and expectations.”



## The Result: Delivering a seamless mobile experience and preparing for growth

### Enabling fast, mobile assessments with offline functionality

By using Couchbase Mobile, SyncThink enables team doctors to have a responsive experience while conducting sideline assessments even if network connectivity is intermittent. Doctors can run tests, capture results, and then sync data with Couchbase Server as soon as connectivity improves.

The solution can sync even large data collections rapidly. “EYE-SYNC collects a decent amount of data in a 60-second evaluation period, and we need to sync all of that data as soon as possible,” says Beeler. “The Couchbase sync capabilities are very impressive. Teams can test multiple players simultaneously, then sync a large amount of data seamlessly. They can get results fast, which means they can quickly determine whether a player can stay in the game or requires additional medical attention.”

### Streamlining administration

SyncThink has developed its groundbreaking EYE-SYNC solution with a relatively small team. To keep moving forward, the company wants to avoid excessive administrative tasks that can pull team members away from innovation. “We need to minimize IT management overhead as much as possible,” says Beeler. “The Couchbase administrative tools help streamline administration so we can concentrate our resources on developing new features for our customers.”



## About SyncThink

SyncThink develops revolutionary eye-tracking technology products, now in VR headsets, that give medical professionals objective metrics for visual attention. Based on 15 years of research and holding over 10 patents, the first SyncThink product, EYE-SYNC, is a 60-second, objective sideline assessment that uses eye tracking to evaluate for ocular-motor impairments – a most common and serious component of concussion. FDA-cleared for detecting eye-tracking impairment, EYE-SYNC is used by leading university athletic departments and medical clinics, from Stanford University to Massachusetts General Hospital. SyncThink is transforming concussion assessment, recovery, and monitoring.

### Tracking brain health for Stanford football

The Stanford University football team was an early adopter of EYE-SYNC, which the team uses across the entire lifecycle of brain health for players. “As new players join the team, they are screened using EYE-SYNC,” says Beeler. “If a player is injured during a game, team doctors on the sideline use EYE-SYNC for a fast, objective assessment that helps them make the return-to-play decisions. For players who suffer injuries, clinicians can subsequently use EYE-SYNC to monitor their recovery progress over time. At each step in this lifecycle, the solution reduces reliance on subjective self-reporting by providing objective measures.”

### Gaining the scalability for continued business growth

By selecting Couchbase and deploying it on the Microsoft Azure cloud, SyncThink has the agility and scalability to support a rapidly growing company. “We’re definitely focused on business growth,” says Beeler. “Our goal is to provide our technology for more teams and users in a broad array of fields, including the military. Couchbase on Microsoft Azure gives us the scalable platform we need to pursue our business goals.”



### Looking Ahead: Envisioning future innovations

SyncThink continues to expand its solution, developing new types of assessments and new use cases for EYE-SYNC. For example, the company partnered with Massachusetts General Hospital to develop recovery and training paradigms that can help improve outcomes. “We are exploring ways to use the solution to provide training for eye motion, vestibular balance, and cognitive functioning,” says Beeler. “With Couchbase, we have a strong foundation for producing the solution we envision for the future.”

### Learn more

Visit [couchbase.com](https://couchbase.com) to learn more about the world’s most powerful NoSQL data platform.



2440 West El Camino Real | Ste 600  
Mountain View, California 94040

1-650-417-7500

[www.couchbase.com](https://www.couchbase.com)

## About Couchbase

Couchbase’s mission is to be the data platform that revolutionizes digital innovation. To make this possible, Couchbase created the world’s first Engagement Database. Built on the most powerful NoSQL technology, the Couchbase Data Platform offering includes Couchbase Server and Couchbase Mobile and is Open Source. The platform provides unmatched agility and manageability – as well as unparalleled performance at any scale – to deliver ever-richer and ever more personalized customer experiences.