

# Mo.net

## Introducing the Mo.net Platform



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### What is Mo.net?

Mo.net is an award-winning, service-oriented financial modelling platform which harnesses the latest technology to allow organisations to radically improve their actuarial and risk management modelling capabilities. It provides a comprehensive, powerful and cost-effective platform, designed to meet all current and emerging end-to-end insurance modelling & calculation needs.

Mo.net offers unrivalled levels of speed, scalability, flexibility and enterprise integration due to its modern, open, loosely-coupled architecture. Mo.net allows users to develop their own bespoke models using a core set of high performance, extensible building blocks & components to reflect the features of their specific insurance products and business needs.

Models & calculations can then be deployed for use by a multitude of business applications – from front-office new business illustrations, through core actuarial & risk reporting activities, and into back-office policy administration calculations, as illustrated in Figure 1.

### Product Vision

Our vision is simple - to provide a single calculation engine for the entire life insurance enterprise, by offering a platform which is:

- Faster - quicker to develop, deploy and run
- Better - more controlled, flexible, accessible, scalable
- Cheaper - low cost of ownership / operation
- Integrated - reusable, accessible, portable
- Controlled – access & audit, change management, versioning

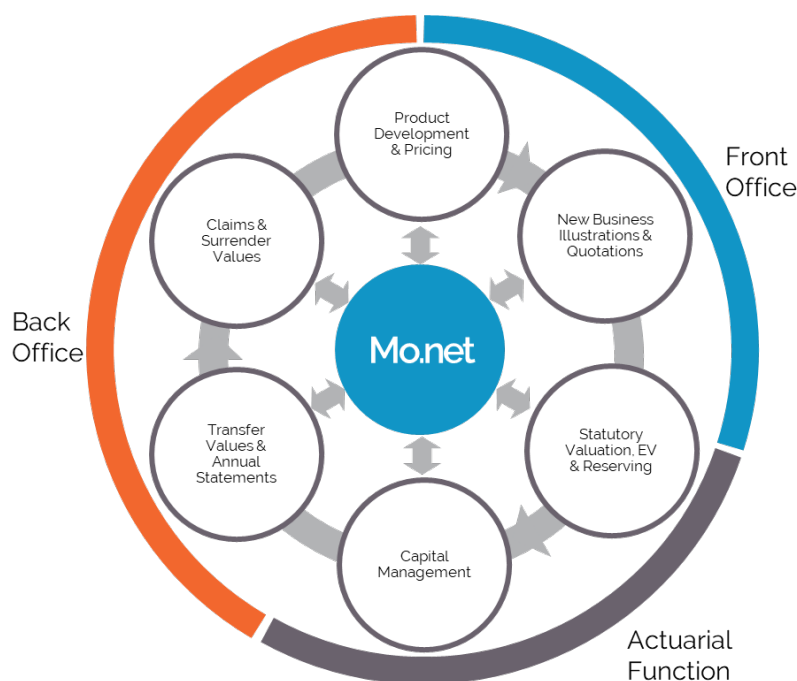


Figure 1 - Supporting the Insurance Product Lifecycle

## Platform Overview

The Mo.net platform is comprised of a range of complementary tools and services designed to meet the needs of a range of different user groups and business applications. Product components are now deliberately segregated between model development, development & operational governance, delivery to production and enterprise consumption activities.

Figure 2 summarises the latest components of the Mo.net platform.

