

MOODY'S

Insurance Solutions

**From complexity
to clarity:
Navigating the four
S's of catastrophe
risk data**





Introduction

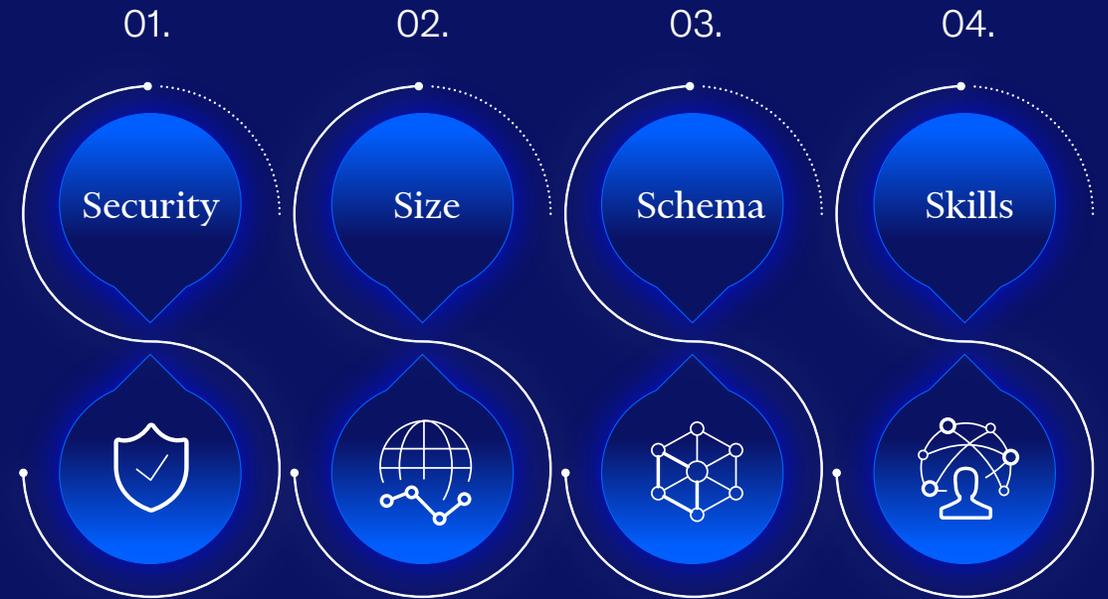
The insurance industry is no stranger to navigating a sophisticated mix of vendor-provided and custom-built, in-house systems. However, managing and scaling operational and archived data across both on-premises and cloud systems can quickly increase in complexity, forcing chief technology officers, chief security officers, chief information officers, and chief data officers to navigate difficult trade-offs in their data management strategies. These include but are not limited to balancing defensive data capabilities — such as compliance, data protection, and security — with offensive capabilities like data fidelity and agility, which are crucial for driving business growth.

For property and casualty (re)insurance, this trade-off is particularly difficult. Catastrophe risk data brings distinct challenges that other organizations within the insurance sector do not need to grapple with. At Moody's, we call them the four S's of catastrophe risk data: **data size, schema, skills, and security**. These four challenges present barriers that can prevent insurers from realizing the full value of their data assets, impacting key risk management functions such as regulatory reporting, exposure management, catastrophe modeling, and capital management.

Adopting cloud-native technologies is a great first step to improving the management of catastrophe risk data. By migrating risk workflows to a software as a service (SaaS) environment firms can elevate the governance, security, and management of their data to drive business growth while keeping data safe, secure, and governable. Let's see how Moody's and its proprietary Intelligent Risk Platform™ are tackling the growing data challenges and helping customers see risk differently.

Introducing the four S's of catastrophe risk data

Many (re)insurers face a familiar challenge: They are data rich but insight poor, constrained by legacy technology that struggles to keep pace with the speed of innovation. (Re)insurers must constantly balance the need to better understand risk with the ability to operationalize these insights within IT systems to improve underwriting, guide portfolio strategy, and inform capital management decisions. This tension is often a key motivator to migrate catastrophe risk workflows to the cloud. Yet without the right partner, firms may not effectively address workflow challenges arising from the four S's of catastrophe risk data — even when they adopt cloud-native approaches.



