



**The Actuarial Profession**

making financial sense of the future

# Implementing Audit Safe Actuarial Practices

Examples from Reserving

Markus Stricker, Intuitive Collaboration  
GIRO 2009, Edinburgh

# Challenges

More than just actuarial calculations.

The processes should be supported by tools which are:

- Operationally safe
- Efficient
- Auditable

What are the requirements of an actuarial workbench to satisfy these conditions?

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# Operational Safety <sup>(1/2)</sup>

- Who needs access to which data?
  - Authorisation of users with roles
- Avoid copy-pasting
  - Access to risk database / risk data warehouse
  - Support for data versioning
- Process support
  - Commenting data directly in the tool
  - Automatic input data locking if derived result/report exists

# Operational Safety (2/2)

- Transparency

- Complete access to all actuarial components; not just documentation, also code and test cases

- Fully testable components and models

- Automated testing to ensure upgrades don't introduce unwanted changes

# Efficiency

- **Process support**

- End-to-end support: Data integration, actuarial calculation, commenting/explaining data, reporting

- **Standard compliance**

- Use of established IT infrastructure (database, application deployment, access rights, back-up, reporting)

- **Fully testable components and models**

- Automated testing to ensure upgrades don't introduce unwanted changes

# Auditable

- All results must be fully reproducible
  - All data which is required to reproduce a result are automatically captured and saved with the result
- Who did what and when?
  - Proper use of an enterprise IT infrastructure
- Open access and fully testable
  - Not a requirement for auditability, but makes the audit process much more efficient

# PillarOne

- Driven by a community with dedicated resources – **open source**
- It is 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

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...](#)



#### Screenscasts

Reserving  
RiskAnalytics



#### Try it online!

Reserving  
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#### 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

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www.pillarone.org

#### Reserving

Try it online!  
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Developer Guide

#### RiskAnalytics

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#### About

Vision  
The open source approach  
Sponsors  
History of PillarOne  
Technology Stack

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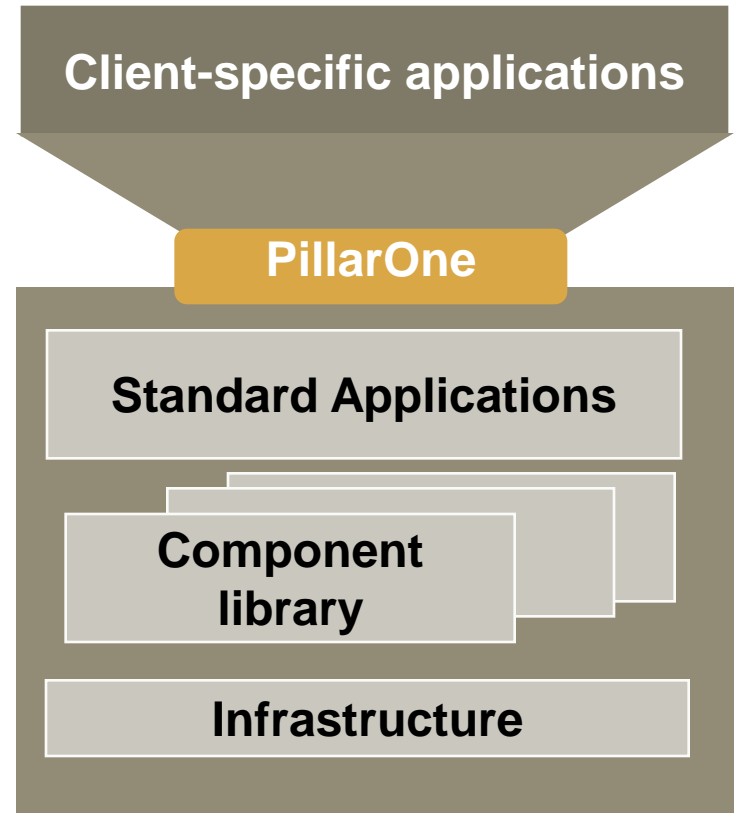
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# PillarOne – an Actuarial Workbench

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 base for an actuarial workbench.

