



The Actuarial Profession

making financial sense of the future

Modelling with PillarOne Risk Management Meets Open Source

Markus Stricker and Stefan Kunz, Intuitive Collaboration
GIRO 2009, Edinburgh

PillarOne

- Driven by a community with dedicated resources – **open source**
- An **Enterprise software suite** for actuarial applications, e.g. reserving, risk modeling/management and pricing/profit testing
- A **community** which encourages the exchange of concepts, methods and implementations around enterprise risk management



The diagram illustrates the PillarOne ecosystem. At the top is a gold oval labeled 'Software Platform'. Below it is a grey rectangular box containing the 'pillar 1' logo, where 'pillar' is in a script font and '1' is a large red numeral. Underneath the logo is the tagline 'Risk Management meets Open Source'. To the right of the logo are three vertical bars of varying heights, with a large white arrow pointing downwards. At the bottom is another gold oval labeled 'Community'.

Software Platform

Community

Risk Management meets Open Source

Insurance

An actuarial workbench for **reserving, risk** modelling/aggregation, ALM, reinsurance optimization, profit-testing. [More...](#)

ERM

A risk management infrastructure to consolidate all different **ERM applications** usable in a stand-alone or multi-user, client-server mode. [More...](#)

Open

Commercially supported by renowned firms, but **free to use and extend** - open source. [More...](#)

Screencasts
Reserving RiskAnalytics

Try it online!
Reserving RiskAnalytics

Download!
Reserving v1.5
RiskAnalytics v2.2

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NEWS

RiskAnalytics: New Screencasts available
15.08.2009

Latest entry on longlist by Insurance, Risk & Capital
22.05.2009

[More news...](#)

EVENTS

PillarOne - Integrationsfähige Risikomanagement-Plattform
29.09.2009 11:15 - Vienna

Two workshops at GIRO Convention 2009
07.10.2009 10:00 - Edinburgh, Scotland

[More events...](#)

BLOG

The one who shares wins
27.05.2009

Germany and France significantly increase Open Source adoption
22.05.2009

[More entries...](#)

www.pillarone.org

Reserving

Try it online!
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User Guide
Screencasts
Roadmap
Developer Guide

RiskAnalytics

Try it online!
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User Guide
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Services

Business Logic
Development
Integration
Consulting
Training
Maintenance
Agreement

Community

Join!
Forums
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News
Events
Blog
Core Team
Members

About

Vision
The open source approach
Sponsors
History of PillarOne
Technology Stack

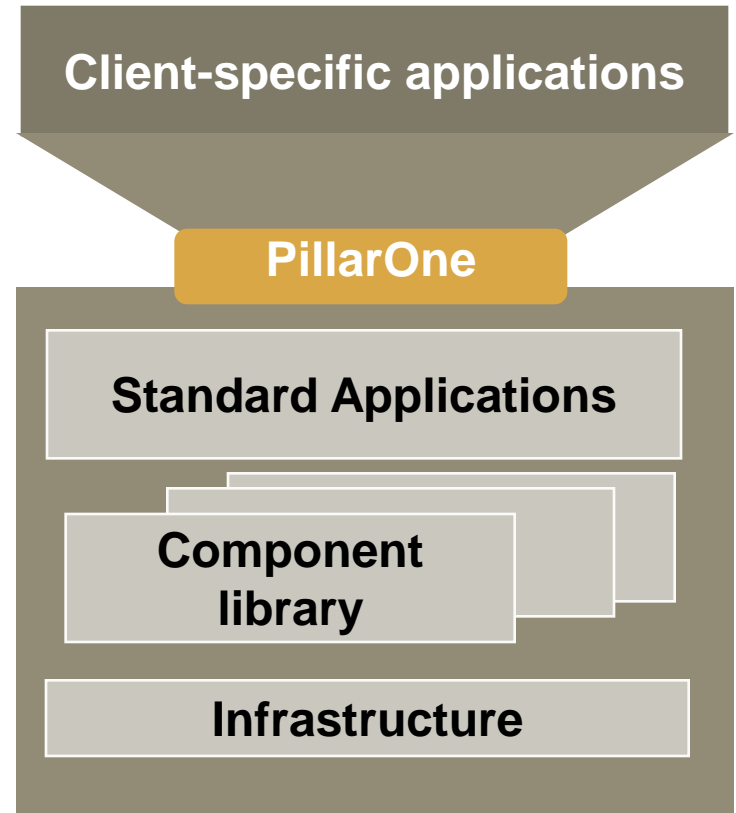
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An Actuarial Workbench