Moody's Intelligent Risk Platform

Moody's Data Bridge	Moody's Risk Data Lake
Moody's Risk Data Exchange	Moody's Data Vault

Unpacking the four S's of catastrophe risk data

Without addressing the challenges that arise from the four S's of catastrophe risk data, firms will face significant obstacles in advancing their analytical capabilities and harnessing cutting-edge technologies like artificial intelligence to supercharge their workflows.



DATA SECURITY

(Re)insurers manage data amid constantly changing global data regulations and across a complex array of infrastructure and risk environments. Security is paramount as they work with highly sensitive customer data. These organizations must navigate the delicate balance between innovation and data security, protection, and privacy imperatives, which frequently leads to reduced agility in business operations.



DATA SIZE

(Re)insurers often manage portfolios encompassing millions or even billions of locations, resulting in substantial data analysis critical for providing insights into a complex risk landscape. Progress in modeling technologies further increases the size of modeled output. The combination of more sophisticated, high-quality, and granular model output and risk portfolios' growing size strains the integration of insights into existing risk management processes.



DATA SCHEMA

Model vendors develop unique exposure and results schemas specifically designed for their catastrophe models. While this approach enhances the quality of the model insights, it can also restrict model choice unless firms undertake complex data transformations to accommodate different model schemas.



DATA SKILLS

While insurers possess deep risk assessment knowledge, leveraging their data to its fullest potential requires the cultivation of advanced IT, software development, and data science capabilities. Acquiring or nurturing these skills represents a significant investment but also presents a significant liability — a competitive market for such talent is expensive and potentially disruptive since high turnover rates can lead to substantial setbacks in project timelines.

Tackling the four S's of catastrophe risk data with Moody's Intelligent Risk Platform

Moody's Intelligent Risk Platform is tailored to meet the evolving needs of catastrophe risk management. Built on cloud-native architecture, it seamlessly grows to meet our customers' growing data demands while providing the flexibility to support workflows across its multiple SaaS applications and on-premises systems.

By migrating to the Intelligent Risk Platform, clients gain access to a suite of common services provided by Amazon Web Services (AWS), including security, reliability, compliance, and support. For many of our customers, this marks the first step in their journey toward building unified risk analytics with enhanced data management capabilities. As the industry evolves, the platform's flexibility and modularity help our customers keep pace with the rapid rate of innovation. With a six-week release cycle, customers consistently uncover new capabilities within their existing workflows, driving increased productivity and fueling business growth.

Moody's provides a wide range of services designed to help clients maximize the value of their data both within and beyond the platform. As our customers seek new ways to leverage the platform's capabilities and streamline data management across their entire IT risk ecosystem, we continue to introduce new licensable and complimentary services to meet their evolving needs and perform all their key workflows within the Intelligent Risk Platform.

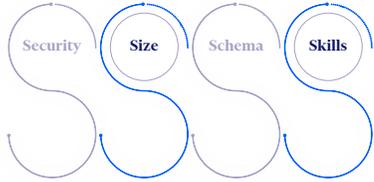
Let's explore how Moody's empowers firms to tackle the four S's of catastrophe risk data.



“We now have a system that is able to flex as our business grows. Whether that's raising the ceiling on our processing capabilities, integrating new global teams into the system, or rolling out a new R&D environment, it's pretty much as simple as flicking a switch once it has been agreed.”