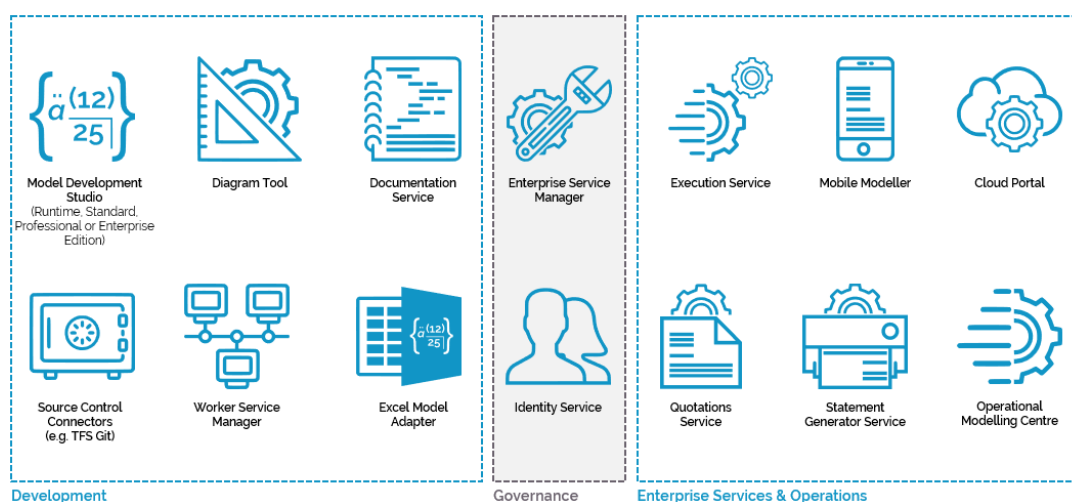


Figure 2 - The Mo.net Platform

## Model Development Studio

The Mo.net Model Development Studio provides a huge array of features & functionality to streamline the process of developing & testing flexible, scalable and performant financial models for a range of business applications. The development environment allows models to be integrated with a range of data sources / targets, external libraries and reporting solutions. It also provides a host of debugging features to ensure models do what they are supposed to, as efficiently as possible.

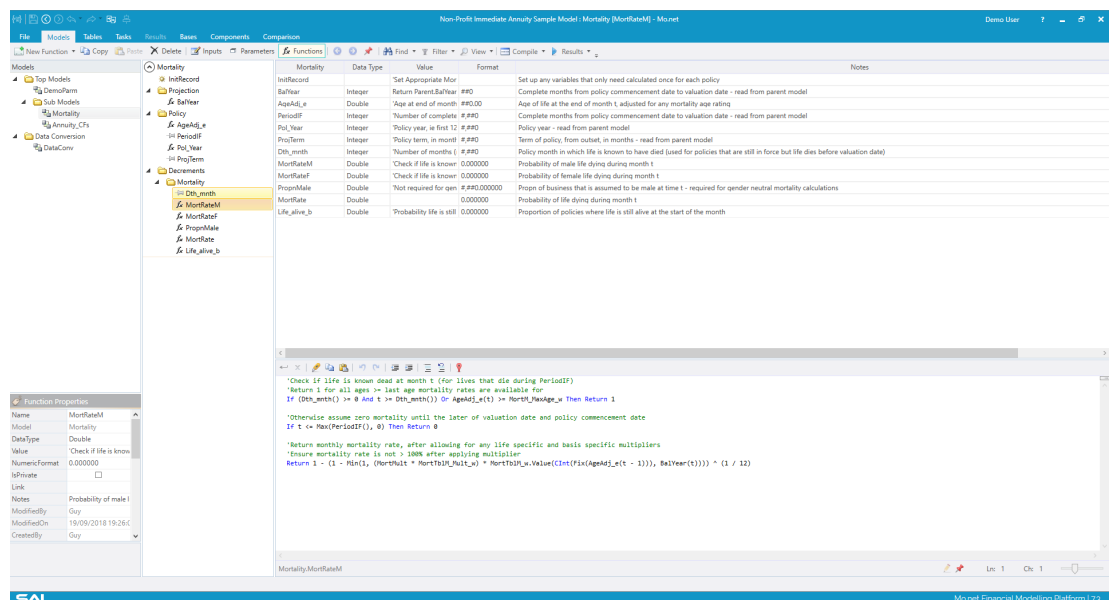


Figure 3 - Mo.net Model Development Studio

## Team Collaboration Service

To ensure that models are developed and changed in a fully controlled environment, the Mo.net Model Development Studio integrates with industry standard source code control providers – currently TFS Git, Visual Studio Team Services and Mercurial. This allows models to be developed in a collaborative / team-based environment with parallel branches of code being isolated from one another before being brought together ready for testing. The integration also allows models to be subject to continuous integration and testing, which can significantly increase development / testing agility.