The IT challenges are the same for all market participants. The standard, economical approach is to

- To provide a common risk infrastructure as a professional, modular base for an actuarial workbench.
- To guarantee a high level of flexibility to implement company-specific models and tools



Applications/Products

- **RiskAnalytics**

Modelling environment for deterministic and stochastic models, such as risk and capital models like Solvency II, ICAS, Swiss Solvency Test, reinsurance optimization, etc. (modelling examples follow)

- **Reserving**

P&C reserving application (see Track B3)

- **Life** (in progress)

Environment for embedded value and profit testing.

IT Advantages

- Multi user, client-server and stand-alone
 - Client-server for an actuarial workbench in a company,
 - Stand-alone for consultants and evaluations
- Operational safety and audit trace
 - Includes data versioning to guarantee full reproducibility
 - Who did what and when?
- IT Integration:
 - Operating systems: Windows, Unix/Linux or Mac
 - Databases: MySQL, Oracle, MS SQL, db2, MaxDB, etc.
 - Authorization and authentication with LDAP or ActiveDirectories
 - Reporting Engines: JasperReport, Birt, Business Object, etc.

Business Advantages

- Validation
 - Automated testing of methods, components and models.
 - Validation rules for parameters.
- Simulation Engine
 - Includes support for multi-period simulations
- Libraries with re-usable business logic
 - Claims generators
 - Dependency models
 - Exposure and underwriting info
 - Reinsurance contracts
- Example models and applications

Models and Components

- A model is a collection of components
- Components can contain components → hierarchies
Examples: LoB, claims generator
- Components can send and receive more than just lists/arrays of floating point numbers
Examples: List of claims contains also claims origin, incurred date, exposure information

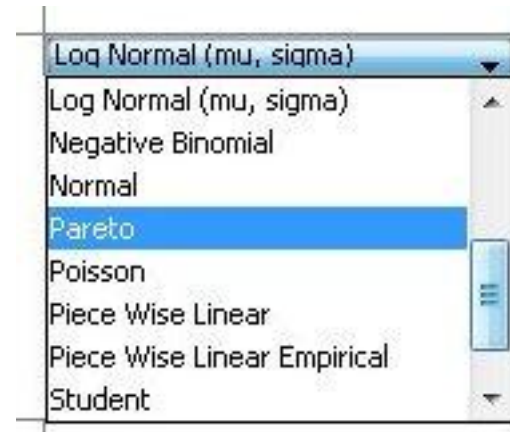
capital eagle	
[-] Motor Third Party Liability	
[+] Underwriting Information	
[-] Claims, stochastic	
[-] Single Claims Generator	
[+] Frequency	
[-] Single Claims Generator	
base	Absolute
[-] distribution	
type	Pareto
Alpha	1.416
Beta	1,000,000
[-] modification	
type	censored
minimum	1,000,000
maximum	100,000,000
[-] Attritional Claims Generator	
base	Premium Written
[+] distribution	
[+] modification	
[-] Reinsurance Program (serial, fixed)	

Components

Three different kinds of components

- Ordinary component: Captures a piece of business logic with parameters
- A placeholder for a set of components with similar properties – „chose from“

Examples: Claims distributions, the model definition will not specify which one is used. The parameterization of the model will define it.



distribution	
type	Pareto
Alpha	1.416
Beta	1,000,000

distribution	
type	Piece 'Wise Linear
support points	[[0; 1]; [0; 1]]

