

GUY CARPENTER
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Broker Overview

A Discussion With CIRCS

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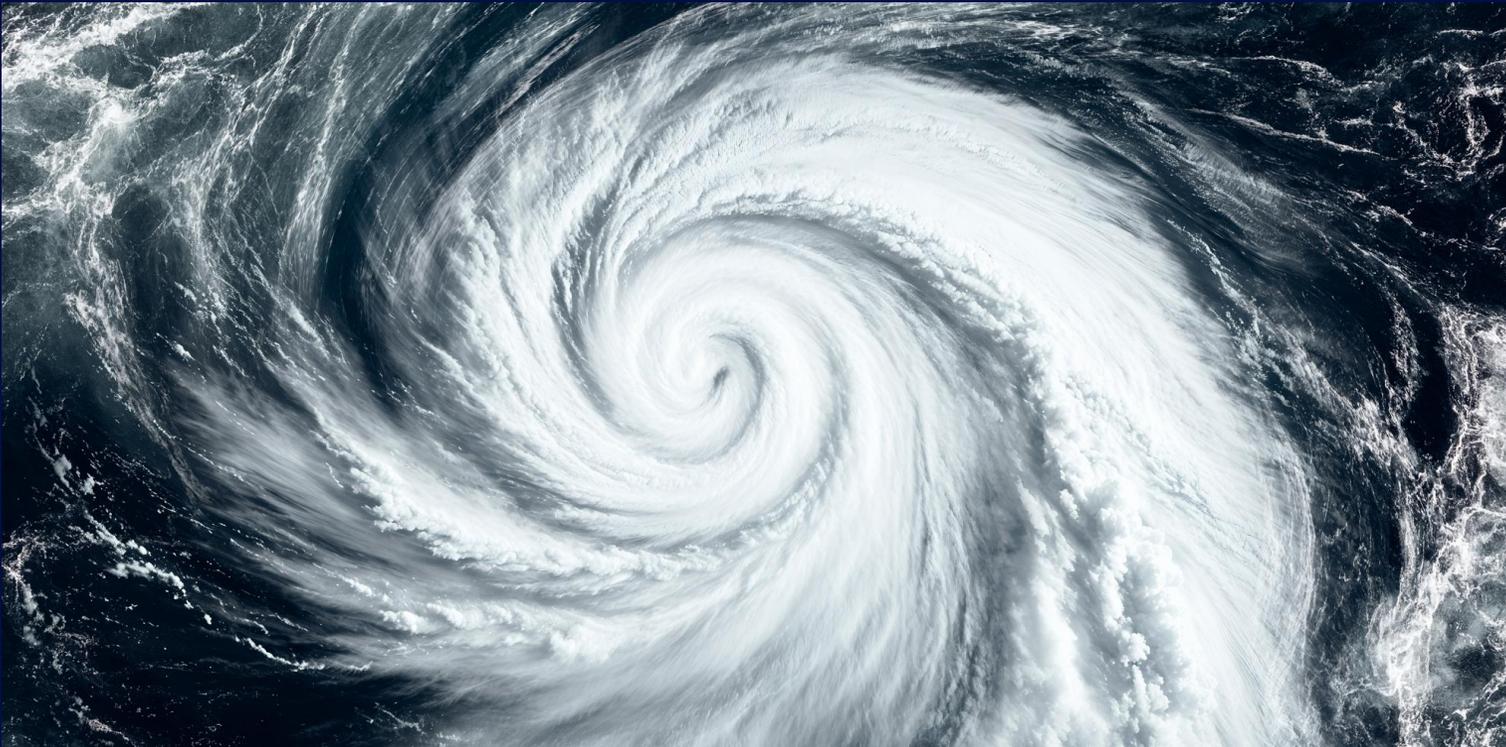
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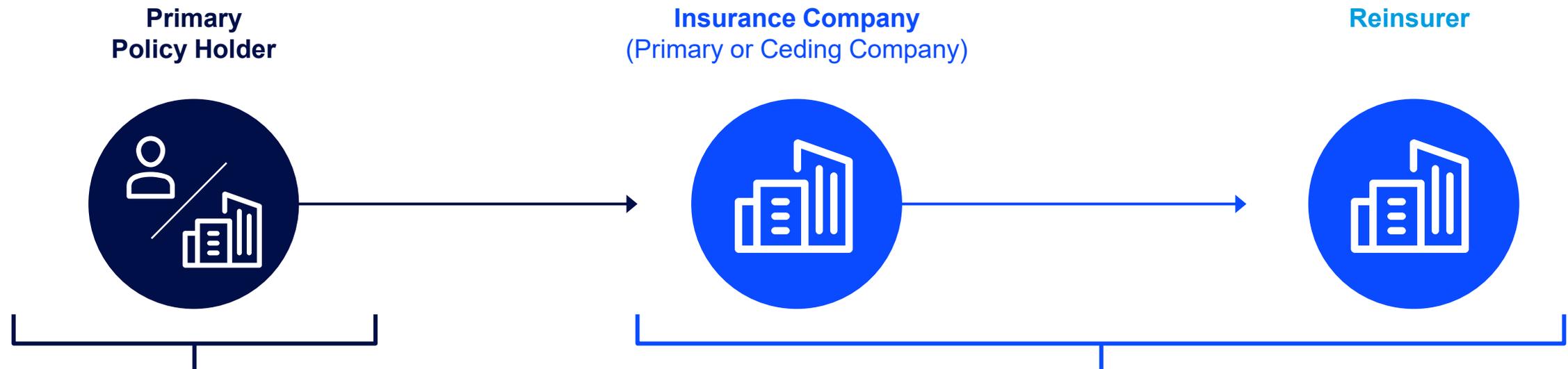
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What is Reinsurance?

