



**Cyber risk modeling - an insurance industry view**

**December 2023**

**[www.cybcube.com](http://www.cybcube.com)**

## Mission

Deliver the world's leading analytics to quantify cyber risk

## History

- Founded in 2018
- Focused solely on cyber risk quantification and analytics
- Largest
  - single investment in cyber risk data and analytics
  - dedicated multi-functional team (>115)

## Market Position

- > 100 (re)insurance clients
  - 20/30 top cyber carriers
  - 9/20 top global reinsurers
- > 95% client retention rate
- > 66% of global cyber insurance premiums



## Regulatory Engagement

- Maintain active dialogues with regulators in key markets, and regularly engage on projects to develop cyber risk governance frameworks and risk management structures
- Partner with rating agencies to develop approaches to underwriting and rating cyber risk



BANK OF ENGLAND  
PRUDENTIAL REGULATION  
AUTHORITY



International  
Association  
of Insurance  
Supervisors

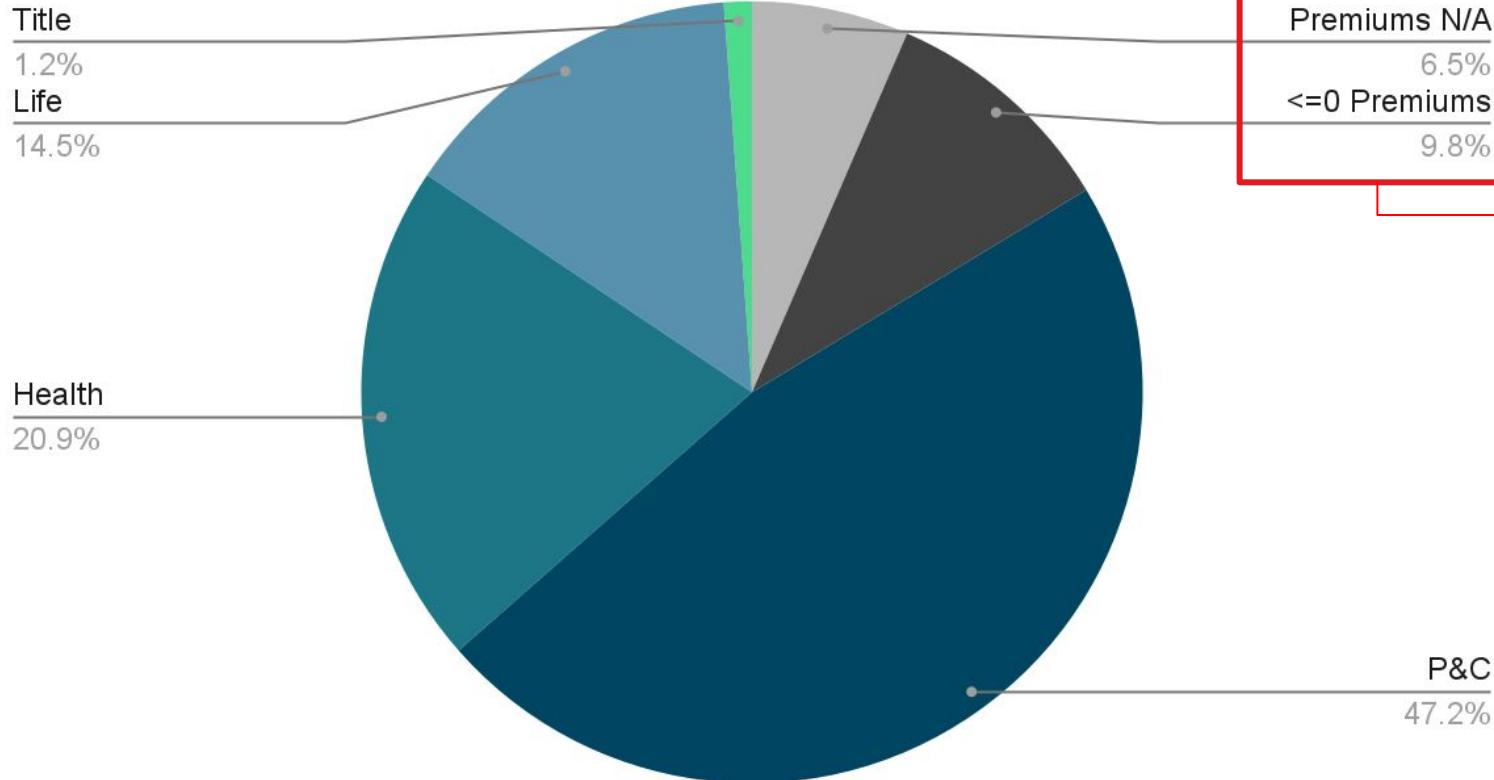
## CyberCube Solutions leveraged

- Portfolio Manager
  - SPoF scenario-class based cyber cat model
  - Quantify attritional and tail risk
- Account Manager
  - Predictive security score and risk factors



