



# PROPHET GI CAPITAL MODELING LIBRARY

Flexible and transparent capital modeling

## Overview

At the heart of SunGard's Prophet GI financial modeling solution is the Prophet GI Capital Modeling Library, containing the actuarial code required for creating general/P&C insurance capital models. The code is designed to be easily understood, but more importantly, easily modifiable by actuaries to meet the exact requirements of the business, including any bespoke products or local regulatory variations.

Actuaries can quickly build, modify and extend their models using Prophet's simple code, without the need for additional coding languages or skills. And because of its transparency, managers can readily understand which factors drive certain model results.

## Key Features

- **Easy to configure** – the transparency of the code allows for rapid model development
- **Flexibility** – supports different accounting, claims modeling and asset valuation approaches
- **Comprehensive use of external data** – a wide range of asset types can be applied. Similarly, all standard economic scenario generator and catastrophe vendor model data can be used
- **Compliance** – supports global capital and reporting regimes, e.g. Solvency II, South African SAM, US GAAP and SAP, US RBC, UK ECR, UK GAAP and equivalent regimes
- **Consistency** – for insurers using Prophet for life insurance modeling, assets and economic conditions can be modeled consistently across both areas

As well as protecting the firm from shock losses and insolvency, and for regulatory compliance, effective capital modeling is recognized as fundamental to sustaining insurers' profitability and success. Insurance firms need to strike a balance between holding enough capital to help fuel growth, and for making capital work efficiently for shareholder value.

## Analysis Outputs

The Prophet GI Capital Modeling Library can create key reports, including:

- Financial statements, incl. cash flow statements, revenue accounts and balance sheet
- Capital allocation
- Capital and surplus
- Profit distributions
- Analysis of claims versus other variables
- Business plans
- Premium and claims reserves
- Business unit performance
- Risk performance, e.g. combined ratio and loss ratio

## Aggregation

The library uses a range of mathematical functions contained in a specialized Maths plugin to support various forms of aggregation, including:

- Elliptical Copulas / Correlation matrices
  - Gaussian normal
  - Student T
- Archimedean Copulas
  - Gumbel
  - Clayton
  - Frank
- Independence
- Dependence

## Core Functionality

The Prophet GI Capital Modeling Library performs the following core functions, using either Monte Carlo or Latin Hypercube simulation techniques:

### Premium Reserve

- Written and earned premiums / underwriting risk
- New business modeling including volume fluctuations
- Attritional and large claims
  - Frequency and severity, including individual large claim modeling
  - Aggregate burn cost
  - Loss ratio, including ultimate or per accident period
- Catastrophe claims (see below)
- Different claim payment patterns by claim type, e.g. attritional, large and catastrophe

### Claims Reserve/Reserve Risk

- Using reserve library data and modeling
- Modeling of ultimate claims and payment patterns

### Accounting Variables

- Premiums written and earned
- Claims incurred and paid
- Expenses
- Investment income and gains
- Foreign exchange revaluation
- Tax
- Balance sheet assets and reserves
- Annual, semi-annual, quarterly or monthly calculation time steps possible
- Multiple-basis discounted balance sheet and income statements



## Catastrophe Model Data

Catastrophe model output can be imported from:

- Internal models
- Major vendor models

## Reinsurance Functionality:

All major types of reinsurance are handled:

- Proportional/Quota Share
- Non-Proportional
  - Per risk
  - Per event e.g. CAT
  - Aggregate
  - Stop loss

Important reinsurance modeling functionality is provided:

- Reinsurer default risk
  - Probability of default and loss given default
  - Bad debt amounts
- Reinstatement premiums
- Adjustment premiums
- Stochastic payment lag
- Multiple contract layers and contract parties

## Capital and Economic Scenario Functionality

Capital modeling and economic scenario data modeling comprises:

- Capital
  - One year projected balance sheet approach (Solvency II)
    - Recognition pattern/risk emergence
    - 'Actuary in a box' re-reserving methods
      - Basic chain ladder
      - Bornhuetter Ferguson
      - Benktander
  - Ultimate projected balance sheet
- Risk margin calculations
- Time-zero balance sheet scaling
- Provision for events not in data (ENID)
- Economic Scenario Data
  - External economic scenarios using ESG providers, incl.
    - SunGard's APT
    - Barrie & Hibbert
    - Conning
    - TSM+
    - In-house providers

## Assets

Based on the Prophet Asset-Liability Strategy (ALS) library, a comprehensive range of assets can be modeled:

- Standard Assets
  - Cash
  - Bonds (fixed rate, index-linked, FRNs)
  - Equities
  - Selling and reinvestment
  - Proportional
  - New investment profile
  - Flexible valuation and reporting methods, e.g. amortised book value, purchase cost, market value and lowest values
- Enhanced Assets (ALS library asset functionality)
  - Standard Assets
  - CMO / MBS
  - Sinking funds
  - Wide range of derivatives
  - Other types of bond, e.g. callable

## Curve Fitting and Parameterization

Enhanced loss and experience parameterization functionality is included in a curve fitting module:

- Supply full sets of experience data
- Fit a number of different distributions, continuous or discrete
- Select the parts of the data to include or exclude; ignore outlier values, fit to just a specific section of the data, e.g. just the tail, over the 75th percentile
- Provide a number of goodness of fit statistics to assess appropriateness
- Show graphical fits, including P-P and Q-Q plots, CDF plots
- Supply a set of moments to fit to as opposed to a full dataset
- Integrated directly with the capital modeling solution



## Prophet GI Capital Modeling Components

The Prophet GI Capital Modeling Library is integrated with other core Prophet components:

- Prophet Forms – providing an intuitive user interface
- Glean for experience and rate analysis, supporting users in the selection of relevant variables, and in pricing
- Prophet's data management functionality, including the Prophet Data Conversion System (DCS)

Prophet Forms is a Windows-style user interface that allows initial model assumption sets to be imported, and for sensitivity variants and scenarios to be set up.

The user can then define the settings and run the model. Queries can subsequently be executed for quick feedback, as well as reporting using spreadsheet templates, accessed within Prophet Forms.

The user can define, tailor and develop their own interface forms as required, using the Prophet Forms Designer tool and standard Prophet spreadsheet reporting templates.

Prophet Forms is fully integrated with the Prophet software platform, which provides additional extensions and optimizations for results aggregation, as well as other mathematical/statistical capabilities.

Further, results can be imported into Prophet's results database and used to create business intelligence reports for actuaries, risk managers and senior executives.

