Institute and Faculty of Actuaries

General insurance pricing – what is next?

Dawid Kopczyk & Zvi Ebert

01 May 2024

Speaker introduction

Dawid Kopczyk

- Fellow Actuary since 2018
- Co-founder & CEO of Quantee
- Previously: Aviva, Royal London, Hannover Re
- Interesting fact: one publication in quantum physics

Zvi Ebert

- MSc Actuarial Management – Bayes Business School
- Head of Technical Excellence, Allianz Commercial
- Previously: RSA, DLG, ERS, Zego, Humn
- Interesting fact: Worked briefly as a white van man

Institute and Faculty of Actuaries

Agenda

1. Motivation
    a) Changes in data & capability
    b) Changes in customer behaviours
    c) Changes in actuarial workforce
2. What is next?
    a) Data Architecture
    b) Modelling Framework
    c) Portfolio Management
    d) Underwriting & Pricing Blend
3. Q&A

Institute and Faculty of Actuaries

Institute and Faculty of Actuaries

Motivation

01 May 2024

Data & Capability

- Data - Black Gold
  - Internal
  - Partner
  - External
  - Granularity
  - IoT – Device & Telematics
- Capability – Engine
  - On Prem/ Off Prem
  - CPU
  - Machine Power
  - Visualisation

Institute and Faculty of Actuaries

Changing Customer

- Retail
  - Consumer knowledge
  - Consumer journeys
  - Embedded Products
  - Telematics/IoT
  - Claims expectations
- Commercial
  - Customer journey/expectation
  - Flexible Risk Appetite
  - Ways of working
  - New needs

Blurring of Retail & Commercial

Regulatory Environment

Institute and Faculty of Actuaries

Changes in actuarial workforce

Demand ↑ Supply ↓

- The **demand for actuaries** is projected to **increase 24% between 2020 and 2030**[1] – that is much faster than the average profession (~5%).
- The data is based in the US, but same we can observe in globally and in the UK – for instance The Actuary Jobs, had 787 live job vacancies at the start of Q1 2023 – **a 48.5% increase on the figure at** the start of Q1 2013, which was 530[2].
- On the other hand, the **supply of actuaries is decreasing** - we can all observe that many of the potential candidates for actuarial roles 10 years ago are choosing a non-actuarial career paths for example **data science**. Particularly in senior roles, it is more and more challenging to find an employee with desired skillset.

1) https://www.bls.gov/ooh/math/actuaries.htm
2) https://www.theactuary.com/2023/03/01/take-your-pick

Institute and Faculty of Actuaries

Changes in actuarial workforce

Change in scope of tasks

- In the pricing function, increased demand for actuaries can be explained by:
  - Increasing competitors' pressure on price in GI
  - More data sources
  - Changing regulatory landscape
  - Changing market conditions (i.e. inflation)
- Pricing processes are more and more **resource heavy** with extending scopes of actuaries' responsibilities including **data science**, **coding** and even **DevOps** skills.

Institute and Faculty of Actuaries

Institute and Faculty of Actuaries

What is next?

01 May 2024

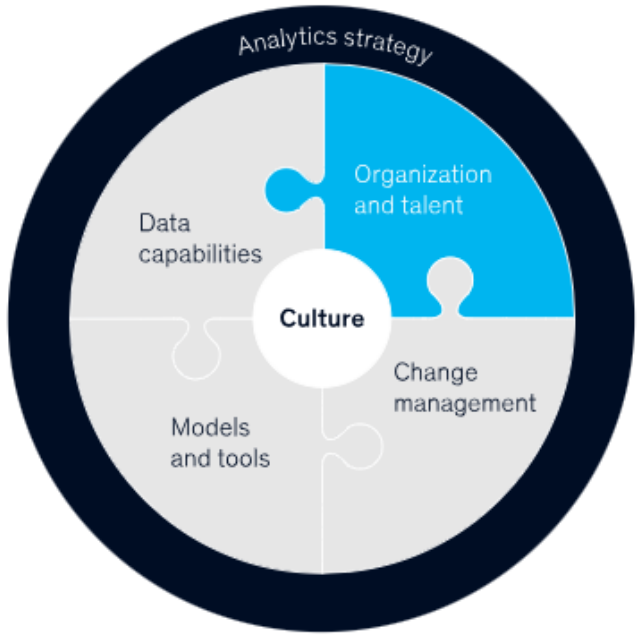
Institute and Faculty of Actuaries

Data Architecture

01 May 2024

Setting up Modern Data Structures

- Understanding current internal eco system
- Getting from where you are today to an ideal state
- Ideal state
  - Strategic plan
  - Dynamic for changing insurance needs