# Insurance Industry loss modeling analysis: Carrier Count by Type

## Company Count



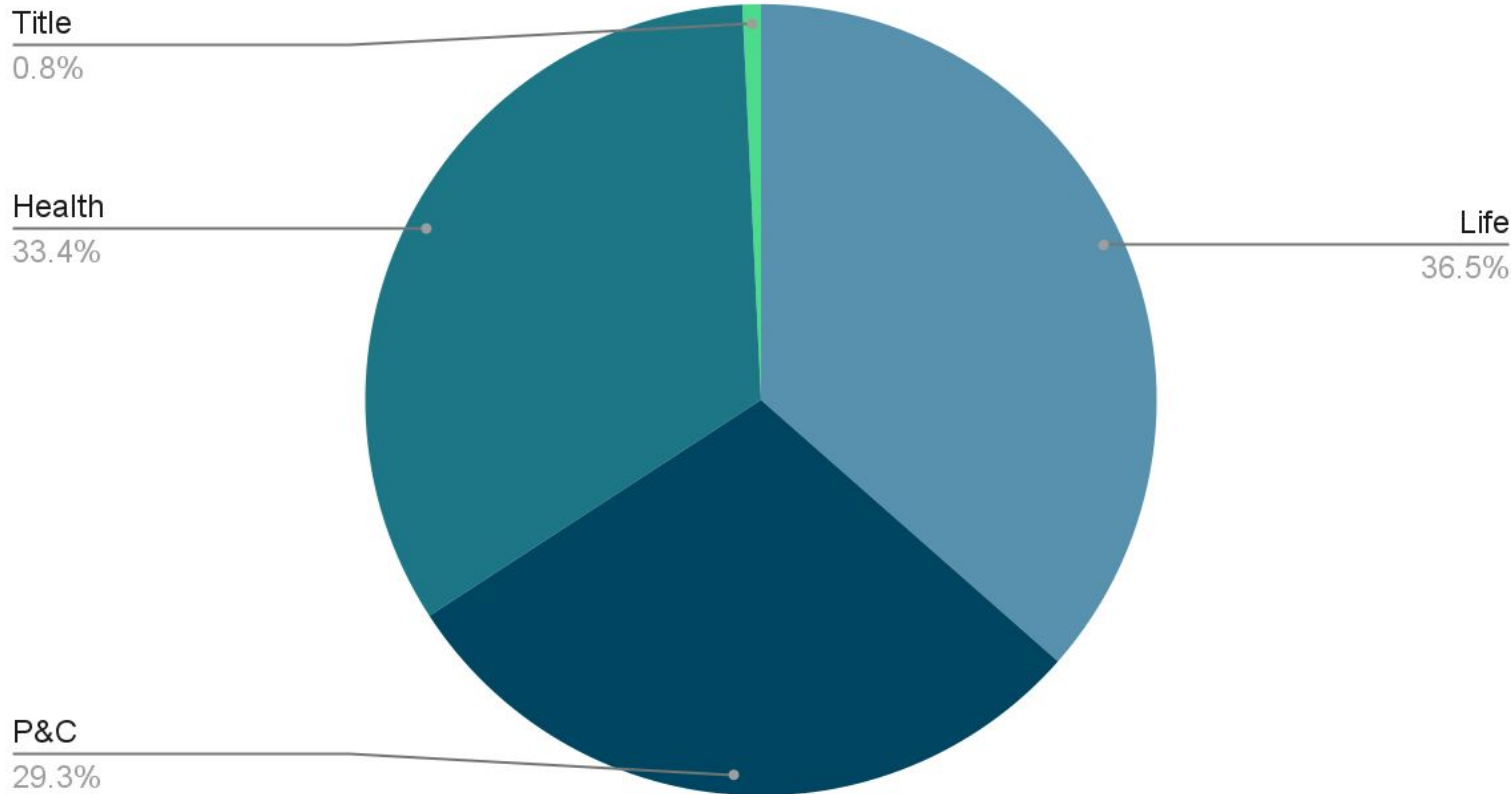
## # of Carriers by Type

- *Total* 4155
- **Excluded** 679
  
- *Subtotal* 3476
- P&C 1960
- Health 867
- Life 601
- Title 48



# Insurance Industry loss modeling analysis: 2022 Direct Written Premium by Type

## Premiums by Carrier Type



## Premiums by Carrier Type\*

- P&C \$1,055B
- Life \$967B
- Health \$848B
- Title \$21B

\*excluding N/A, Zero, Negatives



## What questions did we tackle?

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1. Which companies are most vulnerable from a security perspective?
2. Which of the insurer's technology dependencies are the vector for loss?
3. What types of events are most likely to cause losses across the insurance industry?
4. What is the financial cost of cyber attacks on the US insurance industry?
5. Which companies present the largest risks?



## Executive Summary

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1. *Which companies are most vulnerable from a security perspective?*
  - a. **Micro-sized insurers (<\$10mn premium), on average, have the weakest cyber security postures and are most vulnerable to loss**
  - b. **Large companies, on average, have the best cyber security among insurers**
  - c. **The Insurance sector, on average, is below the Financial industry average on cyber security**
2. *Which of the insurer's technology dependencies are the vector for loss?*