Reinsurance is Insurance for Insurance Companies

An insurance company, called the **primary** or **ceding** company, passes on (cedes) portions of its liability from insurance policies issued to the public to another insurance company, known as a **reinsurer**.



Insurance

- An agreement by an insurance company to indemnify a policyholder for \$ losses above a certain amount (up to a given limit) due to some cause (weather, cyber, terror, ...).

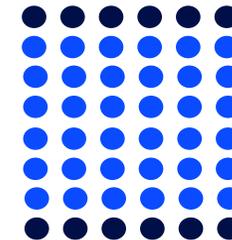
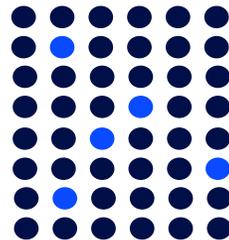
- Reinsurance is essentially a transaction between two (or more) insurance companies, where one relieves another of responsibility for losses in excess of a certain amount (usually for a fee or commission).
- Each contract is privately negotiated (usually by reinsurance intermediaries or “brokers”) and tailor-made to the specific situation
- It is a “hedge” against insurance loss

Why Do Insurance Companies Buy Reinsurance?



Attritional Losses

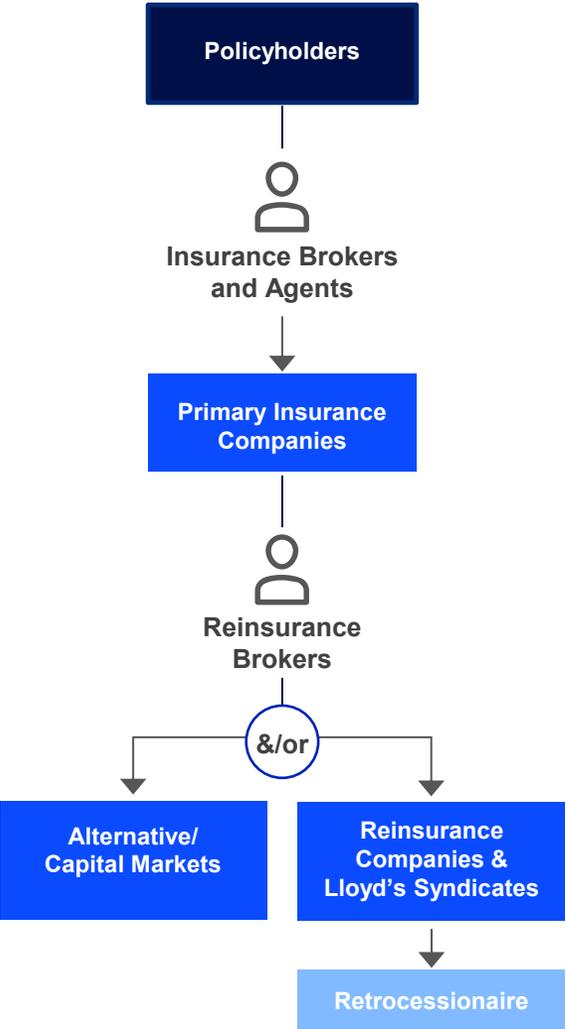
Policyholders serviced by available funds of the insurance company



