

# Exos Financial Uses Numerix CrossAsset SDK Python to Scale Up Risk Analytics

## ABOUT EXOS

Exos Financial was founded in 2018 by Brady Dougan, the former CEO of Credit Suisse, with the goal of building a state-of-the-art, next generation platform for B2B institutional finance. The platform is designed to deliver all the services of a traditional investment bank, reimagined and tailored to a modern digital world, all integrated into a powerful, modern technology platform driven by data and data science. The firm has also launched a series of businesses designed to give it a foothold in a number of key areas of institutional finance, while serving as a proof of concept for its technology.

## THE NUMERIX SOLUTION

Exos chose to integrate Numerix's CrossAsset SDK Python, a comprehensive pricing and risk management analytics library, into its own proprietary risk and valuation platform in order to enhance the quality of its analytics capabilities.

**For this case study, Numerix interviewed Philippe Hatstadt, Chief Risk Officer of Exos Financial, to discuss the story behind its strategic partnership with Numerix.**

### What Is the Origin of Exos Financial's Relationship with Numerix?

As Chief Risk Officer, I am in charge of market, credit and funding risk, valuation, and quantitative analytics. I joined Exos in 2019 and during the first two and a half years of my employ at the firm, we built an in-house risk and valuation analytics platform that was constructed on top of an existing open source quantitative library.

We quickly reached a limit as to what the library could offer in terms of the quality of the analytics. We really needed to move

into the next generation of analytics, and as we started looking at the world of vendors that were out there, we wanted to find a fintech firm that offered an industry-leading pure library that could be well integrated with our stack and grow from there.

Numerix came up very clearly as the leading solution provider, in so far as the quality of the analytics were concerned, and the various interfaces and APIs that we could easily integrate into our platforms. Numerix's strong quant team was also a significant draw.

### What Business Need(s) Had to Be Met?

We needed a comprehensive multi-asset and derivatives risk management analytics and valuation library that we could integrate into our own proprietary risk and valuation platform. Exos is a strong technology shop and, as I mentioned,

it built its own proprietary analytics, trade processing and reference data infrastructure.

However, what we ultimately wanted was a pure quantitative library that could be plugged into this in-house infrastructure. This library needed to include an analytics system that had a number of high quality models, both deterministic models and stochastic models for interest rate instruments, securitized products, options, equity assets, as well as digital assets, such as high volatility crypto.

We also needed an analytics system that could handle fixed income derivatives in order to, for example, construct curves. While we had our own proprietary analytics for mortgage-backed securities that included our own cash flow libraries, we didn't want to have to spend too much time building the more complicated piece of it, which is the discounting and stochastic modeling.

So, we were now connecting the dots in the sense that we integrated our cash flow and prepayment models on top of certain Numerix stochastic rate models to effectively build a very bespoke OAS model for certain instruments.

The other important piece of the analytics platform that Numerix offers is a suite of Economic Scenario Generators. We use two types: a risk neutral one for valuation and risk management and a real-world one, as both models are useful for taking a number of scenarios and molding them into certain views that can be applied to more complicated models to figure out what would happen in typical stress scenarios.

For Exos, all of this is quite valuable as it allows us on our core skills to develop financial products and integrate them into our quantitative platform, while relying on Numerix to do the heavy lifting for core models, which is a capability that Numerix is particularly strong at providing.

## How Are You Using CrossAsset SDK Python?

It has been about one year since we started using CrossAsset SDK Python, including the Excel API. We used the product to help create three types of applications/libraries. First, we built a library that we call Risk Core, which is a complex library that uses Python and which integrates our reference data, be it market securities, prices, trades, transactions, positions, and so on and then combines that with Numerix's analytics.

The second application is in many ways an extension of the Numerix Excel interface, which augments it with Exos analytics and higher level class risk and valuation components. We've pushed it further whereby we have integrated our own quantitative platform into our own Excel add ins, which also connects to JupyterLab, and gives us an ideal level of scripting capability while preserving compatibility with the production systems. We find this to be an ideal research and prototyping framework.

The third application, which we started building recently, is a trade processing application that requires the ability to calculate, for example, live accrued interest on a real time basis, while sharing the core valuation library with other technology parts of the firm more focused on operations.

## How Was the Project a Success? Describe the Results?

It was challenging to integrate CrossAsset SDK Python library into our existing infrastructure and figuring out how to put all the pieces together. But it was also extremely rewarding because we were able to put in place a very powerful combined platform that really helped us build a whole bunch of layers on top of that. The success can also be looked at in terms of the quality of the implementation, but more importantly, the acceptance and the power of the resulting application.

Our risk management application can now, essentially, do anything we want while preserving flexibility as the turnaround time to add new instrument types and related valuation analytics has been optimized. We have been put in a position to maximize the efficiency of how we use the Numerix library and I am getting to a point where I can leverage our library and write higher level code and not as much NX pro-level type code as we were doing a year ago. So, now the productivity is much higher and keeps improving as we continue to optimize the structure of our risk core library, which also evolves as the Numerix APIs themselves evolve.

On the latter point, and overall, I genuinely think of our relationship with Numerix as a partnership, and it is a good partnership. ■