The key features of Mo.net's source control functionality are free for lone developers to use without an additional licence. To enable the full collaborative potential of Mo.net source control, one of the additional connectors available within the Team Collaboration Service must be installed. This enables multiple users to work simultaneously on a single Mo.net project and share their changes with each other.

## Legacy Data Connectivity

To help customers who wish to migrate to Mo.net from existing first-generation modelling platforms and take advantage of a wider variety of data sources, we continue to extend the data integration capability of Mo.net. In addition to traditional connectivity to text files, Excel workbooks, and Access, SQL Server & Oracle database environments, Mo.net provides integration with legacy data sources, such as FoxPro, allowing models to be migrated without necessarily requiring data sources or targets to be changed. We've also made the process of writing output to database environments far easier, without having to write a line of code.

## Sample Models

While Mo.net's unrivalled ease of use allows new clients to quickly develop their own modelling solutions from scratch, many customers like to get up and running as quickly as possible. To help we offer a rapidly-expanding selection of basic model templates that cover a range of territory-specific products, features, projections, and regulatory requirements. These templates enable an accelerated implementation of modelling solutions for product pricing, regulatory reporting, decision support, ALM and risk management. For some applications it may simply be a case of attaching the template to existing policy and assumption data sources. The templates also offer a reference point for developers wishing to develop best practice modelling techniques.

The following sample projects are available to all licensed users of the Mo.net platform and to those undergoing a product trial. Most project templates are now available directly from within Mo.net Model Development Studio. The remaining projects can be downloaded from the Download Centre.

- Term Insurance
- Conventional Life Products
- Conventional Life Products with IFRS 17 Features
- Non-Profit Immediate Annuity
- Unit-Linked Endowment Assurance
- Unit-Linked Savings
- Credit Life
- Takaful Model
- Funeral Plan

An extended range of premium model and country-specific templates are available through our model development partners.

## IFRS Assess Enterprise

IFRS Assess Enterprise is an accelerator tool that helps insurers understand the impact of IFRS 17 on their business. Powered by Mo.net, it provides unrivalled governance, audit capability and performance to support operational reporting and deliver on IFRS 17 requirements (see figure 4). The tool ensures that implementation of any required changes is effective, efficient and avoids excessive implementation costs, reducing overall project risk. IFRS Assess can be configured for both the General Measurement Model (GMM) and Variable Fee (VFA) approaches and provides valuable insights to actuarial teams affected by the regulatory changes.