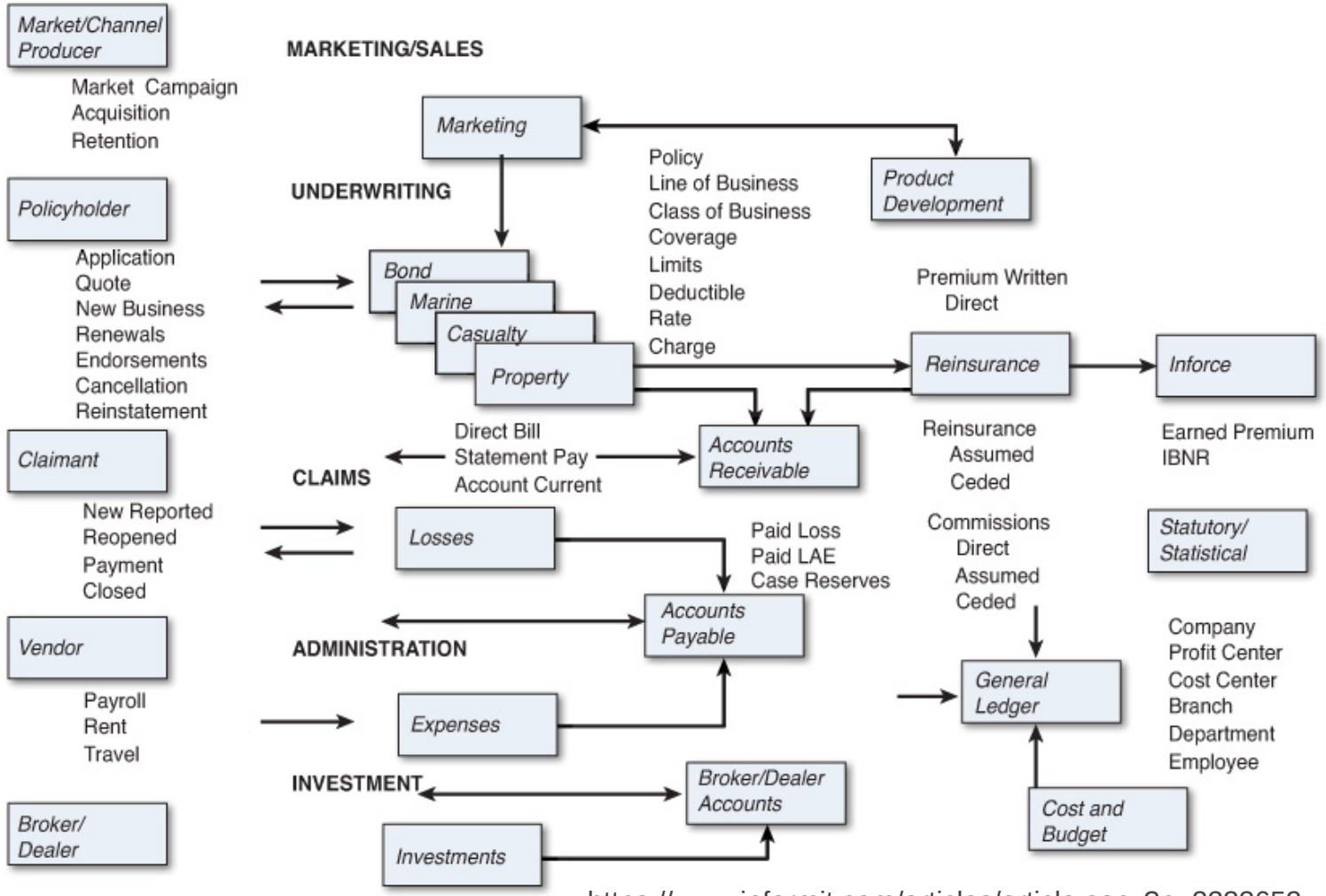


https://www.mckinsey.com/industries/financial-services/our-insights/insurance-2030-the-impact-of-ai-on-the-future-of-insurance

- Most of the current literature on IoT, AI impact of insurance was written between 2018 and 2021 – but stands true. Few insurers have managed to transform their underlying platforms.
- Beware the buzzwords!