— Scott Christian, Executive Vice President of Catastrophe Analytics at BMS Re

Moody's Risk Data Lake



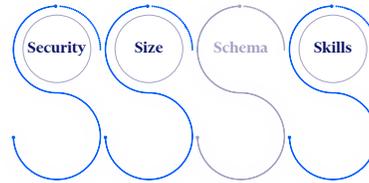
The insurance industry is not immune to the thirst for more advanced analytics. Catastrophe modelers seek increasingly sophisticated models, underwriters demand a broader variety of data to enhance their assessments, and exposure managers require granular location- and policy-level data to effectively assess risk accumulations. All of this adds larger, more diverse datasets into risk workflows, requiring more technical expertise, storage, and advanced technologies. In pursuit of greater analytical firepower, many insurers are adopting and managing data lakes outside of core catastrophe modeling systems to bring together exposure, model losses, and years of claims from disparate systems. However, many still struggle to realize the full value of their catastrophe data. Building workflows to fill the data lake adds complexity and costs to IT systems and reduces users' ability to query all their catastrophe data for advanced analytics.

Moody's Risk Data Lake is a cloud-based, programmable analytical environment fully integrated with the Intelligent Risk Platform. Designed to address catastrophe risk data's specific challenges, the Risk Data Lake builds on the strength of the Intelligent Risk Platform's unified data store by offering data science tools, libraries of preconfigured risk workflows, and an advanced catalog to enhance data accessibility. Additionally, it is flexible and capable of ingesting and managing third-party unstructured data such as insurance claims, providing the same types of services found in a traditional data lake solution.

Designed for users with various levels of technical expertise, the Risk Data Lake serves a broad range of risk stakeholders. Its flexible reporting capabilities are directly embedded into the interface of platform applications, providing a no-code analytics environment to build bespoke analytical insights without having to engage with IT or developers. For more technical users, the Risk Data Lake offers data science tools such as Structured Query Language (SQL), Python, and R to analyze the data and utilize the most sophisticated tools to run advanced analytics.