  - a. **Cyber attackers are most likely to access systems via shared technology dependencies such as certificate authorities, cloud service providers and content management systems**
3. *What types of events are most likely to cause losses across the insurance industry?*
  - a. **Ransomware and Data Theft are the sources of largest loss to the insurance industry**
4. *What is the financial cost of cyber attacks on the US insurance industry?*
  - a. **In any given year, the insurance industry will suffer \$434mn in losses. At the 1-in-250 return period, the insurance industry could suffer losses of \$8.3bn**
5. *Which companies present the largest risks?*
  - a. **In a breakdown of individual companies that drive the industry loss, larger insurers contribute most to the loss quantum**

# 1a. Which companies are the most *vulnerable* from a security perspective?

- CyberCube's security scores consider 45 security risk factors, including Open Ports, End-of-Life products, Unpatched software
- These top-10 vulnerable\* companies are all Micro size (<\$10mn GwP). Company names obscured below, because...
- 'Vulnerable' does not equal 'Negligent'. Cybersecurity is fast moving and requires resource. The likelihood of being attacked is a function of cybersecurity, the company's value as a target and the volume of data/assets to be stolen

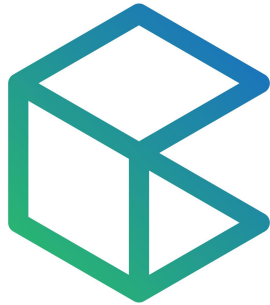
## P&C

- Superior Specialty Ins Co
- Fair
- Nev
- Unit
- Cali
- Wis
- Mid
- Pen
- Jet
- Consumer Specialties Ins



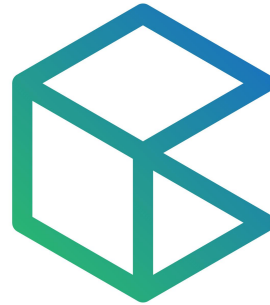
## Life

- American Mut Life Assn
- Allie
- KJZ
- Am
- Ass
- Fou
- Nati
- Wes
- Port
- Dakota Capital Life Ins Co