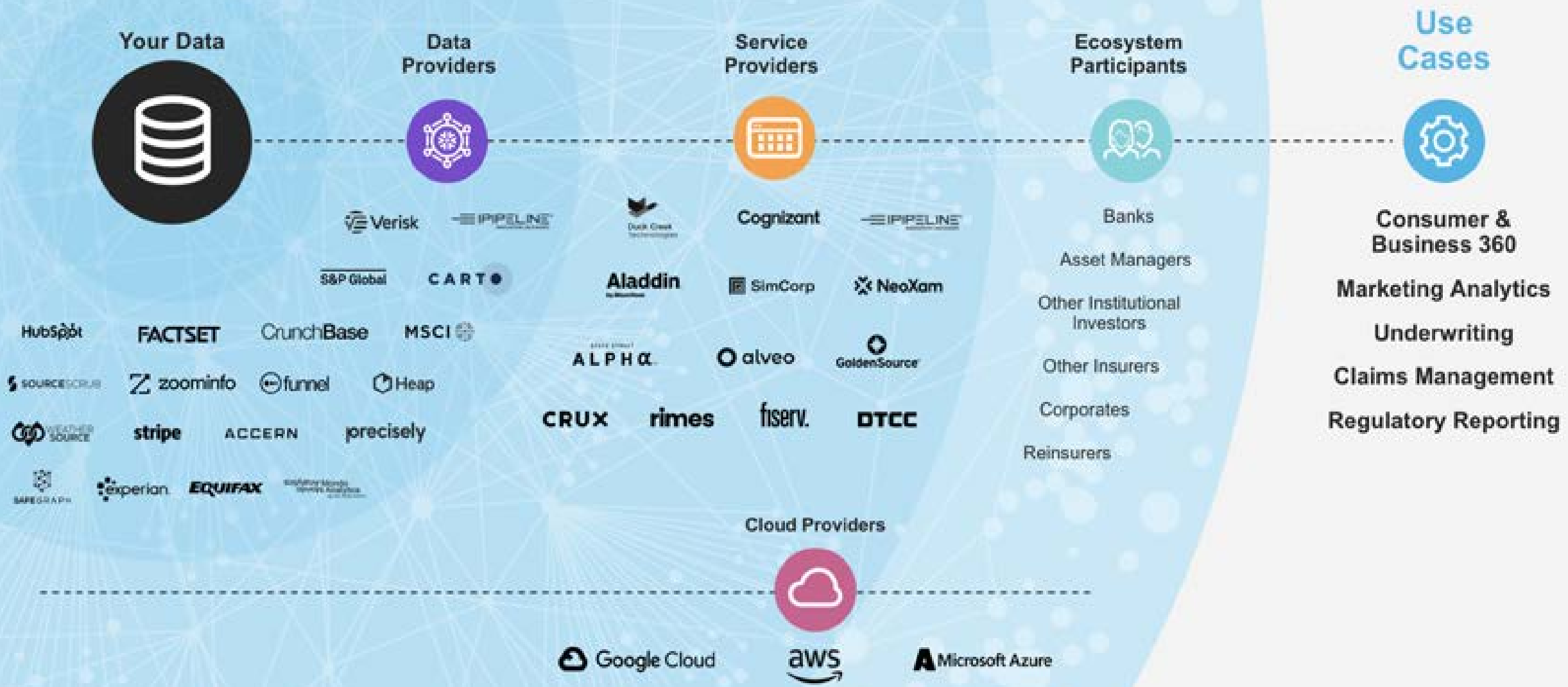
Institute and Faculty of Actuaries

1. Map out your data flows

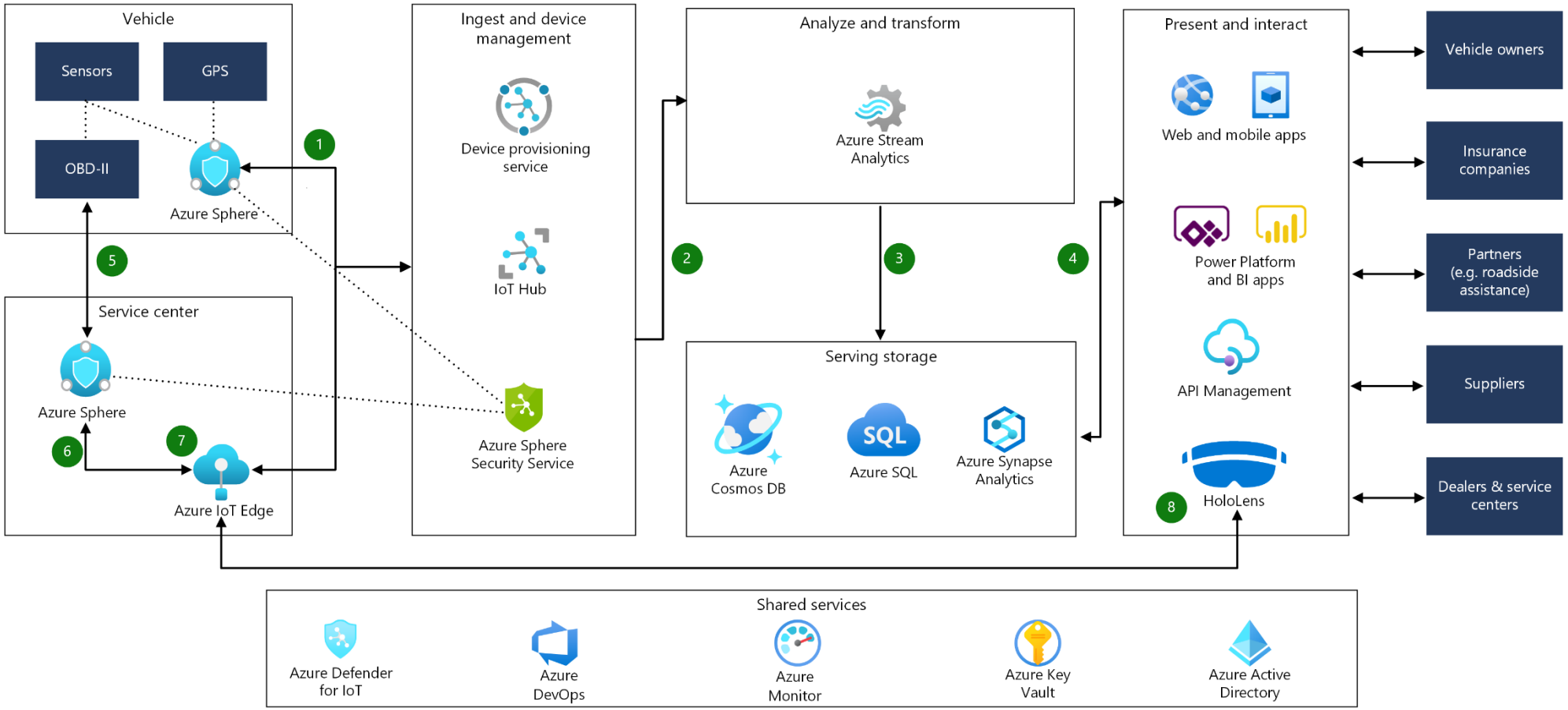


https://www.informit.com/articles/article.aspx?p=2233652

2. Understand your various data (re)sources



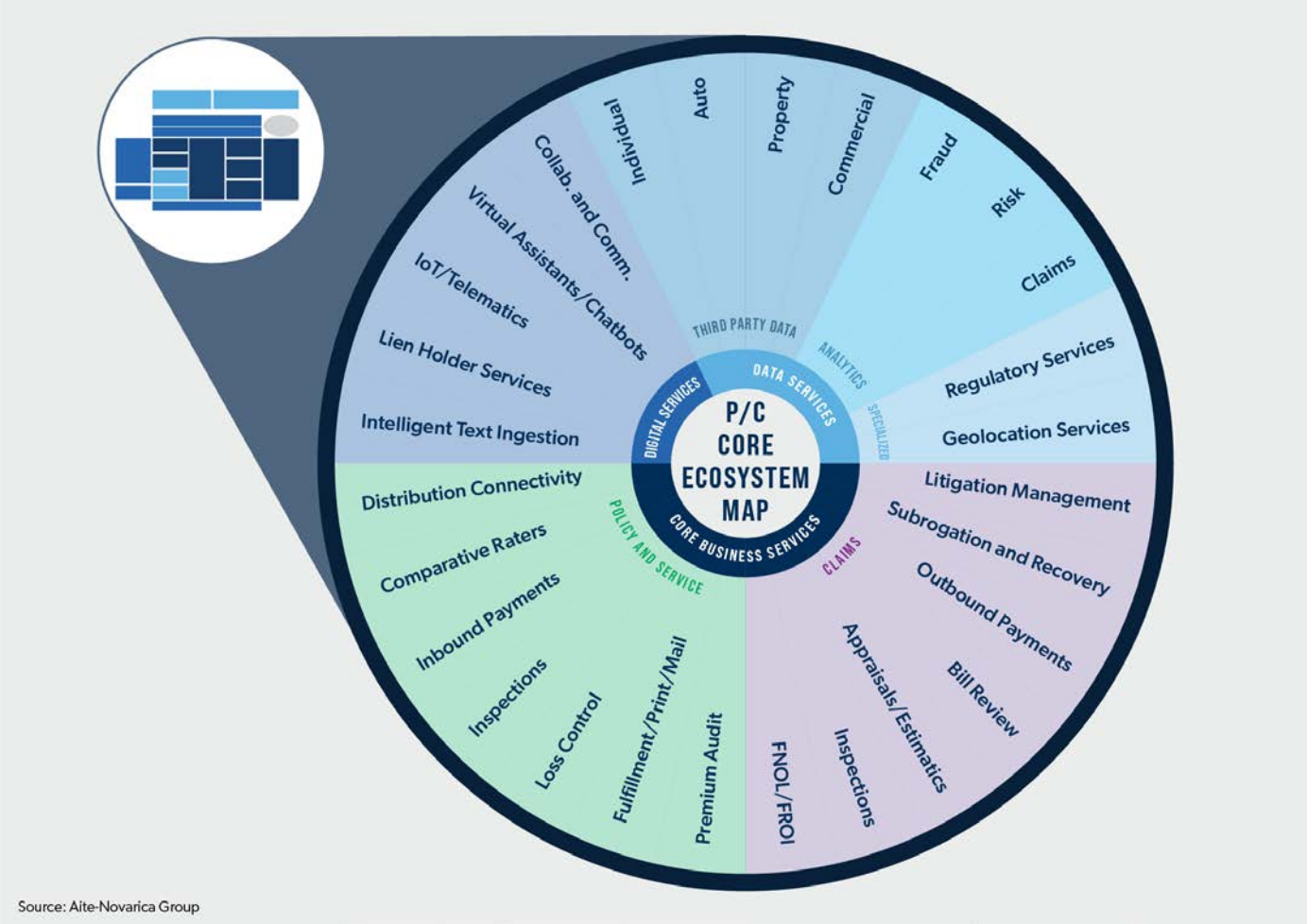
3. Think of the future (now!)