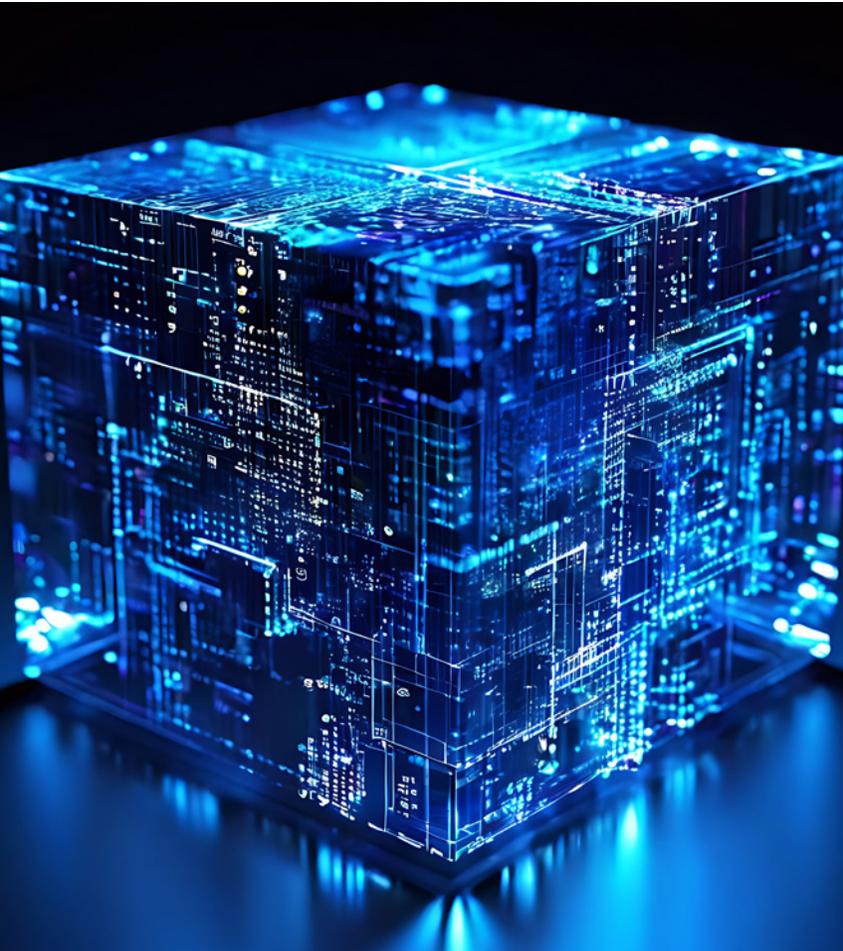
Moody's Data Vault



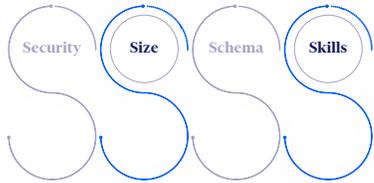
In their day-to-day workflows, catastrophe modelers frequently produce massive datasets, from portfolios encompassing billions of locations to large, sophisticated modeled outputs. For CIOs and chief compliance officers, maintaining the proper data retention, access, and security at scale and in both archival and operational systems is critical — especially when regulators demand that (re)insurers retain this data for seven or more years. Simply archiving data in external data centers can add complexity to IT systems, increase servicing and maintenance costs, and create a patchwork of data administration and security processes. This makes it more challenging to locate and utilize the data when it's needed most. Responding to a regulatory audit could sidetrack your risk teams for days or even weeks if they can't find the appropriate data.

Moody's Data Vault provides a self-serve, flexible data storage and management solution that unifies operational and archived risk data within a single cloud-native environment. By directly integrating with the Intelligent Risk Platform, Data Vault archives, stores, and maintains risk data according to organizational retention policies. Expired data is automatically purged to make room for new archives, helping firms maintain compliance with global regulations. In addition, Moody's Data Vault includes high-definition search capabilities to operate on large archive data. Together, these capabilities simplify the management and security of archived data, all at a better total cost of ownership.

Data Vault's database snapshot service eliminates the need for traditional daily or weekly backups of exposure and non-exposure databases. By automatically capturing snapshots as frequently as every eight hours, it minimizes the risk of data loss from accidental deletions and reduces reliance on specialized IT teams or database engineers for manual record maintenance. This frees up resources, allowing teams to focus on higher-value IT initiatives that drive business growth.

