

Cloud Computing Revolutionizes CRE Risk Management

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Cloud computing is quickly changing the entire financial services industry in the U.S. and Europe. Many simple and complex software applications are now available to industry professionals via any browser window. By now we are all accustomed to accessing our email online from wherever we may be at the time. Soon most standard office applications for word processing, for example, will be used the same way—securely over the web.

More complex financial software applications are following closely behind. For example, in risk management for commercial real estate lending, the migration of risk models to the cloud makes sense because of the huge reduction in operating expenses for a financial institution and a fantastic improvement in computational time. The migration to the cloud takes risk measurement from a quotidian capital reporting requirement into a competitive advantage for institutions.

Cloud-based Risk Models

Today, complete risk management applications reside on the cloud as wholly hosted solutions. They are accessed via a web browser by any risk department employee given a password. The cloud eliminates the need for lenders to install and maintain applications on in-house computers.

Further cost reductions occur because the risk manager can access the CRE risk system immediately, without a prolonged implementation project. In fact, the hosted solutions make a lot of sense for institutions

wanting to avoid the significant capital costs and project risk of an in-house implementation.

Massive Computational Power on Demand

Another major benefit for risk management is that the cloud makes massive computational power available when it is needed. This means different risk measurement approaches can be used that may have been previously avoided because they use a lot of computational power. The approaches are much more useful and intuitive than traditional risk measurement tools.

The traditional approach to assessing the risk of commercial real estate financing is to use expert judgment supported by some nominal or stressed cash flow projections. More recently, with new regulations, there are requirements to quantify the risk in commercial real estate financing in more rigorous terms. Typically, the risk is quantified in terms of the probability of an investor not being able to pay the debt and the subsequent loss given a default.

Simplistic, Descriptive Scorecards

One approach to risk quantification has been to make scorecards that take a series of factors such as loan-to-value and debt-service-coverage-ratio and weight them to create a score, which is then tied to the risk. This has the advantage of being relatively simple but they do have several significant limitations. Scorecards cannot capture the multi-year complexity of commercial real estate deals, they do not take into account the details of individual deals, and the assignment of the weights can be a mystery.

The biggest weakness is that scorecards do not tell the lender anything new. They just formalize what the lender already knows so that the numbers can be reported elsewhere. Every lender knows that the tenant mix, the lease agreement details, and the financing terms make a significant difference to the risk and price that in. They also suspect that reserve accounts, covenants and interest derivatives can make a big difference to the risk profile and profitability but have not had the machinery to know the extent to which the risk changes with different financing terms.

Cashflow Simulation

The cloud makes tremendous computational power available. It cloud makes it possible to do a much better job in quantifying, differentiating and structuring the risk in commercial real estate deals using **cash flow simulation**.

and borrower characteristics. The knowledge can be used to guide structuring and pricing, as well as reporting the risk in quantitative terms. The simulation approach uses an open cash flow model that has intuitive terms such as void periods and refinancing thresholds, rather than requiring mysterious weights.

Computational Power of the Cloud

In the past, one disadvantage to the simulation approach was that running the full set of cash flows over multiple years in thousands of possible scenarios required massive computational power. Even the fastest server farms took three to four minutes to get a set of results.

Four minutes is reasonable when analyzing a single deal but when looking at a bank's portfolio of thousands of deals, the calculation time could potentially be several days for a detailed stress test looking at the stress on



Lenders see how changes to financing details can equate to a dramatic change in a loan's risk. The change can be quantified using a cash flow model, projecting property and loan performance in many thousands of possible conditions. They can examine what would happen to a loan if in three years interest rates were to rise markedly, a tenant defaults, and it took six months to replace one at the prevailing market rate.

The result from simulation analysis is a profile, year-by-year, of the spikes in default. The spikes indicate how the financing structure might be changed to best match the property

each lease over time.

Until the cloud came along, the best set up for an institution was to run the deals in parallel, that is, have several computers running at the same time.

Typically a bank might have thirty computational servers, bringing the calculation time down to a couple of hours. A couple of hours for a detailed portfolio analysis is generally acceptable, and can be reduced further by installing more hardware, but that implies a significant capital expenditure for a

set of installed servers that may be idle until the end-of-month run.

One Thousand Deals in Ten Minutes

By accessing virtually unlimited servers on-demand, portfolio analysis becomes much faster and more cost effective. For example, with a burst of 200 servers, a portfolio of 1,000 deals takes 20 minutes to run with complex deals, while taking only 10 minutes for straightforward CMBS conduit loans.

A burst of computational power like this has an 'infrastructure-as-a-service' cost of a few hundred dollars for a portfolio run, which is significantly more efficient than building a dedicated in-house server farm. Once the calculations are finished, the cloud computers can be shut down until the next time they are next required. The ability to tune the computational supply with demand is known as elasticity.

Benefits of Cloud Computing for CRE Risk

In summary, there are several significant benefits of using the cloud for risk management in commercial real estate.

Analyze CRE financing structures with unprecedented detail and differentiation

Use best of class cash flow models without mysterious weights

Cut apart the structure and price for new deals

Fast calculation times for large portfolios under different market assumptions

Immediate availability and elasticity, without a large implementation process, management, and cost

Technology is not yet quite at the stage of allowing the user to tap a radio button to find the best financing structure for matching a property portfolio's cash flows but cloud computing is at the stage where a portfolio manager can quickly run many different analysis to slice the portfolio, and report on the risks from any perspective they wish. ■

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