Mo.net Financial Modelling Platform
Navigating the Implementation of VM-22 with Mo.net

June 2025
Revision 4

Purpose

This datasheet explores the requirements of the new VM-22 regulations for non-variable annuities in the US, and the implications for financial modelling teams and the tools & models they use. Finally, it outlines how the needs of VM-22 can be comprehensively delivered using the Mo.net Financial Modelling Platform.

Background

The U.S. insurance landscape continues to evolve under principle-based reserving (PBR), and at the forefront of this evolution is VM-22—a game-changing regulation governing statutory reserves for non-variable annuities. As of 2025, VM-22 is now the mandatory reserving standard for many fixed annuity products, replacing long-standing, formulaic rules with a more dynamic, risk-sensitive framework, similar to those now in place elsewhere around the world.

What is VM-22?

VM-22 is part of the NAIC's Valuation Manual, which defines how insurers calculate statutory reserves in the United States. Specifically, VM-22 governs reserves for non-variable annuity products, including:

- Fixed deferred annuities
- Immediate income annuities (SPIAs)
- Fixed indexed annuities (FIAs)
- Market value adjusted annuities (MVAs)

VM-22 introduces a principle-based approach to reserving. Rather than relying on fixed assumptions and standardised tables, insurers must now model projected

future cash flows under both deterministic and stochastic scenarios using company-specific experience and prudent assumptions.

The reserve is set as the maximum of three components:

1. Net Premium Reserve (NPR) – A prescribed formula-based floor.
2. Deterministic Reserve (DR) – A single best-estimate scenario.
3. Stochastic Reserve (SR) – A Conditional Tail Expectation (CTE) based on 1,000 economic scenarios.

Why the Change?

The shift to VM-22 is part of a broader move towards Principle-Based Reserving (PBR), which aims to align reserves more closely with actual risks and product features, encourage innovation in product design, replace rigid formulas with company-specific models and assumptions, and improve consistency across insurers.

What Does VM-22 Replace?

Prior to VM-22, annuity reserves were determined using several outdated or limited methodologies. These included:

Actuarial Guideline 33 (AG 33)

This approach was used for deferred fixed annuities and relied on a formula-based Standard Scenario Reserve (SSR) method. However, it had notable limitations, as it did not adequately reflect real-world policyholder behaviour or investment risks.

Actuarial Guideline 43 (AG 43)

This method was used primarily for variable annuities, though it still applies to some non-fixed components. It introduced stochastic modelling for certain guarantees, marking a significant evolution in reserve methodology. Elements of this approach remain relevant today, as some concepts in VM-22—such as Conditional Tail Expectation (CTE) stochastic reserves—are adapted from AG 43

CARVM (Commissioners' Annuity Reserve Valuation Method)

This approach was used for deferred annuities and required the use of minimum guaranteed interest rates along with prescribed mortality tables. However, it often led to reserves that were either overly conservative or inconsistent, limiting its effectiveness in accurately reflecting underlying risks.

Prescribed Interest Rates and Mortality Tables under the SVL

These were standard tables (e.g. 2001 CSO) and maximum interest rates, often out of sync with actual experience.

While effective in simpler times, these legacy approaches failed to accommodate modern, complex annuity products or reflect economic realities like interest rate volatility, dynamic policyholder behaviour, and optionality in product features.

Financial Modelling Implications of VM-22

From a financial Modelling perspective, VM-22 significantly raises the bar. It not only increases model sophistication, but also requires deeper integration between actuarial, risk, finance, and IT functions.

Increased Model Complexity

The days of simple formulaic reserves are over. VM-22 requires models to simulate policy-level cash flows across decades-long horizons, capturing real-world assumptions for:

- Lapse and withdrawal behaviour
- Optional benefit utilisation
- Expense loads
- Investment income and reinvestment spreads
- Contract guarantees and dynamic hedging strategies (e.g. for FIAs)

This complexity drives the need for more advanced financial modelling platforms with scalable compute.

Stochastic Modelling at Scale

A cornerstone of VM-22 is the Stochastic Reserve (SR), calculated as the CTE 70 of the worst 30% of reserve outcomes across 1,000 interest rate scenarios. This is a serious computational burden.

Insurers must therefore invest in:

- High-performance computing (HPC) infrastructure
- Cloud-based modelling environments (e.g. Azure, AWS, etc)
- Efficient job orchestration and model run scheduling

Stochastic Modelling is not just for variable annuities - it's a core requirement for statutory compliance.

Data-Driven Assumption Setting

VM-22 encourages insurers to use company-specific assumptions, supported by experience studies. This means:

- More granular data collection and quality control
- Centralised assumption management systems
- Annual review and governance process for assumptions like mortality, lapse, and expenses

In short, assumption modelling becomes a dynamic process, subject to internal justification and regulatory scrutiny.

Model Governance and Change Management

VM-22 requires insurers to maintain audit-ready documentation of:

- Model methodology and structure
- Assumptions and justifications
- Version control and change logs
- Results and reconciliations

This places a premium on model governance frameworks and encourages integration of actuarial models into broader enterprise risk management processes.

Impact on Financial Reporting

While VM-22 governs statutory reserves, its implications ripple into:

- GAAP earnings (through DAC and reserve movement)
- IFRS 17 liabilities (for global firms)
- Forecasting and capital planning
- RBC calculations and ALM strategies

Actuarial models need to feed into multiple financial views, and results must be interpretable by finance and risk stakeholders, not just actuaries.