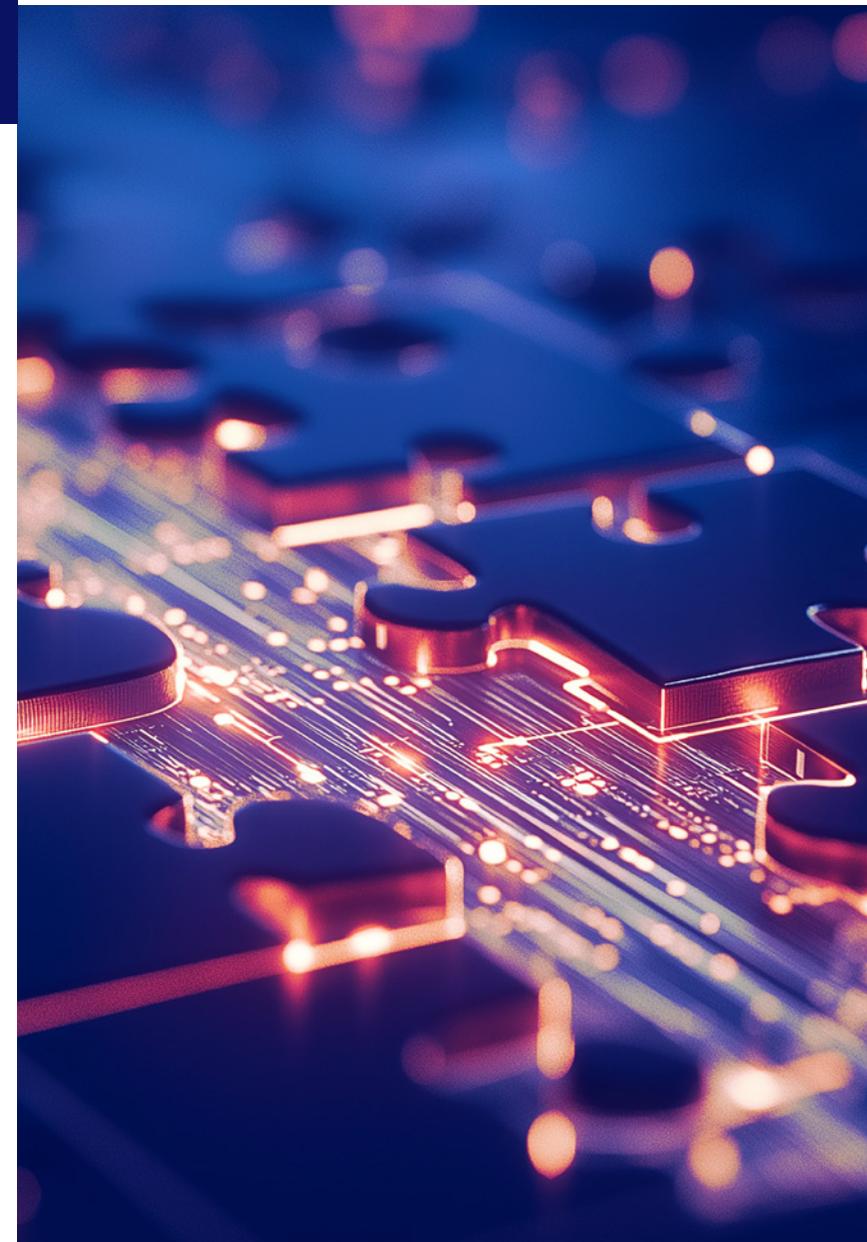


Moody's Data Bridge



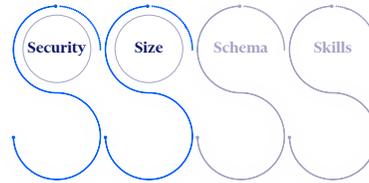
(Re)insurers and brokers manage extensive and complex IT environments, with workflows developed and refined over many years. As they transition from Moody's RiskLink to Moody's Risk Modeler™, many are adopting a phased approach to migrating their workflows to the Intelligent Risk Platform. Large amounts of catastrophe risk data, such as exposures and results, are often stored and managed in multiple on-premises databases. Additionally, catastrophe modelers have curated mission-critical workflows using SQL to access this data. Migrating to a new platform should not require them to redesign hundreds of workflows or learn new programming languages. Catastrophe modeler expertise in SQL is an asset, not a liability, and catastrophe modelers need to maintain their productivity to fully realize the benefits of cloud computing.

Moody's Data Bridge is a managed database service that hosts Microsoft SQL Server, which is seamlessly integrated with Risk Modeler, Moody's UnderwriteIQ™, and Moody's ExposureIQ™ on the Intelligent Risk Platform. Data Bridge offers backward-compatible SQL access to exposures and exported losses, preserving existing integrations created by catastrophe modelers in their RiskLink and Moody's RiskBrowser environments. This capability significantly simplifies the migration to cloud-based solutions, making sure current workflows remain uninterrupted. Data Bridge also allows for the import of custom databases, helping customers seamlessly manage critical resources such as reference databases — an integral component of their workflows.





Moody's Risk Data Exchange



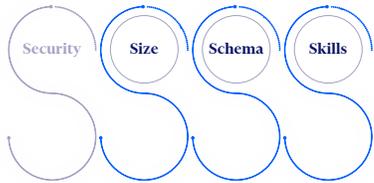
During insurance renewals, the distribution of risk data becomes a critical focus for all stakeholders across the insurance value chain. The need for data to flow freely between primary insurers, reinsurance brokers, and reinsurers is central to the renewal workflow, and the immense size of insurance portfolios — often encompassing millions of locations — and their corresponding modeled results place significant strain on workflows and IT systems.

Moreover, exchanging high-quality, actionable data between various parties can be difficult due to incompatibility between data schemas, granularity of data, and concerns around data governance. These challenges are compounded by the need to maintain data security, which is paramount in an industry dealing with vast amounts of sensitive information. As a result, the balancing act of facilitating efficient data sharing while maintaining strict data security standards remains a persistent issue.

