

## Ken Griffin's Citadel is rebuilding one of its most critical platforms. Here's an inside look at the project

By Bianca Chan

- **Citadel is completely rebuilding a new platform for all of the hedge fund's reference data.**
- **Reference data is used to identify different securities when making a trade.**
- **The platform is currently being rolled out and will let the fund move into new asset classes faster.**



CITADEL

Rituraj Deb Nath (left), head of enterprise data engineering, and Robert Tan, senior software engineering manager, Citadel.

**O**n Wall Street, making a change to a core system is not unlike undergoing heart or brain surgery. Like surgeons and doctors, engineers and senior tech executives tread carefully when it comes to detangling complex webs of systems. One misstep, like failing to recognize an outlier or a typo buried deep in a chunk of code, can bring down an ecosystem of applications.

At Citadel engineers are now in the midst of a delicate operation of ripping out and replacing one of the core systems: the reference-data platform.

Reference data is information associated with certain aspects of a given trade, such as what's being traded (like a security or derivative), who the trade is between (the counterparties involved), the value or price of a trade, and so on.

The reference-data systems at Citadel are massive, holding the universe of products across all markets, with each product and market tracing back to many millions of entities.

Reference data, and the systems that hold them, are heavily involved in every single trade that goes out at Citadel. This is because reference data is the standardized language used to communicate information about trades and everything that is relevant to them.

Having a system that can scale with the growth of the market and support the complexity of multiple trading strategies can have cascading effects to the overall efficiency of the firm. But the existing solution, an unwieldy

combination of legacy systems, was limiting Citadel's rapid growth and it needed an upgrade.

Now, the migration to a new reference-data platform is underway. The rollout will hit every trading desk, from equities to fixed income, quantitative research, commodities, credit converts, and equity volatility. As soon as early 2024, Citadel will start to sunset the legacy system.

With the new solution, Citadel says, it will be able to move into new asset classes much faster. Developers will be able to build new tools faster. If pulled off, the whole organization will move faster and with more precision.

"There isn't a team or system in the organization that does not touch this platform," Rituraj Deb Nath, head of enterprise data engineering, a group that oversees reference data and pricing requirements of the firm, told Insider.

"Instruments have to be defined before you can do anything in the market. Without that, you can't trade it, you can't quote on it, you can't risk it, you can't find what the value of it is. And the precision at which you can do that, the clarity with which you can express that, is really important to the efficiency of the whole firm," Deb Nath said.

But for Citadel, rebuilding a new reference-data system from the ground up was approached much the same way the hedge fund tackles investing: with meticulous planning and analysis.

"It's very rare for financial institutions to rebuild something as core as the reference-data infrastructure," Robert Tan, the lead engineer on the project, told Insider. Tan joined Citadel in 2019 from Google as a member of the hedge fund's elite recruitment program, NXT.

"It's used frequently and is something many would be afraid to touch," Tan said.

## The new platform was built to set up Citadel for future generations and asset classes

Citadel completed planning, analysis, and development work throughout 2022, Tan said. In recent months, businesses have been onboarding to the new platform. The firm declined to disclose the cost of the rebuild.

When the prior reference-data platform was built nearly 20 years ago, Citadel was mostly an equity and fixed-income shop, not the multi-strat giant it is today.

The older platform "served us well through nearly two decades of investment, but as markets matured and Citadel's businesses evolved to incorporate new strategies, we found ourselves needing to handle additional complexity," said Deb Nath, who has had a storied tech career on Wall Street at sell-side powerhouses like Bank of America and Goldman Sachs.

In addition to updating old technology, Citadel found it needed to react to the ever-evolving market faster. "When new opportunities emerge, we need to react quickly — and that requires a flexible platform that's built to handle a wide array of instruments and markets," Tan said.

With the new platform, Citadel can respond when new asset classes come into the market. When new asset classes appear, which they do with greater frequency and shorter time horizons these days, there's a swath of back-end processes that are required to start working with them, from sourcing the data to representing and pricing them, Tan said.

The new platform is built in such a way that it supports branching into new trading strategies and asset classes faster than ever — sometimes in just a matter of days, Tan said.

There's also increasingly more crossover between trading desks, which has made precise communication between different businesses all the more critical.

"It's critical for our systems to accommodate growth in various asset classes and support the ever-increasing crossover between them," Tan said.