Life **Probabilistic** Modeling

Highly performant Python with JIT compilation and distributed computing comparable to highly optimized commercial C++ solutions.

CHALLENGES

Calculations in **pure Python** are slow. Scaling up to 1000s of CPUs.

Complex state models based on time inhomogeneous Markov chains.

Risk of failures and impaired quality of delivery.

We have successfully implemented a framework to allow the Life team of an Insurance company to perform the implementations and testing of life actuarial models, as required by regulators, in a highly streamlined and cost-effective manner.

SOLUTIONS

Dask provides **advanced parallelism** for analytics. When used for distributed calculations in Kubernetes, cluster enables to scale up to **1000s of CPUs**.

Python framework makes use of **Numba** to **accelerate calculations**.

Jenkins and Bitbucket play a key role in the **Continuous Integration** pipeline.

dask

Numba

S = Surrender; M = Matured; A = Alive; DIS = Disabled; D = Dead.

CI setup contributes to **minimizing the number of bugs and regressions** giving **confidence** when modifying the codebase.

70% ⬇ **Replacing expensive proprietary solutions** with open source software and the ability to scale computational resources on demand will allow up to **70% cost saving** after an initial transition period.

Python solution is more **accessible** and **cheaper** than custom C++ or off-the-shelf blackbox.

> " Continuous integration is very rare in actuarial modeling. Designing and implementing the CI pipeline was one of my key contributions to the project success. I also enjoyed the extensive usage of open source, cutting-edge technologies.

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