Cyber analytics
A multi-model approach to risk quantification

WillisRe

Cyber exposures are growing rapidly in line with increasing worldwide dependence on digital technology. This growth in exposure includes both cyber as a line of business and "silent" cyber exposure under other lines where coverage is not specified. Yet modeling of cyber risk is still in its early days. This creates a challenging environment, and in order to best manage exposures Willis Re recommends a multi-model view of cyber risk.

In order to assist clients, **Willis Re** developed the industry's first probabilistic portfolio model and has assessed multiple third party models, licensing several of these: **Cyence**, which is is a sophisticated and widely adopted model providing valuable insight on cat aggregation risk potential; **Corax**, which uses advanced risk analytics to model portfolio losses and offers the unique capability of individual risk scoring; and **RMS Cyber Solutions**, which is a new model from an industry leader in natural catastrophe modeling. These models complement our own model, **PRISM-Re**, which now has two components: **PRISM-Re Core**, whichhas the unique ability to model both attritional and systemic cyber losses probabilistically and **PRISM-Re SRDS**, which quantifies extreme tail losses using forward-looking scenarios.

|	PRISM-Re	Third Party Models		
	WillisRe	**GUIDEWIRE CYENCE**	**CORAX**	**RMS**
Attritional and cat	Yes	Yes	Yes	Yes
Affirmative and silent	Yes	Affirmative only	Affirmative only	Yes
Fully probabilistic	Yes	Yes	Yes	Yes
Deterministic RDS available	Yes	Yes	Yes	Yes
Key differentiator	Broad scope; transparency	Wide market adoption	Individual risk scoring	Established cat framework

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PRISM-Re Core is a full probabilistic model, estimating attritional and systemic losses based on the analysis of hundreds of cyber claims, tens of thousands of cyber incidents, survey results, published studies and expert opinion. Together with PRISM-Re SRDS, the model covers both affirmative and silent cyber losses.

- Modeled results representative of attritional/non-cat loss potential arising from single or systemic events.
- Flexible architecture for assumptions to be easily adapted for user-defined inputs.
- Outputs include detailed simulated results in YLTs, which can be easily integrated into any stochastic modeling platform for reinsurance optimization analysis or as part of ERM.

PRISM-Re SRDS quantifies systemic cat losses under defined Stochastic Realistic Disaster Scenarios based on portfolio exposure composition

- Complements PRISM-Re Core by forecasting PML potential under specific catastrophe scenarios arising from all sources of exposure.
- Parameterized using an extensive database of historical events and expert opinions.

GUIDEWIRE CYENCE
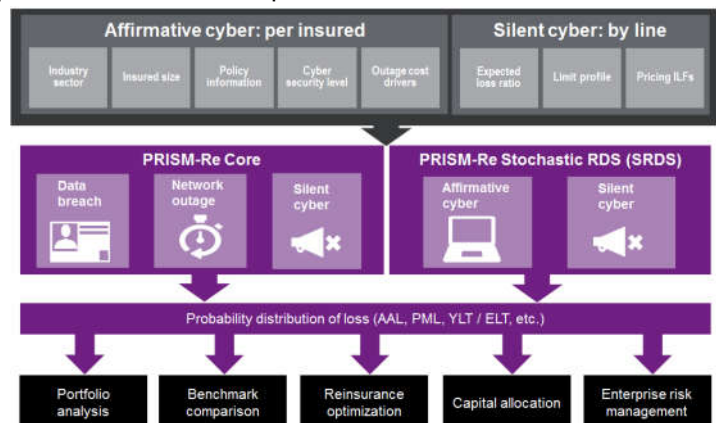
Cyence provides an outside-in threat assessment that differentiates individual risks using an external, nonintrusive approach. It boasts widespread market adoption among leading global insurers and reinsurers.

- Combines economic/risk modeling, cyber security and big data analytics to create a sophisticated cyber risk modeling platform.
- Encompasses portfolio analysis, accumulation analysis and scenario modelling capabilities.
- Strong collaborative relationships with Lloyd's, other regulators and rating agencies.

CORAX

Corax has individual policy pricing and portfolio accumulation capabilities. It leverages advanced machine learning techniques applied to exclusive third-party data sources.

- Provides a broad and transparent approach to quantifying cyber risk with the ability to stress a portfolio against catastrophic scenarios.
- Looks beyond the typical data sources, partnering with legal service firms for detailed cyber claim cost information and marketing companies for demographics on individual corporations.
- Measures the similarity of organizations within a portfolio to project widespread exposure to catastrophic cyber events for better portfolio management.
- Generates cyber "hygiene" scores for underwriting and risk selection.

RMS

RMS Cyber Solutions probabilistically models various IT cyber loss processes and silent cyber scenarios. RMS is an industry leader in natural catastrophe modeling.

- Key focuses include IT-related cyber threats and cyber physical scenarios (e.g. power blackout, property fire, and upstream energy).
- Partners with leading cyber security rating companies such as BitSight and SecurityScorecard to incorporate individual risk scores as inputs to the model.

Staying ahead of the field

The cyber landscape is evolving rapidly and **Willis Re** recognizes this requires a regular review of third party model developments in order to provide our clients with the most relevant and up to date risk quantification analysis. Likewise, we continue to update and enhance our own model, **PRISM-Re**, to ensure we stay ahead of the field.

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