→ To guarantee a high level of flexibility to implement company-specific models and tools



# PillarOne Applications

- **Reserving**

P&C reserving application (see following pages for feature highlights)

- **RiskAnalytics**

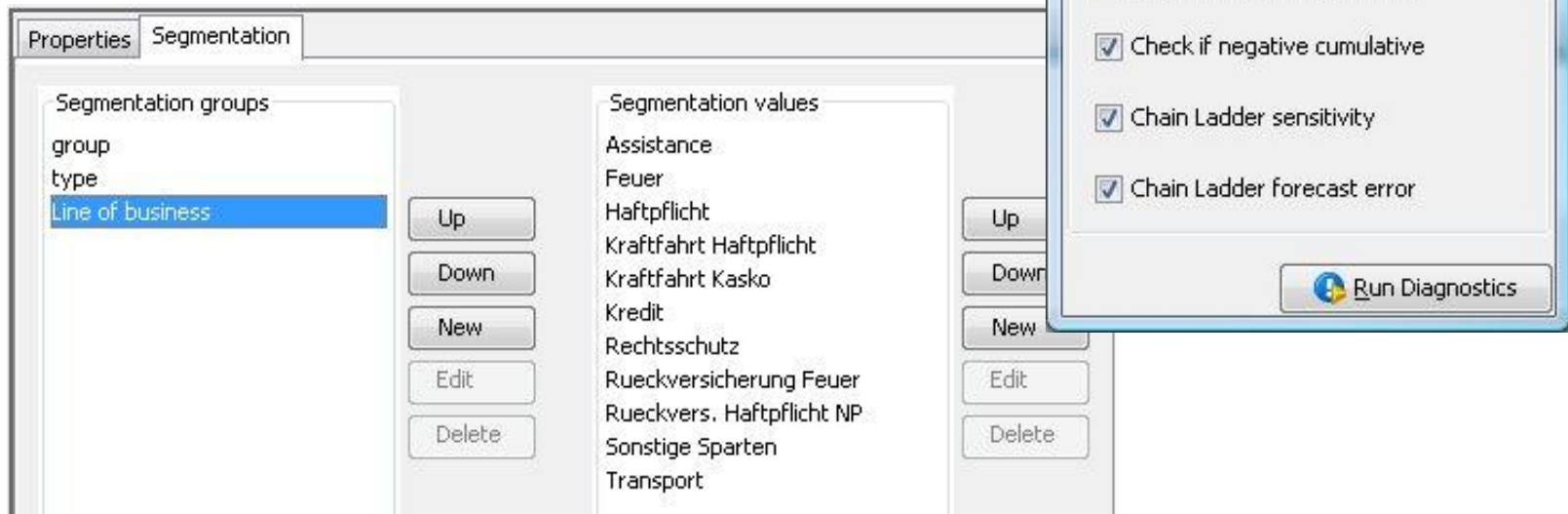
Simulation environment to build and run partial internal or internal risk and capital models (see Track E4 for features) – Solvency II, ICAS, Swiss Solvency Test, reinsurance optimization, etc.

- **Life** (in progress)

Environment for embedded value and profit testing.

# Reserving – Feature Highlights

- Custom data segmentation
  - Safety and efficiency
- Data diagnostics, extendable
  - Safety and efficiency



# Reserving – Feature Highlights

- Powerful definition of compound projections
  - Avoid copy-pasting for post- or pre-processing
  - Safety and efficiency

Create new Reserving Method

**Identifier**

Display Name

Base method **Compound by Reporting Period**

**Parameter**

Method for old periods **Compound by Reporting Period**

Green Start Date

Method for green periods

Create new Reserving Method

**Identifier**

Display Name

Base method **Compound by Reporting Period**

**Parameter**

Method for old periods **Additive Incurred**

Green Start Date

Method for green periods **Additive Incurred**

# Reserving – Feature Highlights

- Comments to support a sign-off process
  - More efficient than email with attachments, better for auditing

The screenshot displays the 'Haftpflicht - Detail' application window. It features a 'Claims paid' table with columns for years (1999-2008) and time periods (12, 24, 36, 48). The table shows cumulative values in CHF. A sidebar on the left contains a 'Navigation' pane with a tree view of data elements and a 'Comments' pane. The 'Comments' pane shows a comment for the 'Claims paid' table, dated 09.09.2009 09:20:48, stating 'Joe, this looks inflated, please check.'.