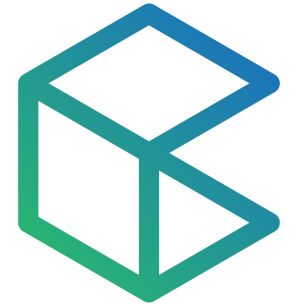
## Health

- Magna Ins Co
- Unit
- Pro
- Digi
- Opt
- Ryd
- Solk
- Mor
- Eon
- Central Mass Health LLC



## Title

- American Eagle Title Ins Co
- Nati
- Sou
- Cali
- Ape
- Title
- AHF
- ARI
- Dak
- Connecticut Title Ins Co

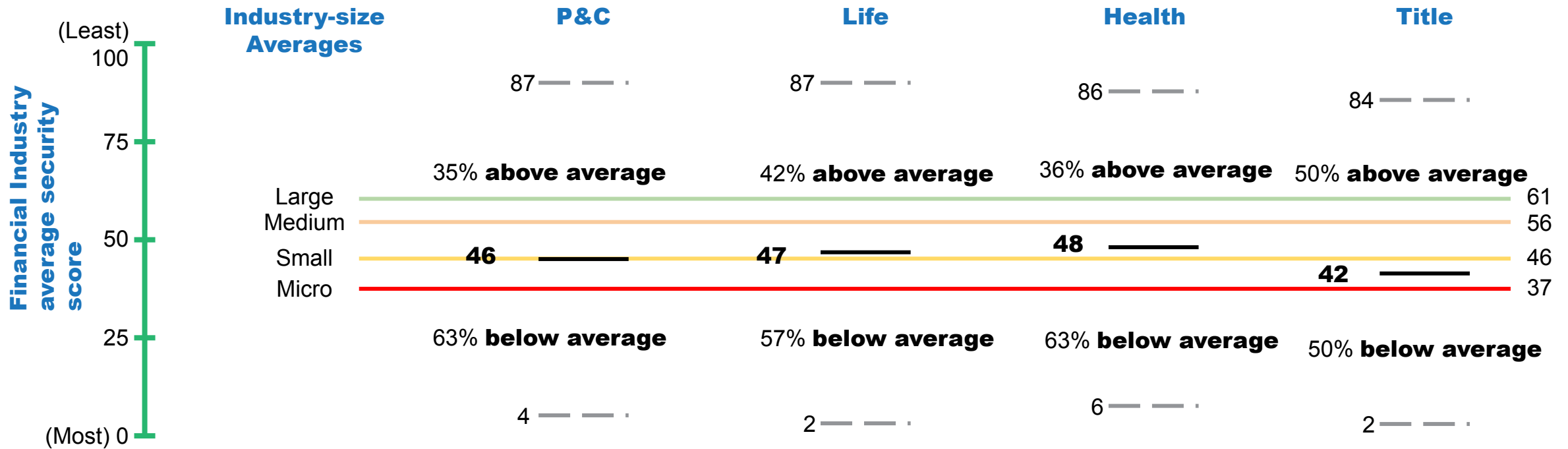


\* lowest CyberCube security scores



# 1b. Which segment is the most *vulnerable* from a security perspective?

- > CyberCube Security Score averages show *all* Financial industry companies
- > For all insurers, the averages by segment range from 42-48, therefore slightly below average Financial companies
- > For P&C and Health insurers, two-thirds are below average for all Financials
- > Life and Title insurers sit around the Financial industry average
- > Overlaying company size, Large and Medium companies have above average scores. Small are average and Micro are below average







## 2. Which of the insurer's technology dependencies are main vectors for loss?

- CyberCube loss modeling is based on Single Points of Failure (SPoF) technology dependencies that act as vectors to cause loss
- We show here the top SPoF groups for the insurance industry
- Research highlights 4 main SPoF types as vulnerabilities for attack: Certificate Authority, File sharing providers, Email services providers and Content Management Systems