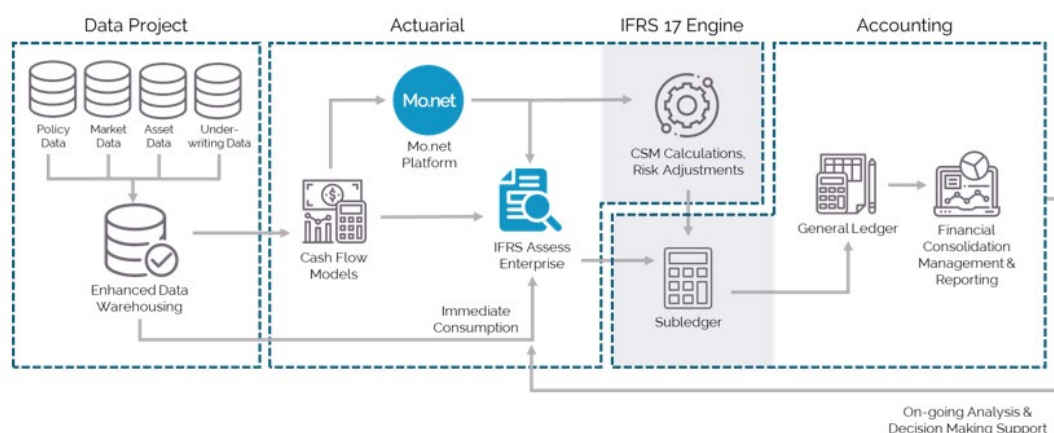


Figure 4 – IFRS 17 End-to-End Processing

## Documentation Service

Actuarial models have traditionally been developed by actuaries for actuaries, without regard for the processes and governance that are commonplace in the IT industry. This often leaves complex models with little or no associated documentation, either in terms of requirements, specifications or implementation references. This can make models difficult to support or change, and often increases reliance on key personnel who are familiar with how models were intended to work - usually the original developers.

With the regulatory agenda continuing to demand increasing evidence of good quality, appropriate and up-to-date model documentation, there is a clear need to help customers develop a body of documentation for their critical business models. The Mo.net Documentation Service can be used by model developers, testers, auditors and users to create a baseline set of technical documentation from an existing modelling project. The document set will have a structure that is consistent with the model itself, include diagrams to aid with understanding of project structure, and will be populated with key attributes from the modelling project, allowing retrospective requirements to be added later.

Similarly, any differences between two versions of the same model can also be documented, which provides a robust set of evidence to satisfy model governance, change control & audit requirements.



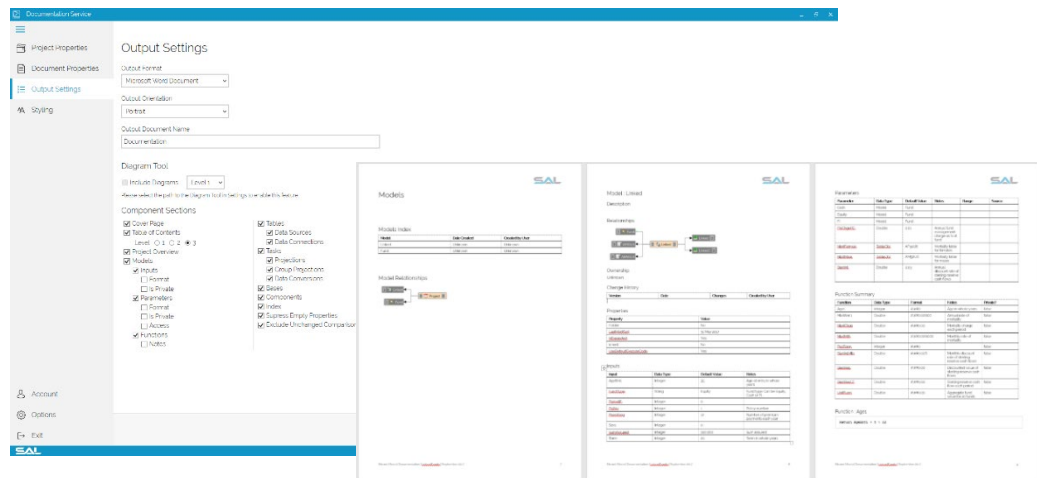


Figure 5 - Mo.net Documentation Service and Sample Output

## Worker Service & Worker Service Manager

We offer a range of tools to allow the configuration, control & monitoring of Mo.net Worker Services. The Worker Service Manager can be used to manage distributed modelling clusters from a central console. Users can configure how parallel projections are run on one or more nodes (worker PCs); define the machines on which the projection will run; specify how many workers are created on each node and what debug information is produced. The Worker Service Manager also allows the Worker Service to be remotely installed, started, stopped, and uninstalled, subject to appropriate permissions.