Microsoft Azure

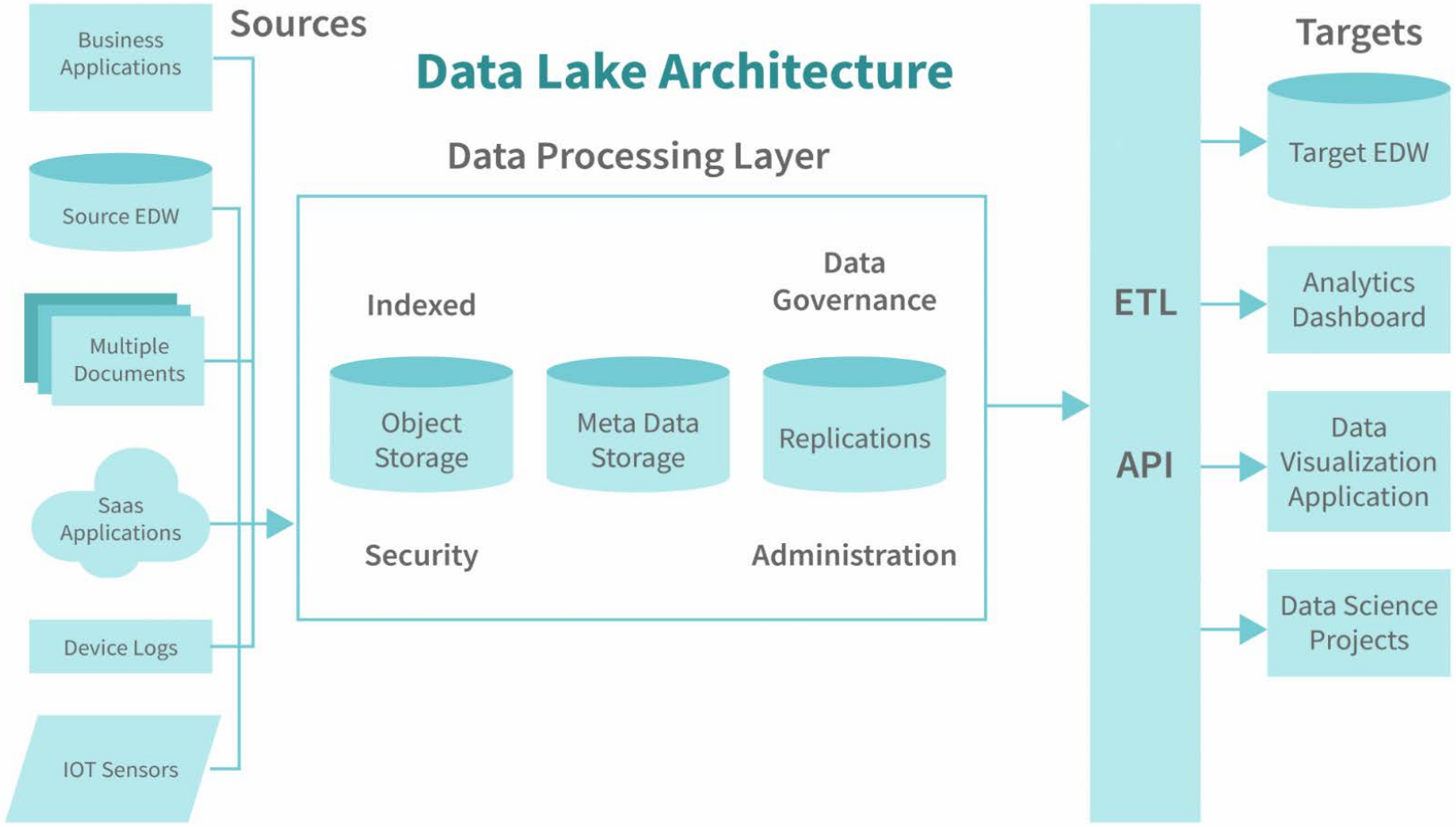
Institute and Faculty of Actuaries

4. Understand the elements of your ecosystem



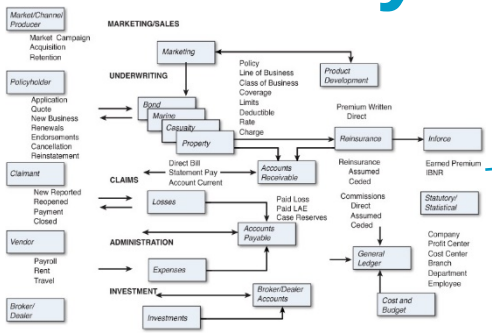
Institute and Faculty of Actuaries

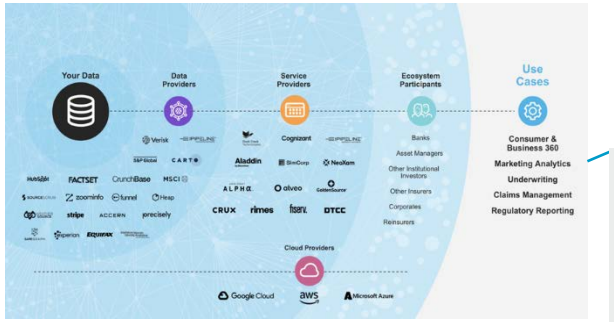
Is a “data lake” the answer?

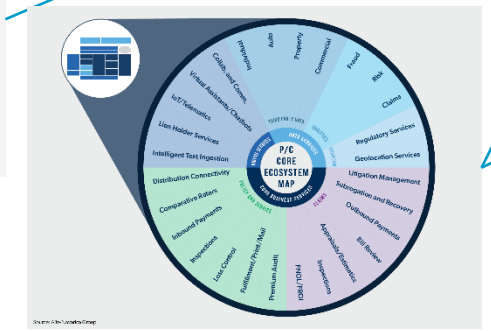


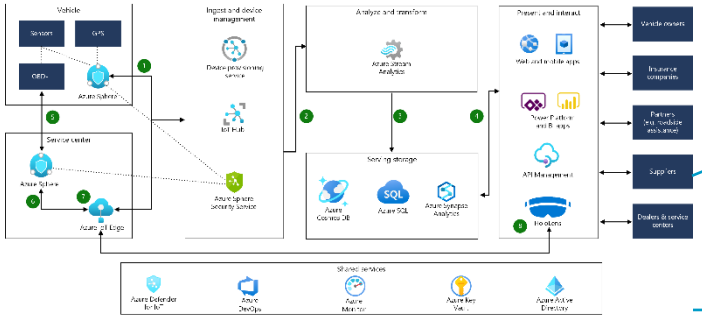
Institute and Faculty of Actuaries

Certainly looks like a good fit?









Sources

Business Applications

Source EDW

Multiple Documents

Saas Applications

Device Logs

IOT Sensors

Data Lake Architecture

Data Processing Layer

Indexed

Data Governance

Object Storage

Meta Data Storage

Replications

Security

Administration

ETL

API

Targets

Target EDW

Analytics Dashboard

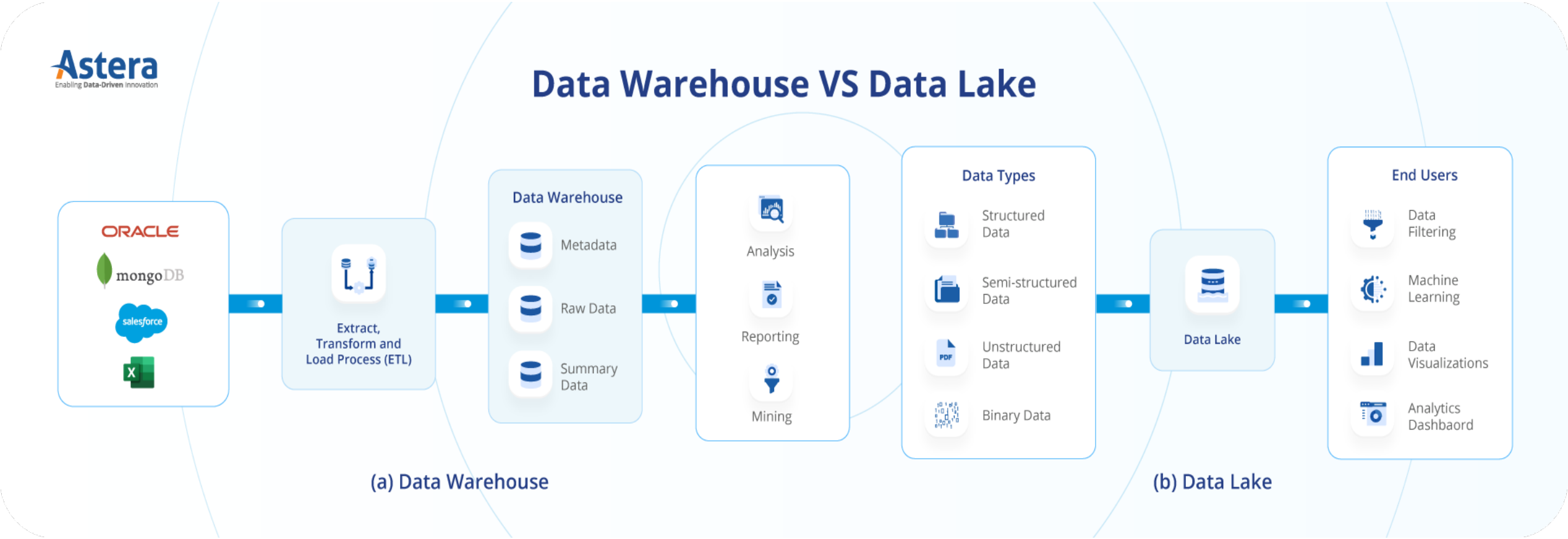
Data Visualization Application

Data Science Projects

InterviewBit

Institute and Faculty of Actuaries

How different is a lake to a warehouse?