**Navigation Pane:**

- Triangles
  - Claims incurred
  - Claims paid**
- Projections
  - Claims incurred Additive
  - Claims paid Chain Ladder Uncer
  - Claims incurred Chain Ladder
  - Claims paid Additive
- Patterns
  - claims paid tail
  - claims incurred tail
- TimeSeries
  - Premium

**Comments Pane:**

in Claims paid [6;-1] from guest at 09.09.2009 09:20:48

Joe, this looks inflated, please check.

**Claims paid Table:**

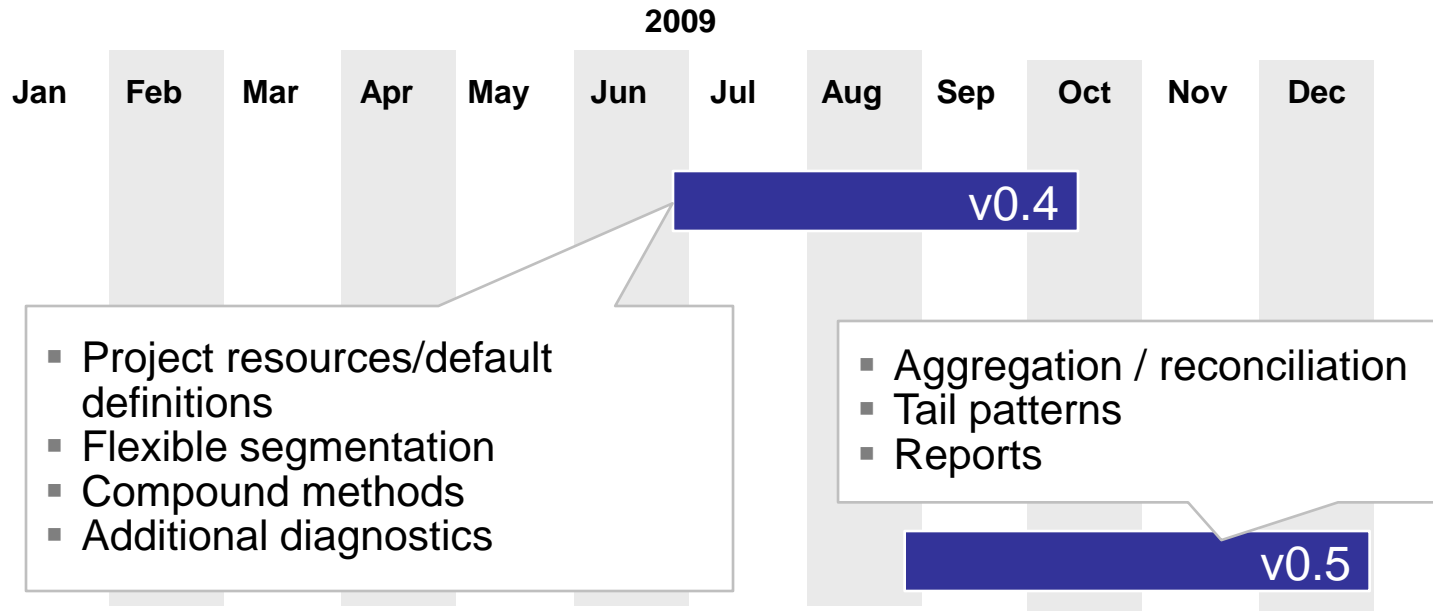
	12	24	36	48
1999	71,378.00	95,226.00	100,960.00	104,068.00
2000	73,275.00	96,461.00	101,395.00	104,490.00
2001	75,121.00	98,108.00	103,305.00	106,022.00
2002	74,202.00	96,544.00	100,089.00	102,525.00
2003	79,175.00	103,976.00	111,192.00	114,787.00
2004	78,035.00	101,887.00	107,989.00	111,302.00
2005	84,960.00	113,640.00	120,443.00	124,110.00
2006	83,475.00	109,828.00	114,727.00	
2007	78,934.00	106,142.00		
2008	77,614.00			

# Reserving – Feature Highlights

- Compare support  
→ Efficiency



# Reserving – Roadmap



# Contact

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