Catastrophe Losses

Reinsurer pays insurer agreed funds when losses of insurer exceed agreed amount (to help service policyholders).

The Insurance Vertical – Policyholders to Retrocessionaires



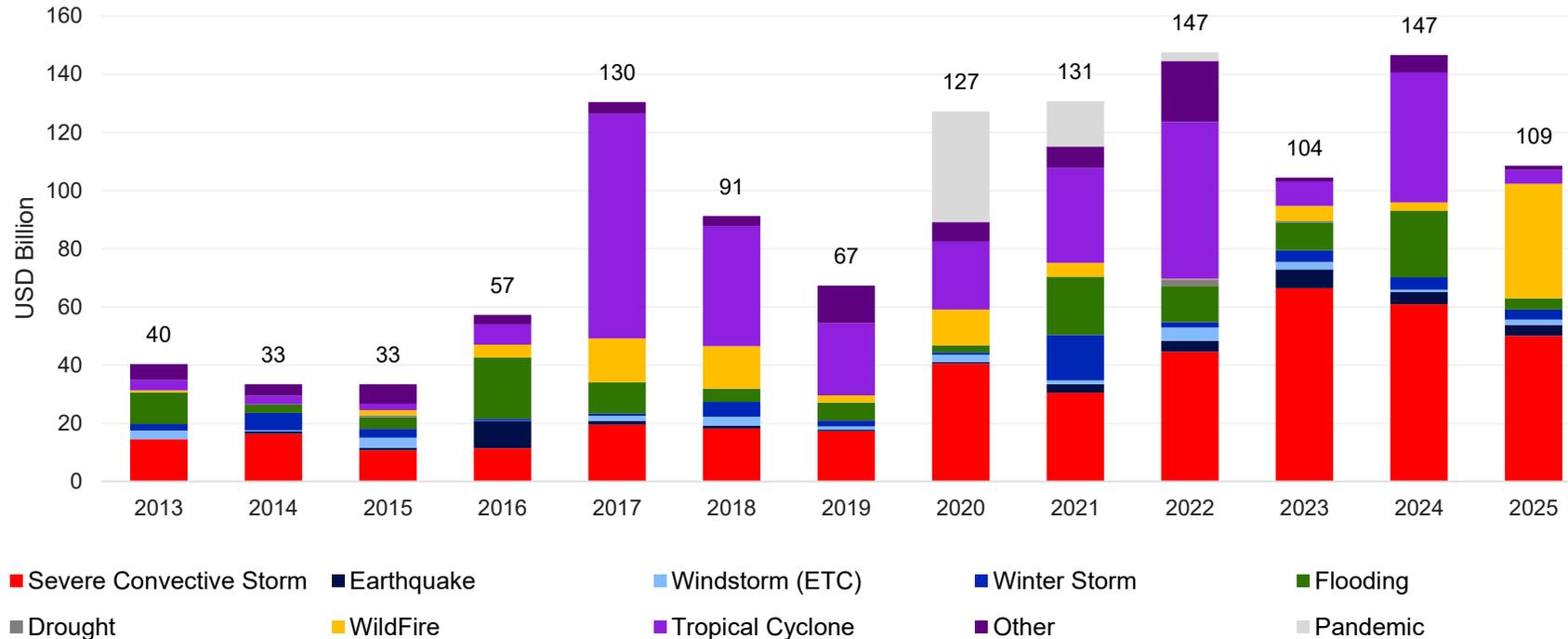
Policyholders	Individuals, businesses of all sizes and government agencies buy insurance to protect against property and/or liability losses, as well as life and health coverages.
Insurance Brokers and Agents	Brokers and agents match buyers with appropriate insurers. Many insurers also have e-business platforms and write business directly over the internet.
Primary Insurance Companies	Primary insurance companies of all shapes and sizes sell policies to the original insureds and are responsible. A company can write several lines of business (multi-line or diversified), a few or just one (specialty). An insurer can be owned by shareholders (stock) or their policyholders (mutual).
Reinsurance Brokers	Insurance companies amass portfolios of policies and, for a variety of reasons, buy reinsurance to help them manage risk. Reinsurance brokers help to put together these transactions and place them with panels of reinsurers and/or capital markets; thereby spreading risk.
Reinsurance Companies & Lloyd's Syndicates	Like primary insurers, reinsurers can write many, a few, or just one line of business. Sometimes, they are subsidiaries of primary insurers, but many times are independent companies owned by shareholders.
Alternative/Capital Markets	In recent years capital markets investors have become more active in assuming insurance related risks through insurance-linked securities and other types of transactions.
Retrocessionaire	A retrocessionaire may, in turn, assume risk (or sell an insurance policy) to a reinsurer that desires to manage its risk.