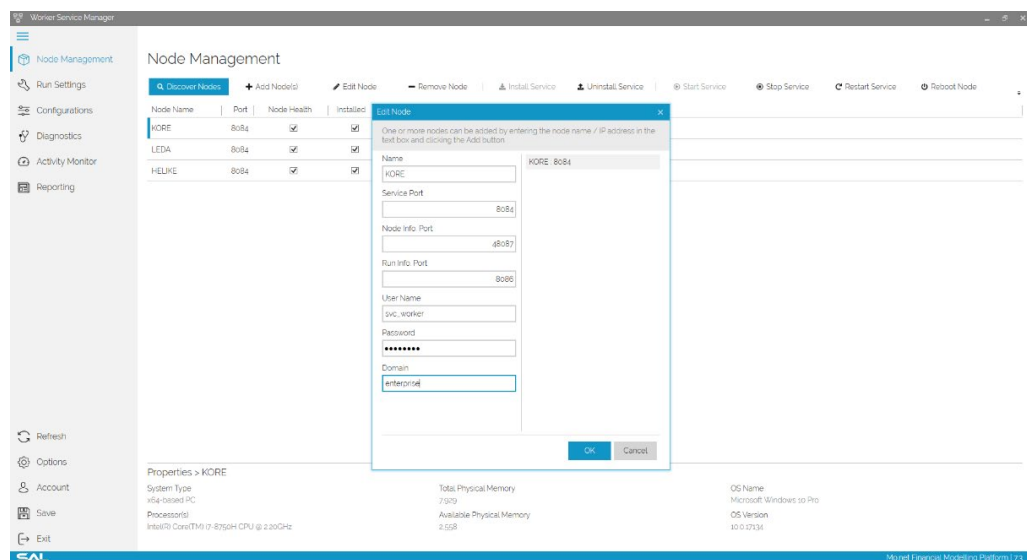


Figure 6 - Mo.net Worker Service Manager

## Excel Model Adapter

Developed for actuarial, finance & risk functions, the Excel Model Adapter (EMA) transforms any end-user developed spreadsheet application into a fully operational model. The EMA can be used across the entire insurance enterprise and will be available in two editions.

EMA Analyse provides comprehensive analysis of any Microsoft Excel workbook content, regardless of its size, complexity, and features. EMA Analyse is run without a Mo.net license, meaning anyone can explore the risks within their solutions and generate powerful insights.

EMA Migrate transforms any end-user developed spreadsheet application into a fully operational model by converting all elements of the source workbook into corresponding & clearly segregated Mo.net components. Once migrated, the project

then benefits from the other best-in-class features of the Mo.net platform, such as control, performance, transparency, flexibility and enterprise integration.