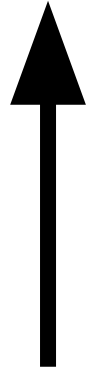
### Insurer technology dependency groups

- > **Cloud Service Provider** (Omni)
  - > AWS, Azure, Salesforce
- > **Content Delivery Network** Provider
  - > Cloudflare, Akamai, Amazon CloudFront
- > **Certificate Authority**
  - > DigiCert, Let's Encrypt, GoDaddy
- > **Cloud-based Enterprise File Sharing Provider**
  - > MS OneDrive/Azure, Google Drive, Apple iCloud
- > **Email Services Provider**
  - > MS Exchange, Gmail for Business, Zoho Mail
- > **DNS Provider**
  - > Route53, Cloudflare, GoDaddy
- > **Operating System - Server**
  - > Ubuntu, Unix, Linux
- > **Content Management System Provider**
  - > WordPress, Adobe Experience Manager, HubSpot CMS
- > **E-Commerce Platform**
  - > Shopify, Magento, Amazon



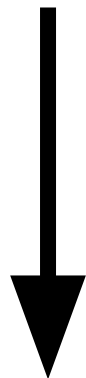
### 3. What type of event(s) can cause the largest losses to the Insurance Industry?

Five highest loss scenario classes



Loss type	SPoF exploited
Ransomware	File Sharing Provider
Data Theft	Fund Administrator
Destructive Malware	Cloud Services Provider
Ransomware	Endpoint Operating System
Data Theft	Enterprise Payroll Provider

Five lowest loss scenario classes



Loss type	SPoF exploited
Cash Theft	Financial Transaction Provider
Data Theft	E-Commerce Platform
Ransomware	Medical Device Manufacturer
Data Theft	Mobile Point of Sale Vendor
Extortion	Point of Sale Vendor



## 4. What is the financial cost of cyber attacks on the US insurance industry?

Individual Life & Health company contribution to loss is higher

Annual Probability	US Insurance Industry	P&C	Life	Health	Title
Average Annual Loss	434	120	168	142	4
2.0% or 1-in-50yr	4,267	1,167	1,738	1,387	35
1.0% or 1-in-100yr	5,782	1,585	2,458	1,896	54
0.4% or 1-in-250yr	8,284	2,077	3,642	2,735	87
0.2% or 1-in-500yr	11,501	3,101	4,917	3,876	122

Losses shown in \$millions.



# 5. Which companies drive the most losses – on average vs in a cyber catastrophe?

## P&C

### Average Annual Loss

- State Farm Auto Ins Co
- United Ins Co
- State Farm & Cas Co
- National
- Federal



### 1-in-250yr cat

- State Farm Ins Co
- United Ins Co
- State Farm Cas Co
- Nations
- **United Mobile Assn**



## Life

### Average Annual Loss

- Health Ins Co
- American Ins Co of NY
- Globe of NY
- Wysh Ins Co
- Reliar Life Ins Co



### 1-in-250yr cat

- Health Ins Co
- American Ins Co of NY
- **Wysh Life Ins Co**
- **Relianc Life Ins Co**
- **Globe Life Ins Co of NY**



## Health

### Average Annual Loss

- Pacific Health Ins Co
- Clover Health Ins Co
- Golden State Health Ins Co
- Anthem Health Ins Co
- Cigna Health Ins Co of NC Inc



### 1-in-250yr cat

- Pacific Health Ins Co
- Clover Health Ins Co
- Golden State Health Ins Co
- Anthem Health Ins Co
- Cigna Health Ins Co of NC Inc



## Title

### Average Annual Loss

- Cone Life Ins Co
- Attorn Life Ins Co
- National Life Ins Co of NY Inc
- Allian Life Ins Co Inc
- Real Life Ins Co



### 1-in-250yr cat

- Cone Life Ins Co
- **Allian Life Ins Co Inc**
- **Attorn Life Ins Co**
- **Natio Life Ins Co of NY Inc**
- **Real Life Ins Co**





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Questions?  
Email [rebeccab@cybcube.com](mailto:rebeccab@cybcube.com)



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