Global Insured Large Losses 2013-2025

Severe Thunderstorm Losses Escalating Over Last 5 Years



Significant Insured Losses by Peril - Global



- 2025 CA wildfire losses highest on record at ~USD 40 billion.
- US Severe Thunderstorm drives global insured losses (~43%).
- Insured losses elevated since 2017 (~USD 93 billion to 9M2025).
- Why the loss escalation?
 - Economic Factors
 - Population Growth
 - Physical Hazard Trends

How do insurance companies assess what “normal” is, for pricing, risk selection, portfolio management?

- Catastrophe Models, *one* tool to account for physically plausible but unobserved events, coupled with damage characteristics and cost: estimate *annual expected loss, probable maximum loss etc.*
- A model can only be so good as the science and engineering knowledge supporting it.
- Supplement with analysis of **claims, deterministic scenarios, spatial hazard scores.**

*Significant Insured Losses (Insured Loss estimates >\$100M), includes NFIP estimate. Figures not inflation-adjusted. Sources: PCS, PERILS, ICA, GC, Floodsmart.org, and other media sources. Russia-Ukraine conflict losses estimated by S&P Global. Updated as of February 20, 2026

What Are Catastrophe Models?



What

A tool that quantifies risk due to catastrophes such as severe convective storm, flood, wildfire, earthquakes, hurricanes, tornadoes, terrorist attacks, etc.

How

Simulate **many** physically plausible, unobserved events such that the aggregate of events gives “realistic” hazard probability
Apply **damage characteristics** to affected properties each event
Assess **how much** each event **costs**
Apply insurance/reinsurance **terms** (deductibles, limits etc.)
Aggregate the loss for all events (**expected loss**)

Why

Used in:

- Pricing
- Underwriting
- Reinsurance buying
- Regulating insurance companies
- Portfolio management

Typical Results and Definitions

Occurrence and Aggregate Exceedance Probability

Exceedance Probability	Return Period (Years)	Occurrence Loss (000)	Aggregate Loss (000)
10.0%	10	\$3,000	\$5,000
5.0%	20	\$15,000	\$22,000
2.0%	50	\$85,000	\$87,000
1.0%	100	\$200,000	\$202,000
0.5%	200	\$300,000	\$310,000
0.4%	250	\$500,000	\$520,000
0.2%	500	\$600,000	\$610,000
0.1%	1,000	\$900,000	\$910,000
Average Annual Loss			\$9,000



Occurrence Exceedance Probability (OEP)
Probability that a **single occurrence** will exceed a certain threshold



According to the **OEP curve**, there is a **1% chance each year** that the Company will see a **single occurrence causing loss of \$200M or more**



Aggregate Exceedance Probability (AEP)
Probability that **one or more occurrences** will combine in a year to exceed the threshold



According to the **AEP curve**, there is a **0.4% chance each year** that the Company's gross **aggregate losses** for the year (from one or more events) **will meet or exceed \$520M**

Do CAT Models Reflect the Current View of Risk?