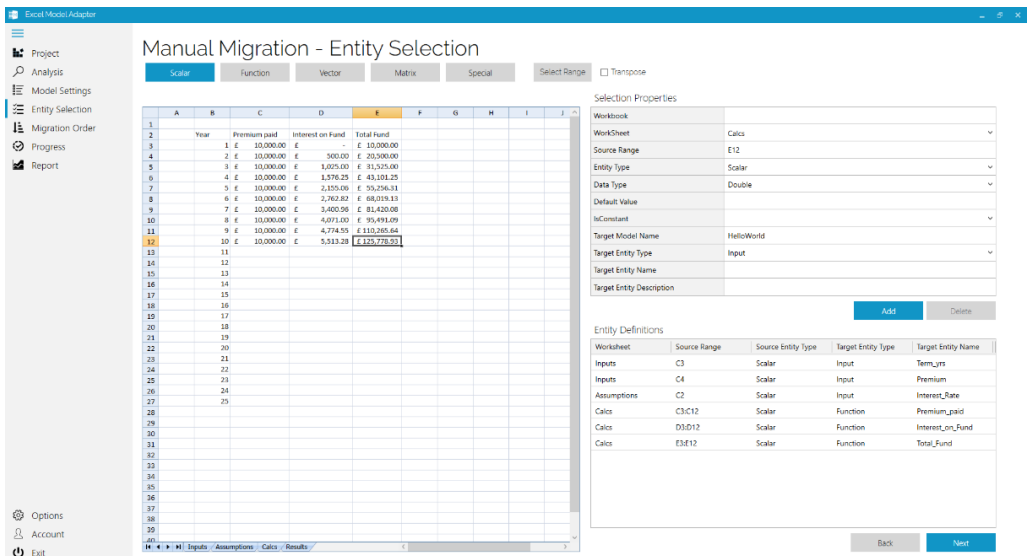


Figure 7 - Using EMA to convert a spreadsheet model to Mo.net interactively

## Identity Service & Identity Service Manager

The first generation of financial modelling platforms were released into an environment where strict governance and control were provided on a best-efforts basis, and where there was little to differentiate development and production users or environments. Since then, the risk modelling landscape has changed dramatically - regulatory and corporate governance now require strict control over every element of the financial reporting machinery. Unfortunately, while the modelling platforms have evolved to offer increased calculation sophistication, the features associated with security, governance and control have remained largely unchanged. The Mo.net Identity Service and Mo.net Identity Service Manager components are designed to specifically address this shortcoming, and offer industry-leading capability in this space.

The Mo.net Identity Service allows the components & features of the Mo.net platform to be controlled via role-based permissions. These roles can optionally be linked to Active Directory, allowing access to be centrally managed by corporate user management.

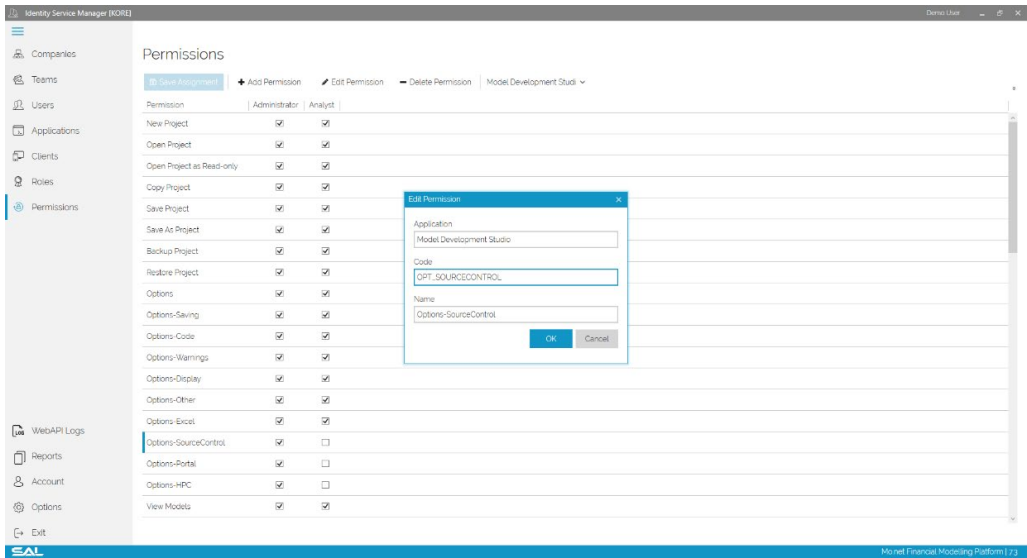


Figure 8 - Mo.net Identity Service Manager



In addition to managing permissions with Mo.net Model Development Studio, Mo.net Identity Service also provides granular event logging back to a central datastore. These events, which capture who has done what across the Mo.net platform, can also be exposed to upstream service management / security monitoring tools.

## Enterprise Services & Enterprise Service Manager

The loosely coupled, open architecture of Mo.net, together with the modest footprint of most models, provides the possibility of properly segregating model development from model operational. Rather than using model development platforms for operational use, with the inherent risks of accidental or malicious model change, we now offer dedicated solutions to support the needs of the different user communities. Our Enterprise Services & Tools allow compiled models to be published to Quotations and / or Execution Services and consumed using a rich API by one or more client applications, either on demand or in batch.

### Quotations Service

The Mo.net Quotations Service enables you to perform individual insurance quotations or illustration calculations from a range of client systems & devices. It allows user-developed models to be consumed on demand (policy-by-policy) and synchronously by a number of consumer applications – typically customer / IFA-facing websites, mobile applications or back-office administration systems. The service implementation allows for native workload distribution across many cores, to meet any scalability / bandwidth considerations, and also includes built-in load-balancing functionality through an associated router service to ensure a responsive service to consumer applications.