Institute and Faculty of Actuaries

What would the C-Suite choose?

	Data Lake	Data Warehouse
1. Data Storage	A data lake contains all an organization's data in a raw, unstructured form, and can store the data indefinitely — for immediate or future use.	A data warehouse contains structured data that has been cleaned and processed, ready for strategic analysis based on predefined business needs.
2. Users	Data from a data lake — with its large volume of unstructured data — is typically used by data scientists and engineers who prefer to study data in its raw form to gain new, unique business insights.	Data from a data warehouse is typically accessed by managers and business-end users looking to gain insights from business KPIs, as the data has already been structured to provide answers to pre-determined questions for analysis.
3. Analysis	Predictive analytics, machine learning, data visualization, BI, big data analytics.	Data visualization, BI, data analytics.
4. Schema	Schema is defined after the data is stored in a data lake vs data warehouse, making the process of capturing and storing the data faster.	In a data warehouse, the schema is defined before the data is stored. This lengthens the time it takes to process the data, but once complete, the data is at the ready for consistent, confident use across the organization.
5. Processing	ELT (Extract, Load, Transform). In this process, the data is extracted from its source for storage in the data lake, and structured only when needed.	ETL (Extract, Transform, Load). In this process, data is extracted from its source(s), scrubbed, then structured so it's ready for business-end analysis.
6. Cost	Storage costs are fairly inexpensive in a data lake vs data warehouse. Data lakes are also less time-consuming to manage, which reduces operational costs.	Data warehouses cost more than data lakes, and also require more time to manage, resulting in additional operational costs.

Comparison from https://www.qlik.com/us/data-lake/data-lake-vs-data-warehouse.
CEO choices are author assumed

Even on points where data lake would be preferred – there are significant barriers to achieving these advantages

Institute and Faculty of Actuaries

Making the case for modern data architecture

Snowflake example

- ‘Always on’ policies – **customer centric**?
- Integrated data with modelling capability - **efficient**
- Data centric decision making – **empower employees**
- Not cheaper but **better**
- **Versatile** and resistant to future
- **Product innovation** and new insurance solutions – no problem!
- Continuous modelling
- infrastructure without huge processing requirements – **faster**
- Increased **oversight** and **control**
- **KPIs**
  - **increase GWP**
  - **decrease LR**
  - **upsell/cross-sell**
  - **increase conversion**
  - **decrease capex**