No – but they still have their place, and adjustments can be made.

- Cat models calibrated to best available historical record
- Scientific knowledge used to account for physically plausible but unobserved events
- The science and engineering knowledge underlying a model will evolve
- Hurricane are typically updated every 2 years. Other perils are far less frequent
- *A model is only so good as the scientific and engineering knowledge supporting it*
- The very young state of the science for severe thunderstorm is a challenge for the insurance business
- “What is normal”, “what is the average of the worst”, “how have these changed”, “how should we expect these to change” are *all essential questions*.



Developing Clarity in View of Risk

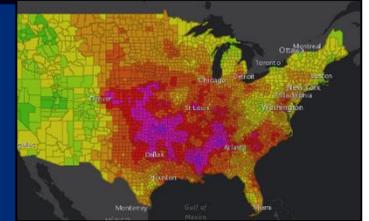
Other tools to complement the catastrophe models



Claims Experience

Valuable context shorter return periods
Limited value for tails

Hazard Layers



Valuable for accumulation analysis by
risk classification



Deterministic Scenarios

Assess peak concentrations with known
events or ring analysis

Catastrophe Models



Physically plausible & unobserved
events for tails, loss estimates

What Do We Need? – “Current View”

Can we advance our view of what “normal” and the “average of the worst” are?

- **Best view of risk today: calibrated with parent environments (CAPE/SHEAR etc.), surface observations, and statistical associations between the two.**
- **Use resimulation techniques to create physically plausible but unobserved events.**
- **Aim for a smooth-ish hazard surface with a reasonable attempt at convergence.**
- **Are there best practices we can develop for resimulating these known environments for physically plausible but unobserved events?**
- **Can we advance our knowledge of environments that would produce severe weather?**
- **Can we further advance our knowledge of surface activity relative to those environments (statistically)?**
- **Can we advance our understanding of inter- and intra-seasonal variability (and underlying physical causes)?**
- **The industry would benefit from transparent scientifically defensible, vendor independent stochastic datasets that we can use as a common reference point for decision making.**

- **Current challenges tying CAT model output, knowledge of the physical hazards, with pricing/underwriting.**
- **Hail is costing a lot of money, but we don't really know much about wind...**

What Do We Need? – “Trended/Projected View”

Can we advance our view of how “normal” and the “average of the worst” are changing?

- **Rescale hazard maps and CAT models as appropriate to account for scientifically defensible trends, noting that our view of “normal” continues to evolve...**
- **Best view of observed trends and projected trends.**
- **Trends have varied conclusions & confidence.**
- **Can we clarify these points of uncertainty (hail, tornado, ST wind)?**
- **Clarification of trends amidst variability.**
- ***Are annual and subseasonal variability changing?***

What Do We Need? : Sub-Seasonal Predictability & Live Events

How can we advance the ability of the science and the technology to tell us what just happened (or what might happen)?

- **What happened? Where? To what severity? To what margin of error?**
- **Some examples: SPC, MRMS, NOAA damage assessment toolkit, remote-sensed products, weather analysis & reanalysis datasets for analysis of SCS environments. Raw and vendor-upgraded datasets.**
- **To what extent can our understanding of real-time environments and ground-truth be advanced in live events?**
- **To what extent can we advance near-term or even sub-seasonal predictability?**
- **How much of my exposure might have been affected and to what severity? Adjuster deployment. How much might it cost (reinsurance)?**

Current –Future – Active

Essential reference points to inform our view of the underlying physical hazards, which inform our views of expected loss, probable maximum loss etc., pricing, capital and reinsurance strategy (and ability to model them)

Fundamentally enables viability of the (re) insurance industry as an essential mode of resilience

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