In addition, the Mo.net Quotations Service natively supports requests and responses using the Origo messaging format. This allows a consistent message structure to be used across a range of connected services, from calculation request & processing to document production & policy administration.

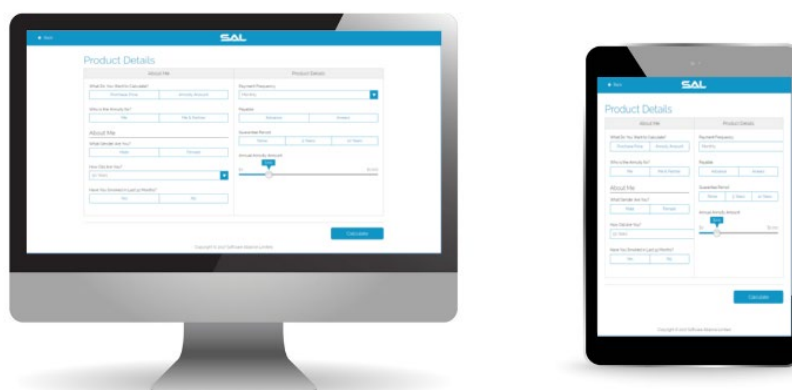


Figure 9 - Calling the Quotations Service from a Web Application

### Execution Service

The Mo.net Execution Service enables any model that has been published to be consumed by any batch-oriented client application. This allows large blocks of business or complete portfolios to be modelled asynchronously. A typical application of the Execution Service might be to generate a set of customer-facing annual statements as part of an overnight batch.

### Enterprise Service Manager

Enterprise Service Manager is designed to manage and monitor workloads across the Mo.net Enterprise Service components. The Enterprise Service Manager provides visibility of all service requests / transactions, whilst also allowing administrators to add

new models to the service catalogue, without having to change the client applications directly. Furthermore, any calculation service request can be loaded back into the Mo.net Model Development Studio for further analysis / review.

Package	Projection	Model Version	Data Version	Client	Client ID	Status	Start Time	Duration (mm:ss)
Conventional Products Sample Model	PricingTask_Serial_Service	1.0.4.16	1	Demo Web Quotations	1	Succeeded	19/11/2018 11:51:01	00:00:00.015066
Conventional Products Sample Model	PricingTask_Serial_Service	1.0.4.16	1	Demo Web Quotations	1	Succeeded	19/11/2018 11:51:57	00:00:00.009027
Non-Profit Immediate Annuity Sample M	PricingTask_Service	1.0.6.18	1	Postman	192.168.1.102	Succeeded	19/11/2018 11:51:31	00:00:00.020926
Non-Profit Immediate Annuity Sample M	PricingTask_Service	1.0.6.18	1	Demo Web Quotations	1	Succeeded	19/11/2018 11:49:41	00:00:00.018671
Non-Profit Immediate Annuity Sample M	PricingTask_Service	1.0.6.18	1	Demo Web Quotations	1	Succeeded	19/11/2018 11:49:16	00:00:00.015375

Figure 10 - Monitoring Quotation Requests using Mo.net Enterprise Service Manager

### Mobile Modeller & Statement Generator Service

The speed, portability and versatility of the Mo.net platform allows models previously trapped inside the actuarial function to be consumed elsewhere in the insurance enterprise, or even by customers / agents in the outside world.

The Mobile Modeller smartphone app is designed to illustrate how existing models can be consumed by a range of devices supporting a variety of potential applications. Whether you want to provide customers with pre-sale quotations / illustrations, or real-time access to claim / surrender values of existing policies, the app can be coupled to any existing or planned Mo.net model. Furthermore, the look & feel can be tailored to your own specific brand requirements.

The latest version of Mobile Modeller includes a preview of a new component we are calling the Statement Generator Service. This allows inputs / results from any request to the Quotation (or Execution) Service to be rendered as a printable PDF quotation or statement and provided directly to a customer or intermediary.

