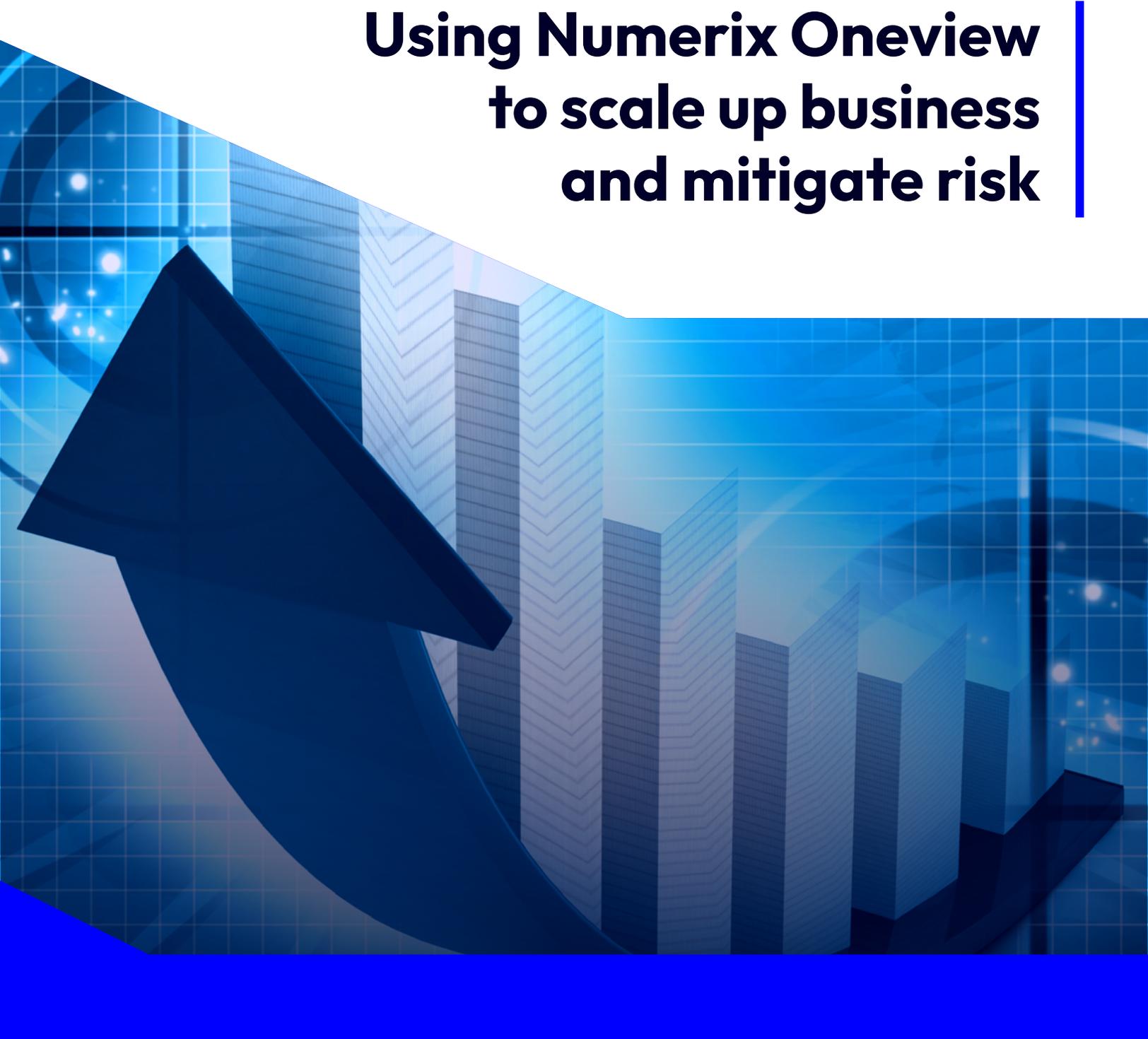


# Using Numerix Oneview to scale up business and mitigate risk





## The Results of a Strategic Partnership with OCBC Bank

Founded in 1996, Numerix provides advanced software solutions for the accurate pricing, modeling, valuation and risk management of multiple types of derivatives and financial instruments.

As derivatives market participants continue to face several challenges, they require tools to help them navigate through complex market conditions and satisfy changing regulatory requirements, which brings the need to upgrade systems to meet the required transformation of doing business today and in the future.

As a global leader in capital markets technology, Numerix offers Numerix Oneview, which features next generation enterprise technology solutions that help financial institutions manage the complexities of the changing capital markets landscape, effectively manage risk and build a competitive edge.

The Oneview platform allows for flexible consumption of solution components for addressing trading needs, as well as regulatory and risk management so that business units can build adaptive, high-performance environments.

This real-time, cloud-ready solution enables users to keep pace with fast moving underlying markets and offers tradeable real-time quoting, real-time risk calculations, and XVA pricing for even the most complex structured products.

Powered by the industry's most sophisticated cross-asset analytics and optimized for performance, Oneview's wide range of modules enable insightful decisions and greater accuracy.