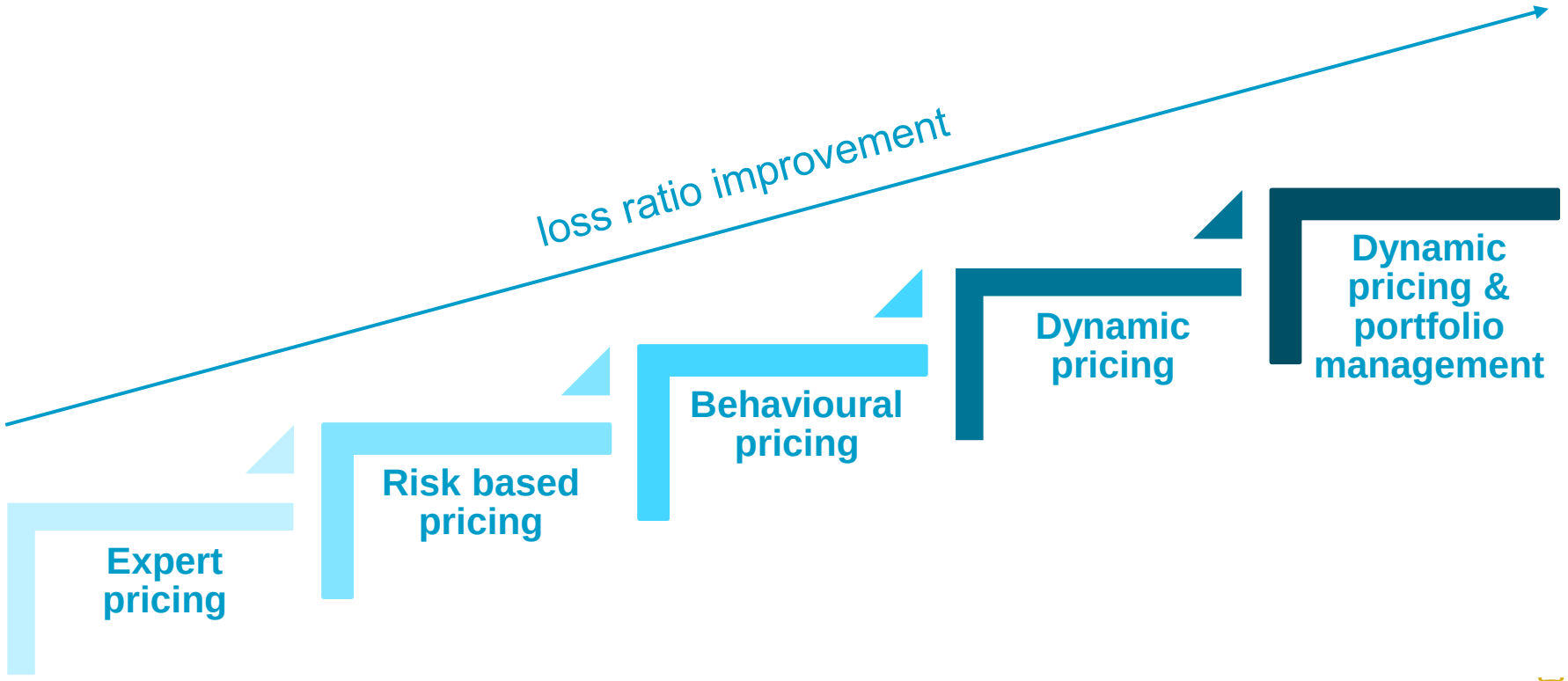
Institute and Faculty of Actuaries

Institute and Faculty of Actuaries

Modelling Framework

01 May 2024

Modelling framework



Graphic source: Quantee, all right reserved

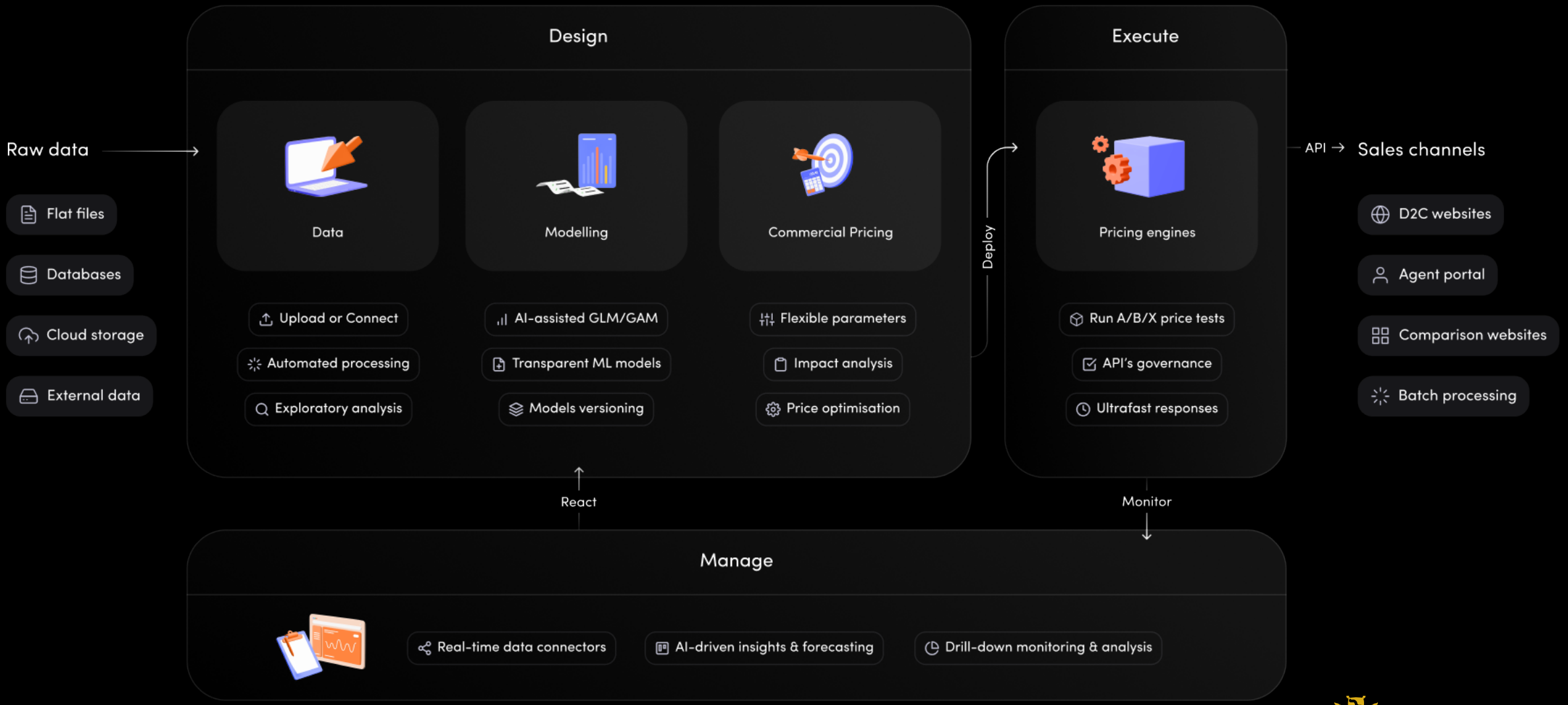
Institute and Faculty of Actuaries

Modelling framework

Pricing modelling workflow:

- Global trend of increasing price sophistication due to increased competitors' pressure and more digitalized policyholders
- Price sophistication increasing from **rating-based** and expert judgment-based pricing, through GLM risk/demand modelling and finishing on **fully integrated workflows** of pricing model design, deployment and portfolio management allowing for ML/AI.
- There also a lot of focus on **fairness** and **transparency** which adds another layer of complexity in the pricing process.

Institute and Faculty of Actuaries



Modelling framework

Personal lines:

- Automation in GLM/GAM modelling with **AI-assisted functionalities** automating tedious daily work of pricing actuaries. This includes:
  - Interaction hints
  - Selection bins / categories mapping
  - Most promising variables
  - Microsegments detection
- In **non-risk models** usage of ML algorithms such as **GBMs** or **unsupervised clustering** (K-Means) for propensity-to-buy modelling, sales discount modelling, car make-model classifications, demand models.

Institute and Faculty of Actuaries

Modelling framework

Commercial lines:

- Application of GLM/GAM models will replace expert judgement spreadsheets due to increased volume of data and increasing competitiveness.
- Enhancement of methods to model big data (e.g. telematics) and create right aggregated outputs for further GLM/GAM.
- Due to low-exposure segments and their importance in commercial (or large speciality) lines – regularized/penalized GLM/GAMs will be popular.

Institute and Faculty of Actuaries

Institute and Faculty of Actuaries

Portfolio Management

01 May 2024

Portfolio management

- Pricing strategy embedded in **evolving competitive and regulatory landscape**.
- Pricing executives are in fact **insurance portfolio managers**, making sure that margins, loss ratios and GWP are constantly monitored and aligned with an insurer's overall strategy and market competitors' landscape.
- Moreover, most recent **regulations such as Customer Duty**[1] in the UK, proves that the ability to **spot and explain in real-time risk outliers** within the portfolio is not only a nice-to-have but also a requirement.

1) https://www.abi.org.uk/data-and-resources/tools-and-resources/consumer-duty/ 2) https://www.theactuary.com/2023/03/01/take-your-pick

Institute and Faculty of Actuaries

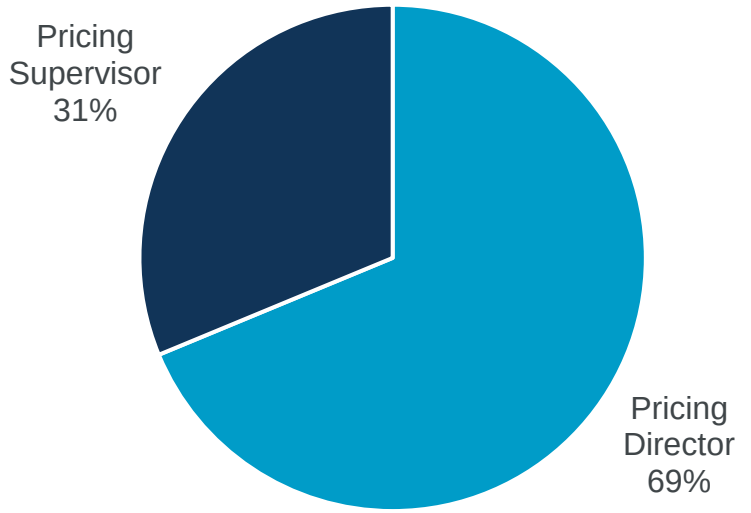
Portfolio management

The most valuable areas in portfolio monitoring – survey results:

Rank	Area	Weighted score
1	Forecast financial results and key indicators quarterly/yearly based on current data.	2.75
2	Automatically detect and notify new trends in production data.	2.625
3	Automatically identify outlier segments.	2.25
4	Use claims and reserves data for ongoing monitoring.	1.4375
5	Set and receive alerts for selected indicators surpassing defined thresholds.	1.3125
6	Access interactive managerial dashboards for portfolio analysis.	1.25
7	Something else	0.8125