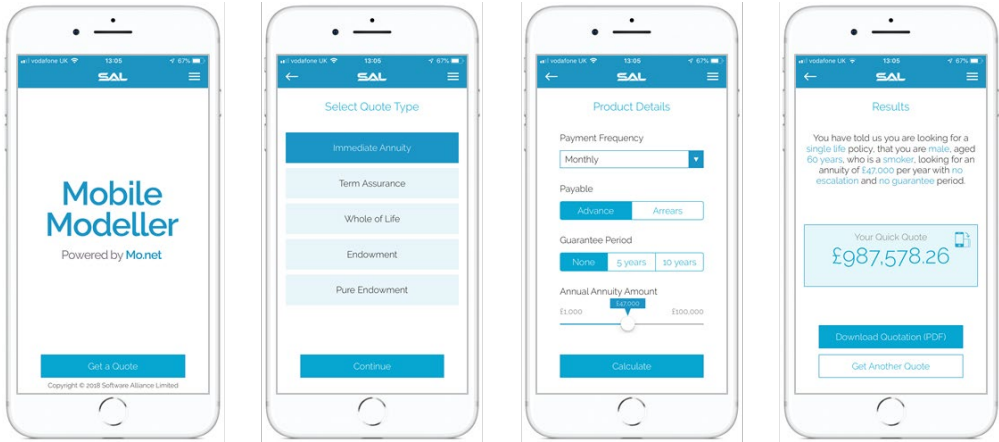


Figure 11 - Using the Mobile Modeller App to Generate a Quotation

## Operational Modelling Centre

Financial modelling platforms have traditionally supported the needs of two diverse user communities – model developers and operational model users. While the needs of the development community are well met, the existing / emerging governance, control, performance and audit requirements of the operational user groups are less satisfied by the existing “bimodal” solutions. These requirements are currently met (in part) by creating processes & procedures, and in some cases wrapper technologies, to artificially limit the way in which the model development platform can be used in an operational context. However, most of these processes are still susceptible to accidental or deliberate failure, such as a model user accidentally changing the code for a production model.

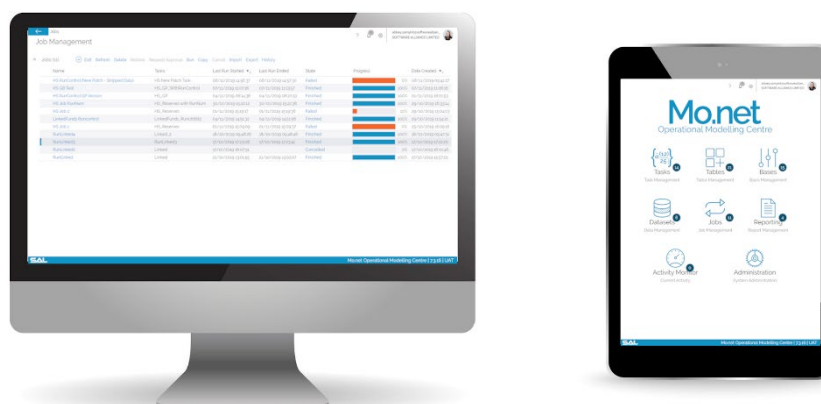


Figure 12 - The Mo.net Operational Modelling Centre

The Operational Modelling Centre is specifically designed to meet the operational modelling needs of all sizes of financial reporting enterprise. Combining a wealth of features to enable robust yet flexible governance & operation of all operational modelling activities, the Operational Modelling Centre ensures you are in control of your modelling environment at all times. Designed to operate in on and off-premise environments, from a range of devices, the web-based interface means that modelling operations are no longer confined to the actuarial desktop.

## Further Information

For more information regarding the Mo.net Financial Modelling Platform and to discuss your specific modelling requirements, please contact us.

Software Alliance Limited  
30 Stamford Street, London, SE1 9LQ  
Tel: +44 (0) 20 3964 2755  
[www.softwarealliance.net](http://www.softwarealliance.net)

Author: Guy Shepherd

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