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— Brant Burnett
   Systems Architect
   CenterEdge Software

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A serious platform for maximizing fun

Enabling complex searches on large customer databases to deliver new insights and improve the customer experience

CenterEdge Software supports the successful daily operation of numerous amusement parks, trampoline parks, water parks, and other family entertainment centers across the United States. The company provides solutions for vital park needs, ranging from point-of-sale (POS) functions and online ticketing to access control and employee management. CenterEdge initially adopted the cloud-native Couchbase Data Platform so franchise organizations could have easy access to customer information across multiple facilities. Now the company is taking advantage of Couchbase Full-Text Search (FTS) capabilities as a way to help its customers conduct complex searches across large-scale customer records and generate results fast.

The Challenge: Speed searches of shared customer information

CenterEdge uses the Couchbase data platform to support its comprehensive suite of entertainment facility solutions. By using a cloud-based platform, the company enables individual facilities to easily access 360-degree customer information that is shared across their franchise group. With the ability to tap into that wealth of customer information, franchise groups can understand customer patterns over time, create targeted promotional campaigns, and more.

CenterEdge also supports on-premises databases, which individual facilities use to safeguard accounting data and ensure availability of POS systems. But the cloud is a better approach for large shared databases. "If an organization has 200 franchise locations, and each location has 500,000 customers, you can't keep the organization's entire customer database in every location—you would quickly run into capacity and performance issues," says Brant Burnett, systems architect at CenterEdge. "To support these large-scale, multi-facility franchise groups, we moved the single source of truth to the cloud."

Searching that large cloud-based database can be challenging, however. CenterEdge had been using traditional SQL searches with plain indexes for the small, local databases. But the company needed a more efficient way for searching the shared database. "When you are searching multiple columns across tens of millions of customers using thousands of workstations, you need a different approach," says Burnett. "We want to support complex queries and generate results fast enough so that staff members interacting with customers can provide a better, more responsive experience."

To make it easier for amusement parks and family entertainment centers to deliver outstanding customer service, CenterEdge wants to enhance its solution suite to:

- Allow individual facilities to search shared customer information in the cloud

- Help users conduct complex searches quickly and efficiently

- Minimize IT administrative burdens for the CenterEdge staff

The Solution: Employ Couchbase Full-Text Search

To speed searches across millions of customer records, CenterEdge is leveraging the Full-Text Search (FTS) capabilities integrated into the Couchbase Data Platform. "Couchbase Full-Text Search allows us to deliver customer search results from extremely large data sets very efficiently," says Burnett. "We saw the potential for enabling partial matching, abbreviation matching, and weighted results—across multiple fields—while avoiding the challenges associated with other methods."

CenterEdge was able to add FTS capabilities to their Couchbase Server cluster by adding two FTS nodes using Multi-Dimensional Scaling (MDS). This was added to their existing cluster of three Data nodes, six Index nodes, and two N1QL Query nodes. Additional FTS nodes can be easily added without downtime as search and data volumes continue to grow over time.

The Result: Pinpointing information fast

Conducting complex searches efficiently

For CenterEdge, FTS capabilities allow them to find data across multiple fields using flexible wildcard searches, similar to the LIKE clauses used by N1QL but with more options for text analysis and without having to target a specific field or index. Ultimately, that means added flexibility and efficiency. "When you're making separate N1QL indexes for each field, you can only do prefix searching from the beginning of the string. There's no way to use N1QL indexes to search in the middle of a string," says Burnett. "N1QL also presents challenges when you want to search multiple fields independently of one another. You need to run multiple queries against separate indexes and then combine the results."

FTS indexing takes a slightly different approach to N1QL indexes. FTS indexes are automatically sharded across nodes, thus spreading the index storage and query workload requirements efficiently. "N1QL indexes typically only reside on one index node, so you can wind up overwhelming a node," says Burnett. "By contrast, FTS shards the index across multiple nodes, flattening everything out into a nice, clean architecture for accommodating large queries efficiently."

Delivering fast results

For users, FTS can help generate the answers they need fast. "In the past, users searching for a particular customer or trying to find all customers who live close to a water park had to sort results to get the answer they need," says Burnett. "Now we can deliver weighted results to speed the process. Faster results mean that staff have a complete understanding of each customer at the point of sale. This improves line speeds and also reduces accidental duplication of customer data, providing more accurate data to marketing teams to accelerate campaigns."

Providing up-to-date information to users

The Couchbase platform also keeps search indexes up to date, which means users can have the confidence they are working with the latest information. "Users quickly become confused and frustrated when they make a change to customer information on one screen and then don't immediately see that change on another," says Burnett. "With Couchbase, data is indexed rapidly so users see updates right away."

Simplifying management

FTS offers an opportunity to significantly reduce administrative burdens for the CenterEdge team. "We evaluated Elasticsearch before there was a full-text option [in Couchbase]. At that time, our customers were only searching a few hundred thousand documents at once," says Burnett. "But we had to add an additional Elasticsearch cluster and constantly stream data to it. And that was too much management overhead. When FTS became available, it was clear that it would be much easier to manage."

Looking Ahead: Moving from exploration to production

As CenterEdge moves closer to deploying FTS into production, the team continues to explore associated features, such as the ability to generate weighted search results or to use a single alias for multiple indexes. "We are still in the early days with FTS," says Burnett. "But we see tremendous potential benefits for our company, our customers, and their customers."

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