## Highlights

- This is the story of a nearly 10-year partnership between OCBC Bank and Numerix, in which the Bank relied on Numerix to address a number of challenges.
- OCBC required a platform that could help it capture more trades and meet demand for products with more innovative features within the structured products space.
- The Bank needed to integrate a more sophisticated risk management process.
- OCBC found it had to look to the benefits of the cloud to meet significant computer and calculation requirements.
- The Bank needed to satisfy new regulatory requirements for XVA, UMR and SIMM.
- OCBC adopted Numerix Oneview as its platform of choice to meet these crucial needs.



# Numerix at OCBC Bank

Oversea-Chinese Banking Corporation, Limited, more commonly known as OCBC Bank, is a multinational banking and financial services corporation headquartered in Singapore. Born out of the Great Depression through the merger of three banks in 1932, as of 2020 OCBC has total assets of more than 521 billion SGD.

Already a long-time client leveraging Numerix for pricing structured notes for rates, FX and equity-linked structures, the Bank pursued greater efficiency and increased performance by expanding its use of Numerix with the integration of the Numerix Oneview platform for pre-trade pricing for back-to-back deals for exotic structured products.

This case study will detail how Numerix helped to support the evolution and expansion of OCBC's valuation activities, and its move to the cloud, in addition to several new initiatives including meeting risk-based capital adequacy requirements issued by the Monetary Authority of Singapore (MAS) and compliance with Uncleared Margin Rules (UMR) in Phase 5.

To support these initiatives, Numerix partnered closely with the Global Treasury division inside OCBC. This unit is responsible for areas of the global business including reporting, markets, credit, funding/liquidity adequacy, and front office pricing/valuations and risk management. This business unit serves retail and institutional clients, banks and corporates, and private banks that seek to buy OCBC products that range from simple FX products to complex derivatives.

Through its use of Numerix Oneview, OCBC Bank completed its regulatory project over one year ahead of schedule, doubled its capacity for processing exotic trades under UMR, and reduced the calculation timeframes for its monthly SIMM backtesting reports from 3 days to 3 hours, a 96% improvement.

## Facing Obstacles

The strategic partnership between OCBC Bank and Numerix spans nearly 10 years and continues strong today. During the course of its partnership with Numerix, OCBC Bank has faced a number of challenges with which it engaged Numerix to address.

Going back several years, the structured products market and its competitive environment transformed and became more sophisticated and complex on many fronts, forcing a greater need for OCBC to meet demand for products with more innovative features. This meant that OCBC's product deployment and valuation activities would now require more significant pricing and compute capabilities than were possible on its trading platform.

The Global Treasury business also found it had a need for products to have faster time to market and satisfy the demand for faster deployments. It also needed enhanced scalability and needed to overcome capacity challenges so as to support periods of high trading volume during volatile markets.

Additional challenges were introduced along the way as new regulatory initiatives and requirements came into play.



## The origin of the strategic partnership

Originally, OCBC had teamed with Numerix for support in pricing structured notes with plain vanilla option components such as for equity-linked structures.

As derivatives products increased in sophistication, the Bank needed to be able to build and price the more complex products that clients demanded, including multi-asset, exotic structures such as TARNs, Pivots and Barriers, which were not easily priced on its trading platform.

Numerix responded by offering an attractive solution for OCBC at the time, which was an on-premise technology architecture that provided the tools that the Treasury business could use to create and price the products it needed in a very customized way. This flexibility and versatility of the solution worked as the foundation for the working relationship between Numerix and the Bank.



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When seeking an on-premise solution for our new product requirements, we looked at a number of vendors and chose Numerix as we believed it would best meet our needs. It was the right choice. Numerix provided us with the versatility we wanted—the building blocks, if you will—to create inhouse the products we wanted to put to the market.”

**Federick Shen**, Head, Global Treasury  
Business Management Unit, OCBC Bank

## As trust grew, OCBC embraced the cloud

As OCBC's valuation and risk measurement activities required significant compute requirements and calculation considerations within the Bank, Numerix continued its work with OCBC and partnered to develop a new managed service offering for trade capture and valuations inside the Bank.

OCBC Bank had always relied on an on-premise technology architecture to manage its trading and product development activities. However, as the Global Treasury business unit grew, capacity and scalability issues and time to market became a bottleneck. For example, the Bank would run out of server space, which would create product wrap up and trade limitations and it couldn't afford the time it would take for its IT department to scale up capacity. Additionally, volatile markets would cause trade volumes to ramp up or ramp down, so scalability was an important factor as well, particularly during periods of large volume activity.

In 2018, with the growing confidence of its partnership strength with Numerix, the Bank felt comfortable embracing Numerix Oneview as a managed service leveraging AWS. The new cloud model enabled the Bank to deploy products more quickly, increase scalability to handle larger volumes of trades, and overcome capacity challenges.



This unique solution allows OCBC to accurately capture any instrument and to compute MTMs as well as risk sensitivities for the portfolio and perform scenario and stress testing. The solution can capture these trades, accurately represent all trade terms and conditions, upload the term sheets and reference attachments, ensure workflow is accurate, run MTM valuation and risk sensitivity reports daily, and other risk reports as needed. OCBC has a full audit trail and life cycle events, as well as valuation history of trades and the ability to drilldown into those trades at any time.