Delivering VM-22 with the Mo.net Platform

To meet the requirements of VM-22, a financial modelling system must be capable of much more than traditional statutory reserve calculations. It needs to handle sophisticated, scalable, and auditable modelling across a wide range of scenarios and product features. The Mo.net Financial Modelling Platform already delivers best-in-class capability against each of these requirements having been successfully used for similar reporting regimes across the rest of world.

Cash Flow Projection Capabilities

At the heart of Mo.net is a policy-level modelling engine which can support in-force and new business projections for a vast array for policy features – such as surrender charges, guaranteed income riders, MVA, etc.

Mo.net can easily cope with long duration policies in excess of 40 years, typical of those required for deferred annuities, and if required handle the mismatches in timing between cash inflows and outflows. Mo.net models can also be developed to handle both fixed rate and indexed crediting strategies (e.g. point-to-point, averaging).

Scenario-Based Modelling

Mo.net can support the development of both Deterministic Reserve (DR) and Stochastic Reserve (SR) models, all within the same project. Deterministic models typically provide a single best-estimate economic scenario, using prudent assumptions.

These models are then easily extended by developing a stochastic wrapper to support thousands of economic scenarios (including interest rate paths) required to calculate the CTE 70 (Conditional Tail Expectation) of reserve shortfalls while also providing functionality for the calibration, validation, and reproducibility of scenarios.

Mo.net also provides integration points with a range of industry-standard Economic Scenario Generators (ESG).

Assumption Framework

Mo.net includes assumption management functionality designed to cater for a variety of different assumptions at different levels of granularity. Assumptions can be separated by product type, cohort, or policyholder class, and grouped together in different bases for different types of runs.

Mo.net includes a range of functionality and sample models allowing clients to perform their own internal experience analysis investigations or use industry standard tables with / without margins for prudence.

Many clients have successfully used Mo.net as part of their investment income and reinvestment strategies by developing solutions to model asset cash flows and yields in line with liability projections.

Computational Scalability

While Mo.net is inherently fast due to its modern, highly optimised and lightweight kernel, the computing needs of VM-22 for large insurers may necessitate the use of high performance computing (HPC) techniques. Mo.net includes its own scalable workload distribution capability designed for running numerous stochastic scenarios in parallel but also provides a native connector to Microsoft HPC Pack running on premise, in the cloud, or in a hybrid environment (for example to provide burst capacity on demand).

Operational runs can be optimised by the use of the Operational Modelling Centre, which provides smart job scheduling and checkpointing to manage long durations runs.

Data Handling

Mo.net provides fully integrated data integration & transformation functionality without leaving the platform. Data can be sourced from a range of policy admin systems, valuation platforms, and investment databases, which can be deployed in different technologies. Data validation and cleansing steps can easily be developed to address incomplete or missing data, with intelligent defaults or interpolations as required. Any changes to data can be logged to a variety of targets to maintain a full audit trail of data lineage.

Enterprise Integration

Mo.net offers market-leading integration with the rest of the insurance enterprise technology stack. It provides native connectivity to up and downstream systems & data stores used for financial reporting, ALM, RBC, and other activities. Results can be written to a variety of file formats (text, Excel, JSON, etc) or industry standard database / warehouse environments (SQL Server or Oracle) running on premise or in the cloud.

Governance and Control

The Mo.net platform provides a fully governed end-to-end modelling environment. Model development is governed via the use of connectors to industry-standard source code control platforms (TFS, DevOps, Git, etc). These connectors provide strict model version control and change management over all modelling artefacts. Operational controls are provided by the Operational Modelling Centre providing full logging & auditing of inputs, assumptions, model versions, and output, and access controls over artefacts / system.

The Mo.net Identity Service offers role-based access to models, assumptions, and results, and can optionally be linked to Active Directory.

The Mo.net Documentation Service provides embedded documentation for model logic, formulas, and assumptions, and generates readable output for regulators and auditors.

Reporting and Analysis

Mo.net allows clients to develop their own customised output specific to their specific needs. In terms of VM-22, output can be developed to provide the breakdown of results, including the separation of NPR, DR, and SR calculations, and the analysis of change by period.

Developing sensitivity analysis and stress testing to investigate materiality and the impact on reserve levels with Mo.net is simple. Assumptions shocks and interest rate stresses can easily be modelled with a few lines of additional code.

Furthermore, using Mo.net's integration potential, results can be presented in dashboards or rich interactive visualisations using tools such as Power BI, Qlik, or Tableau).

Conclusion

VM-22 marks a significant leap forward in the modernisation of annuity reserving. By replacing outdated, static rules with dynamic, model-based approaches, it creates a closer alignment between economic reality, policyholder behaviour, and statutory reserves.

For modelling teams, the message is clear: VM-22 is not just a regulatory exercise—it's a strategic modelling transformation, and Mo.net is well-placed to meet all the requirements of VM-22 today. Those who invest early in robust platforms such as Mo.net will not only meet compliance but also gain competitive advantage in pricing, capital optimisation, and financial transparency.

Contact Us

For more information regarding the Mo.net platform and how it can help you meet the needs of VM-22 or any other regulatory framework, please get in touch:

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