Moody's Risk Data Exchange is a fully integrated service for firms licensing applications on the Intelligent Risk Platform. Risk Data Exchange allows insurers, brokers, and reinsurers on the platform to seamlessly share exposures, results data, and treaty programs with partners in a fraction of the time, regardless of the data granularity. Data shared through the Risk Data Exchange remains within Moody's Intelligent Risk Platform, maintaining compliance with strict security protocols.

To reduce the risk of any data breach, our platform features tenant isolation, role-based access controls, and data encryption that also makes sure tenant boundaries are always maintained during the exchange of data. All exchanges of platform data require administrator approvals for an additional layer of governance and security, allowing for comprehensive oversight of data flow. With fewer bottlenecks in the data-sharing workflow, neither party needs to work with aggregated data. Catastrophe modeling and underwriting tools can take advantage of higher-quality data, improving risk decision-making across the risk life cycle.

Moody's Intelligent Risk Platform Data Transformation Engines



The accuracy and reliability of catastrophe risk models are fundamentally tied to the structure and definition of their underlying exposure schemas. These schemas — comprised of detailed inputs and modifiers that form the backbone of vendor-specific exposure data — are critical to driving high-quality model analytics. The interdependence becomes even more pronounced when scaled across vast portfolios containing thousands or even millions of locations.

For organizations with large catastrophe modeling and IT teams, it is feasible to operate multiple vendor models. However, doing so requires significant engineering resources to adapt exposure data to each vendor's proprietary schema. Adding to the complexity, teams must also invest time and effort to train on new software systems and modeling methodologies — an undertaking not all organizations can afford.

For small and medium-sized firms, the resource demands of managing multiple vendor models — both in terms of data transformation and team training — can be prohibitive, often leaving these firms reliant on a single perspective of risk.

Moody's Intelligent Risk Platform Open Modeling Engine addresses many of the barriers to adopting multi-vendor modeling approaches. The platform can convert exposure data from Verisk/AIR's Catastrophe Exposure Database Exchange (CEDE) and the Oasis Open Exposure Data (OED) schema into Exposure Data Modules (EDMs) without IT taking on any data engineering tasks. Once exposure is in EDMs, catastrophe modelers can run more than 400 Moody's RMS™ catastrophe models within Risk Modeler.





Conclusion

The nature of risk is changing, becoming more interconnected, dynamic, and complex than ever before. As these shifts accelerate, it's only natural that risk data and analytics must evolve alongside them. New challenges will inevitably emerge, compounding the existing issues captured by the four S's of catastrophe risk data. Organizations that fail to adapt risk falling behind in an increasingly competitive and unpredictable market.

Moody's Intelligent Risk Platform is tailored to help insurers thrive in this evolving risk landscape. Built on a foundation of flexibility, and continuous innovation, the platform empowers firms to manage catastrophe risk data with greater speed, efficiency, and confidence. Its modular architecture seamlessly integrates into existing workflows, and regular updates help users stay ahead of technological advancements and industry demands.

By equipping insurers with cutting-edge tools and insights, Moody's Intelligent Risk Platform not only simplifies the complexities of risk management but also drives meaningful productivity gains and business growth. In a world where risk is constantly evolving, this platform allows organizations to be prepared, agile, and ready to lead.

To learn more about how the Intelligent Risk Platform can help you modernize your data management capabilities, contact sales@moodys.com.

ABOUT INSURANCE SOLUTIONS FROM MOODY'S

Moody's shapes the world's view of risk for insurers, reinsurers, financial services organizations, and the public sector, with Moody's models underlying the nearly \$2 trillion property and casualty industry. We empower organizations to evaluate and manage global risk from natural and man-made catastrophes, including hurricanes, earthquakes, floods, cyberattacks, pandemics, and more.

Our exceptional science, technology, and more than 300 catastrophe risk models help (re)insurers and other organizations evaluate and manage the risks of natural and man-made disasters. Leaders can address the risks of tomorrow with the Intelligent Risk Platform's collaborative applications and unified analytics that can power risk management excellence across organizations and industries.

Today's risk professionals trust Moody's to help them manage and navigate the risks of natural and man-made catastrophes.



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