OCBC worked hand in hand with Numerix on attaining all the internal approvals within the Bank for moving to the cloud. Numerix participated in the discussions with internal stakeholders such as IT, Compliance, and Operational Risk Management to address concerns regarding data loss and privacy issues, as well as how corporate confidentiality would be managed.



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As our strategic partnership with Numerix strengthened, we grew comfortable with embracing the change for a cloud resource by moving from on-premise to Numerix's managed services offering. There were many benefits, but primarily we would not have been able to manage high volume demand without the elastic service provided by Numerix and AWS"

Federick Shen

## Meeting regulatory requirements

In 2018, the Monetary Authority of Singapore (MAS), Singapore's central bank and financial regulatory authority, issued a revised notice on Risk Based Capital Adequacy Requirements for Banks Incorporated in Singapore. While the deadline for the amendments to take effect has continued to shift, OCBC took a proactive approach and used this as an opportunity to look at the requirements holistically in order to identify efficiencies.

A new set of rules required banks to disclose the breakdown of the different Prudent Valuation Adjustments, including CVA and FVA. However, OCBC did not have an existing solution for XVA computation to address the MAS requirements by the stipulated regulatory timeline.

Because of the degree of satisfaction OCBC's Treasury Business Unit had with leveraging Numerix Oneview as a managed service, it engaged with Numerix to adopt a solution to this new XVA challenge.

The project involved the Bank sending trade and counterparty information to the cloud platform (where Numerix provided the validated models and an independent/golden copy of market data) and in turn receiving computed results in desirable output format for disclosure to MAS as well as for management reporting.



## Key components of the solution include:

- Trade extraction and trades upload
- Tokenized counterparty mapping to CDS Curves based on country, industry/sector rating and seniority
- Market data sourcing by Numerix and curve setup in accordance with OCBC policies and specifications
- Model validation by OCBC Market Risk Management and MTM reconciliation
- Customized XVA reports produced for Treasury Finance Control, Global Treasury and MAS requirements

At the same time it was working to comply with MAS regulations, OCBC Bank needed to comply with Uncleared Margin Rules (UMR) in Phase 5, but it had challenges performing the Standard Initial Margin Model (SIMM) VaR backtests and sensitivity calculations within acceptable timeframes on its large portfolio of exotic trades.

After the proven results of the MAS compliant solution, Numerix extended the offering to become the source of truth for structured portfolio valuations providing daily MTM, sensitivity runs, hypothetical market value reports and monthly market value vector reports for SIMM backtesting (in support of UMR) based on agreed market data snapshot times.

Oneview was operated by Numerix as a managed service and run on AWS's cloud, utilizing AWS Batch, Lambda, S3, EC2 and many other AWS tools to efficiently run all of the UMR calculations within the Bank's desired timeframes.

The Bank completed the project over one year ahead of schedule, doubled its capacity for processing exotic trades under UMR, and reduced the calculation timeframes for its monthly SIMM backtesting reports from 3 days to 3 hours, a 96% improvement.

Once again, the scalability and elasticity of the cloud enabled OCBC, with the partnership support of Numerix, to rapidly evolve and adopt new functionality. In this case, for adopting SIMM analytics for margin calculations.

In addition to all that has been featured here, it is worth adding that one of the other core reasons OCBC Bank chose Numerix Oneview over other vendor solutions was the coverage of Oneview's analytics library, its out-of-the-box modeling for vanillas and exotics, and its flexibility in capturing and meeting evolving market trends such as the LIBOR transition and currency regime changes.

From an enterprise project point of view, the Bank is not leveraging Numerix Oneview for just one or two of its business teams, but it is using Oneview as a front-to-risk XVA solution involving multiple user groups.

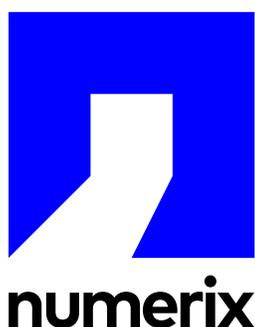


For Numerix, I rate highly its delivery quality, its reliability, its scalability, its flexibility in coming up with solutions to issues we face, and, another important factor, the responsiveness of the Numerix management team.”

Federick Shen

# Key takeaways

- Numerix Oneview as a managed service gave OCBC the ability to capture trades without taxing the internal infrastructure of the Bank.
- Running an increasingly large number of trades for the Bank is possible as Numerix Oneview as a managed service is hosted on AWS, which gives the flexibility for the infrastructure to elastically expand depending on trade volumes and computation requirements.
- Numerix's competitors were not able to capture the diverse multi-asset, exotic structures, such as TARNs, Pivots and Barriers, that OCBC required. Therefore, these firms were also unable to price the structures or accurately represent the trade terms.
- Successfully and accurately managing valuation adjustments, or XVAs, for complex structured products calls for comprehensive and exceptional analytics, robust and real-time calculations and dynamic real-time reporting. This may require partnering with a vendor that offers these and other best-of-breed capabilities.



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