Survey source: Quantee, 2024, CEE region

Executive role in the organization



Institute and Faculty of Actuaries

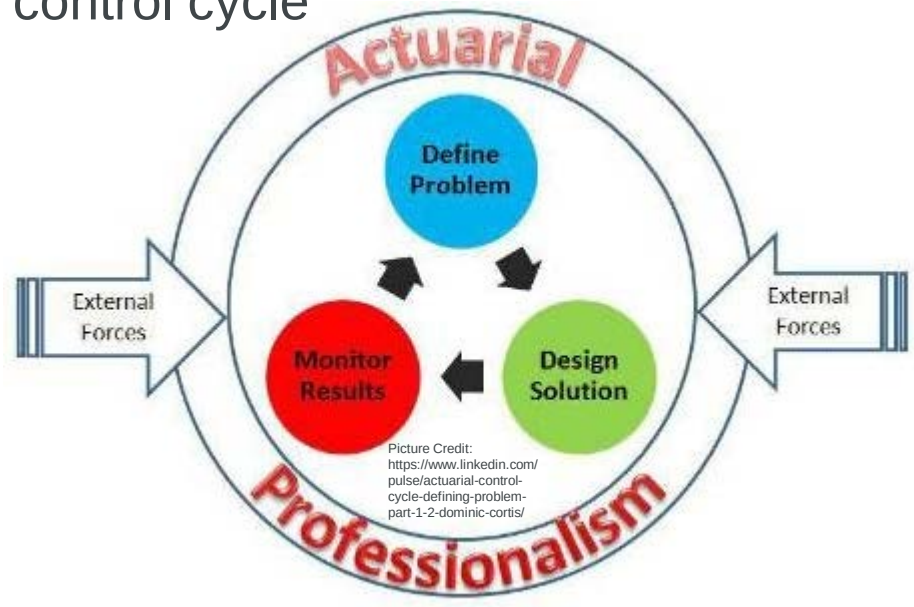
Institute and Faculty of Actuaries

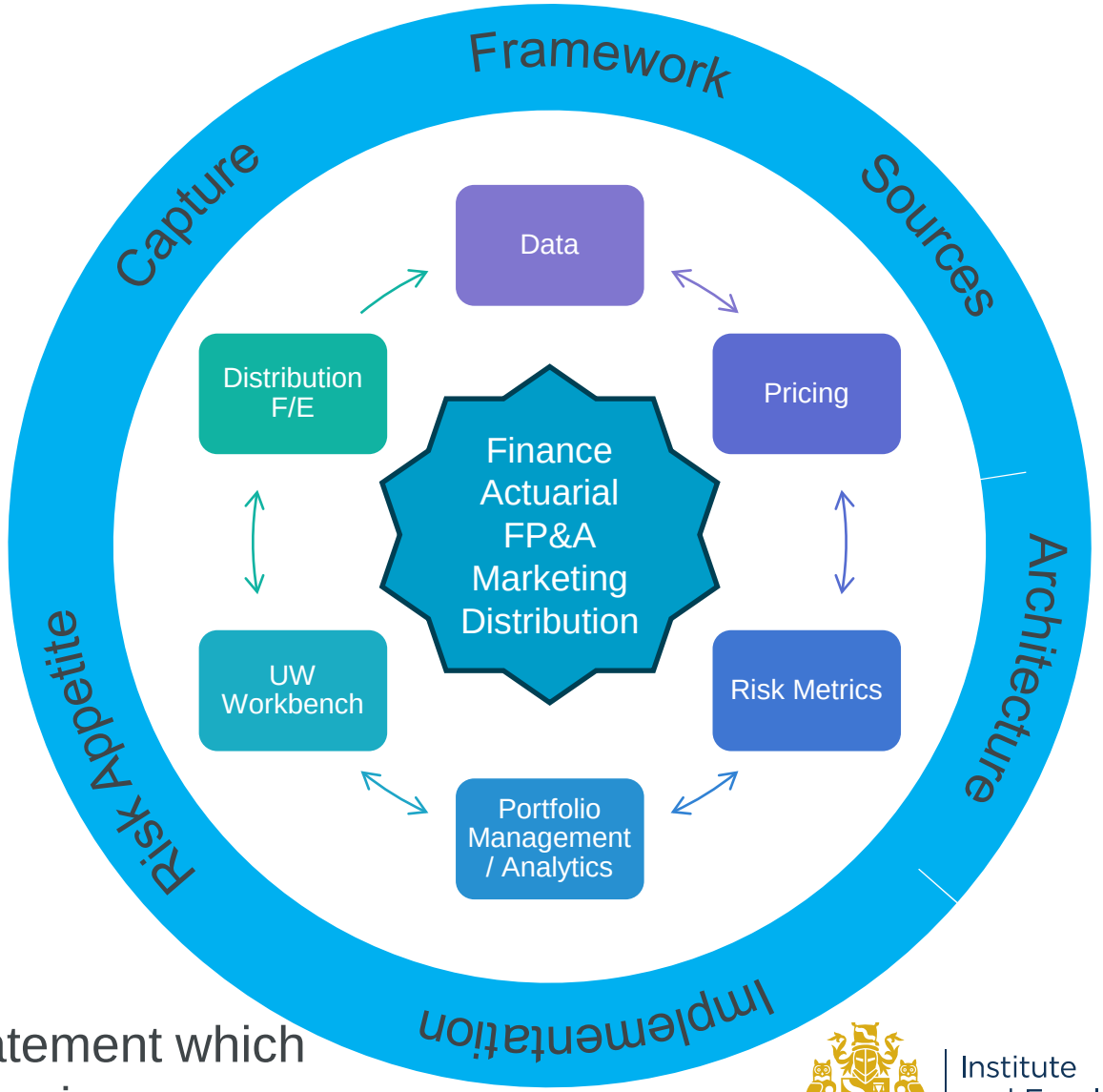
Underwriting & Pricing Blend

01 May 2024

Pricing today and future

- What do you need to think about as a pricing actuary
- Previously problems could be contextualised using a typical actuarial control cycle





- Today's pricing team is looking at a problem statement which encompasses the complete insurance processing journey