distribution	
type	Log Normal (mu, sigma)
mu	0
sigma	1

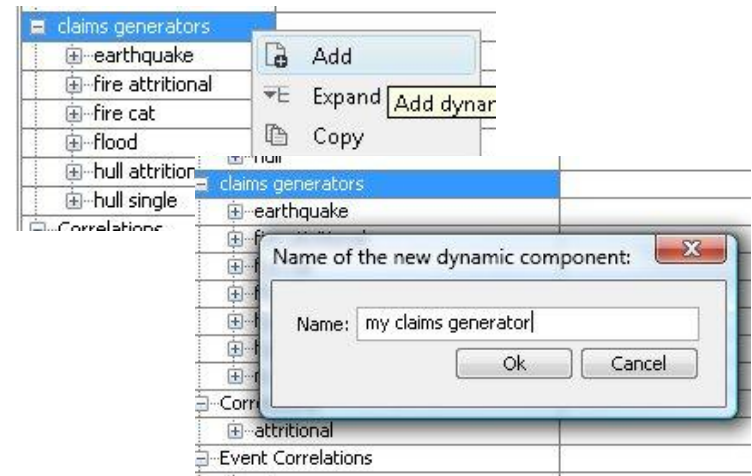
Dynamically Composed Components

Dynamically composed components contain a user or data defined number of one component* type

→ Very powerful to specify models which can be extended in a safe and controlled way by business users

Examples: If a line of business component is dynamically composed, then the user can add LoBs by just adding their data in a parametrization

* Can contain a component hierarchy



⊕ hull attritional	
⊕ hull single	
⊖ my claims generator	
⊖ claims model	
type	attritional
claims size base	Absolute
⊖ claims size distribution	
type	Constant
Constant	0
⊖ claims size modification	
type	none
⊖ associate exposure info	
type	No Allocation
underwriting information	

The Power of Typed Data

Example: Which claims are covered by a reinsurance contract?

- Claims are not just floating point numbers. They have other properties (e.g. claims type, currency, an incurred date)

[-] hull attritional	
[-] claims model	
type	attritional
claims size base	Absolute
+ claims size distribution	
+ claims size modification	
+ associate exposure info	
underwriting information	[hull]

This way, components can filter the relevant information (e.g. for claims origin)

- In a dynamic model environment strong data types are essential

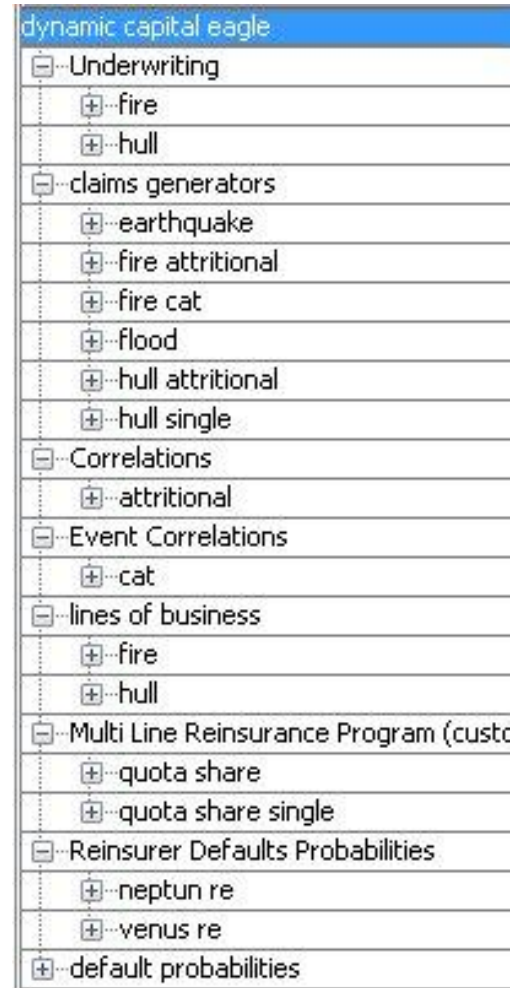
[-] quota share	
+ contract strategy	
inuring priority	0
covered lines	[hull]
Perils, Covered	[hull attritional]
Reinsurer	neptun re

Model Prototypes/Templates

The example model to demonstrate the power of dynamically composed components is Dynamic CapitalEagle.

All top-level components are dynamic:

- Underwriting
- Claims generators
- Dependency structures
- Lines of Business
- Reinsurance



RiskAnalytics – Roadmap

Fall 2009 – v 0.4

- Data driven modelling, including sample application for reinsurance modelling (as demonstrated)
- Internationalisation (GUI can be configured for any language)

Spring 2010 – v 0.5

- Components for asset modelling
- Components for reserve risk modelling, including import from PillarOne.Reserving
- Comparison of simulation results
- Commenting of parameters (collaboration support in multi-user mode)

Contact



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