



Model Blending – Options and Advantages

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Introduction



Intro

- Cory Isaacson, CEO of reThought Insurance
- reThought is a US MGA focused on Flood
- *reThought has built an advanced ModelConvergence Platform for predictive Flood risk analytics, yielding secure, balanced portfolios and right-pricing of risk*



Model-based Underwriting



reThought ModelConvergence Approach



Right-pricing and distributing the risk

- Risk-pricing that reflects the actual risk
 - ...ensure long-term profitability for capacity providers
 - ...and meet market demand
 - ...avoid risk by pricing beyond market appetite
- Requires detailed building-level assessment
 - Risk varies greatly between buildings
 - ...even within close proximity
 - ...within a single building itself
- Distribute the portfolio to avoid concentrated aggregates
- Objective: Sustainable capacity profitability and growth

The reThought underwriting approach

- High-definition risk data
 - Identify each building by geocode
 - Find the high-risk point within the building
 - Validate all supplied building attributes with 3rd party sources
 - Calculate RCV
- Model each risk at the building/coverage level detail
- Utilize model output for pricing
 - Variable based on many factors depending on capacity appetite

Single or Multiple Views of Risk

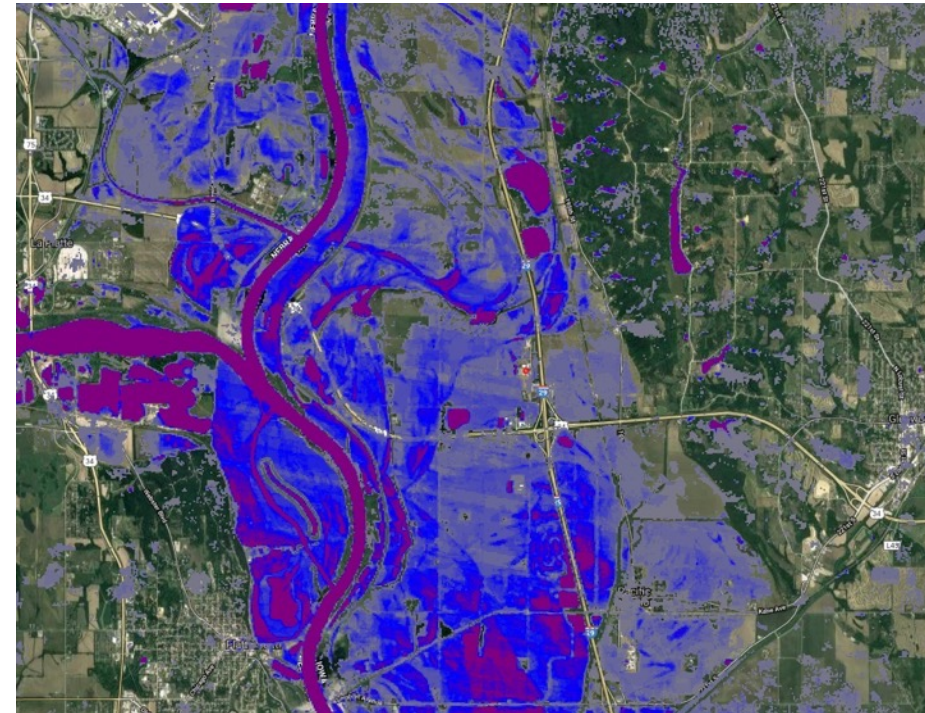


Single or Multiple Views of Risk?

- The strength of cat models is the ability to quantify the risk
- A detailed peril like Flood requires modeling each building
- Models can be very wrong...
 - Particularly on a single point/building
 - Even when supplied with the best possible input
- Using a single cat model for this level of assessment can lead to incorrect results and unpredictable losses
 - A "single-point" or score model is even riskier

Cat Models can vary widely

Model	AAL
Vendor A	\$38,956
Vendor B	\$5,859,041
Difference	150X



Multiple Views yields better results

- Select the best ensemble of models available for the peril(s) you are underwriting
- Manage the ensemble for a balanced and safe view of risk
 - Even a high-level check where models differ can be an added layer of protection
- Maintain a conservative bent
 - You never “know what you don’t know”



Multi-Model Techniques

- Model Blending
- Model Fusion



Model Blending

- Run 2 or more models
- Model Blending approaches:
 - Average AAL from each model
 - Provides equal weighting
- May be adequate from some pricing scenarios
- What about sub-models from the same vendor that relate to your risk?
 - Combining across vendor sub-models is important where appropriate
- EP curve is challenging
 - Mean per simulation year/period (AEP)
 - Rank/Sort across vendors
 - Resulting curve will be very distorted



The Problem with Model Blending

“Model blending can be dangerously misleading if it blends after aggregating and averaging. This can lead to losing detail of the uncertainty, akin to crossing a river which has deep water in the middle but on average is 3 feet deep.” (Oasis LMF documentation)



Model Fusion: The better alternative

- Model Fusion weights model samples at the source
- More computationally expensive
 - ...but results are much more meaningful
- EP Curves can be represented more faithfully

- The approach:
 - Weight the source samples as desired from each input Model
 - Sort/Rank samples for EP curve generation

Model Fusion: Challenges

- How to incorporate multiple sub-peril models from each vendor?
 - Requires deciding which sub-perils can/should combine across vendors
- Combining samples within a model vendor
- Combining samples across model vendors
- Spatial Correlation can be lost, each vendor will have its own approach for this
 - Very difficult to replicate in a realistic manner
- Even with these challenges the results can be very useful
 - Particularly at the location/coverage level for pricing individual risks

Model Weighting Strategy?

- A 50/50 (mean) weighting across models is simple enough
- However, one model may be more accurate in given scenarios than another
- How to decide on the weighting strategy?
 - Requires one or more external reference data points that you trust to determine which model is better and by how much
- reThought has developed our reAI/Flood Resilience Score for a meaningful weighting strategy
- The important point is that you should develop a philosophy and approach for proper model weighting

reThought ModelConvergence Approach





Cory Isaacson, CEO

cory.isaacson@rethoughtinsurance.com

QUESTIONS?