Institute and Faculty of Actuaries

Distribution & Product Complexity

Simpler

More Complex

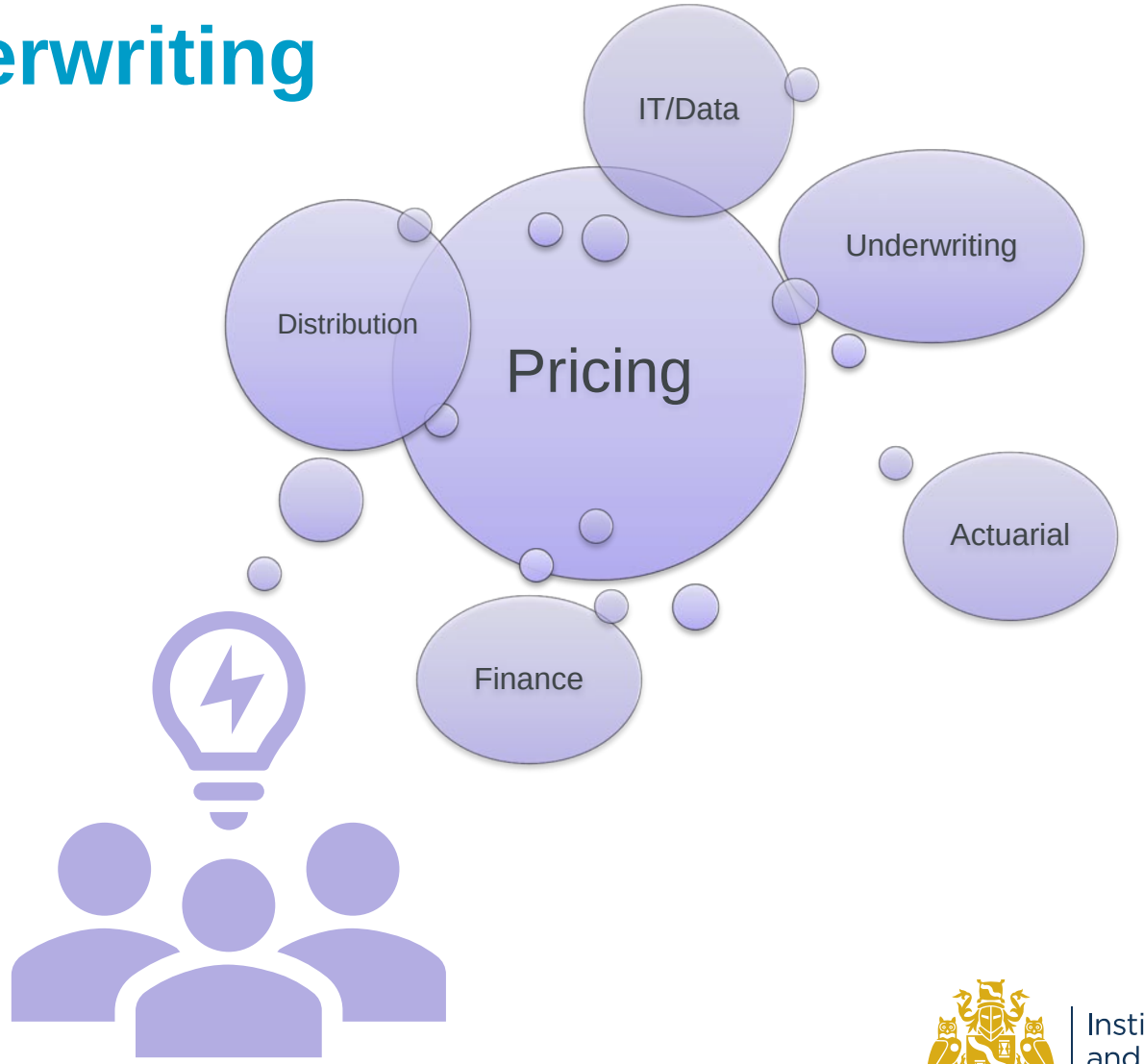
Distribution	Product	Modelling req'ts
Direct	Stand-alone	Peril/Event based
Broker	Packages	Product Optimisation
Aggregator	Add-Ons	Value based
Bancassurance model Not just banks – product upsell	Modular	Multi-Product Optimisation
Embedded	Personalised	Multi-risk optimisation
IaaS (Insurance as a Service)	Alternative Risk Transfer	Parametric

Regulatory Environment → Consumer Duty → Blurring of Commercial & Personal lines → Specialist MGAs on the increase

Institute and Faculty of Actuaries

Future of Pricing & Underwriting

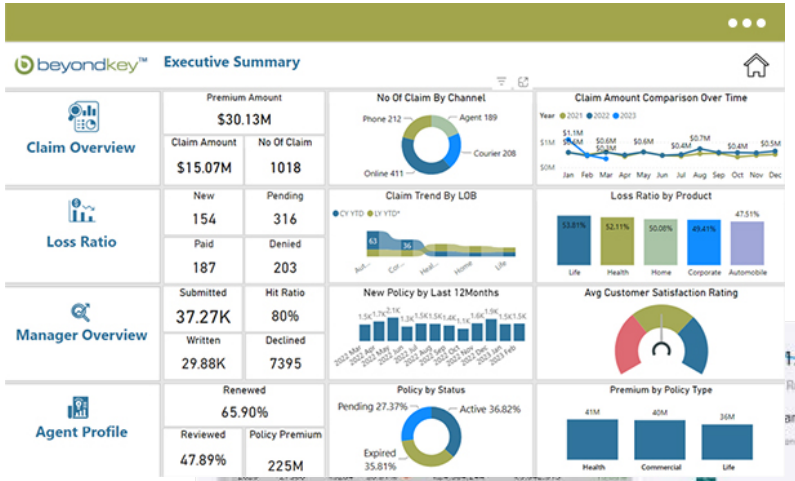
- Pricing will need to increasingly work alongside, and as a central function within the rest of the business
- Integrating with
  - Underwriting
  - Data & Analytics
  - FP&A
  - Product dev
  - Distribution
  - IT & Data
  - Marketing

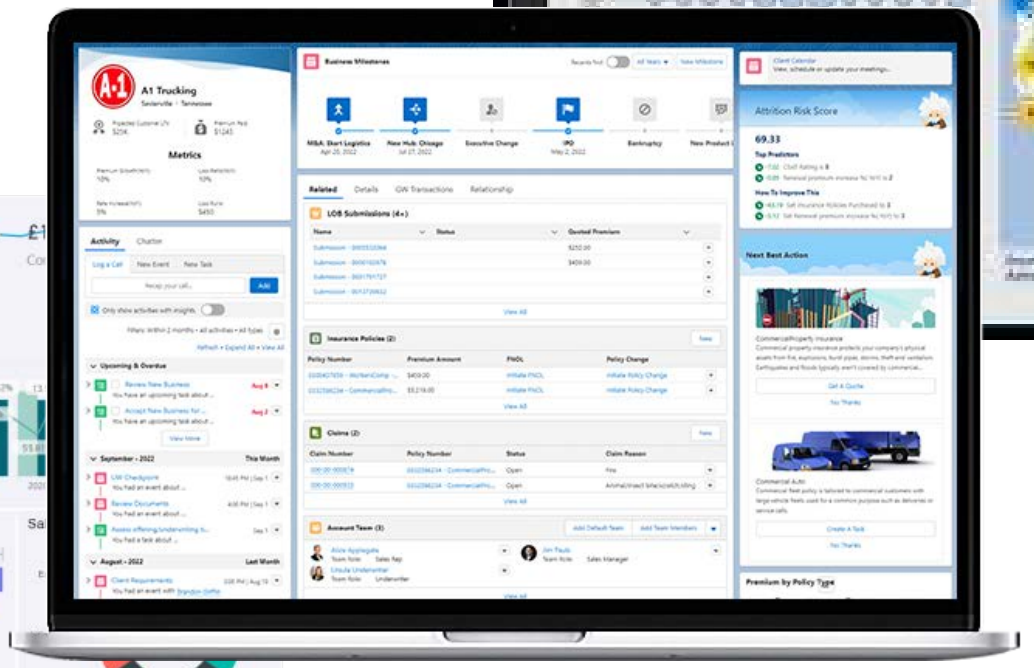


Institute and Faculty of Actuaries

Direct Actionable Insight

Actuarial input is now more than just pricing and reserving





Trading Platforms — Personal Lines, SME, Commercial

Portfolio Strategy — Lines, Large Corp

U/W Workbench — London Market

Institute and Faculty of Actuaries

Q&A

01 May 2024