Session 173: Modeling and Analysis of the Future: A Case Study

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2019 ANNUAL MEETING & EXHIBIT

Modeling and Analysis of the Future: A Case Study

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Introductions

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Corey is a member of Deloitte's Actuarial & Insurance Solutions Practice. He leads the Deloitte's Actuarial Modeling Team and co-leads the Actuarial Modernization offering. Corey specializes in the delivery of Actuarial Modernization programs including the end-to-end design and implementation of data, process, technology, actuarial models, governance, and overall operating model.

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Melanie is a Principal and leads Oliver Wyman's Actuarial office in Seattle. She has extensive experience in model governance and controls, model building and software conversions, model architecture, model validation, financial reporting, litigation support, and mergers and acquisitions. Melanie has spent her entire career with Oliver Wyman, developing and growing strong relationships with her clients and others in the insurance industry.

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Charles is a Manager of Deloitte's Actuarial & Insurance Solutions Practice with 10+ years of experience. He specializes in Model Conversion / Modernization projects, leading and supporting a large number of actuarial system conversions, architecting end-to-end solutions, and designing model governance and controls.

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Justin Meade is a Senior Consultant with Oliver Wyman Actuarial, where he leads the North American Prophet practice and Kansas City office. He specializes in actuarial modeling and transformations, with more than 10 years of experience supporting companies with end-to-end system design and conversions, architecture, development, governance, and validation.

Agenda

Topic	Content	Timing
Purpose	• Objective of this session • Causes for change to model architecture	5 minutes
Model architecture overview	• End-to-end view of future state model architecture	5 minutes
Case studies	• Small group activities	60 minutes
Summary and Q&A	• Session wrap-up	5 minutes

Purpose

Objective:

- To understand how insurances companies can improve their model architecture in parallel with regulatory changes and the increasing demands of the future

Learning Outcomes:

Attendees should be able to complete the following:

- Describe the role of model architecture in effective actuarial modeling, financial reporting, and analytics
- Apply the principles of model architecture in real-world modeling situations
- Describe best practices and provide examples of common pitfalls for each area of model architecture
- Advocate for strategic investment in a strong model architecture for your organization

Times are changing

Actuaries are facing increasing pressure to meet expectations

Regulatory and accounting changes

- FASB Long-Duration Targeted Improvements (“LDTI”)
- IFRS 17
- Principles Based Reserves (“PBR”)
- VA statutory reform

Management expectations

- “Do more with less”
- Provide strategic insight
- Perform more in-depth and timely analyses

Technology

- Automation
- New tools and techniques

Reconfiguring and improving model architecture will better prepare the modeling function to meet demands of the future.

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Model Architecture Overview

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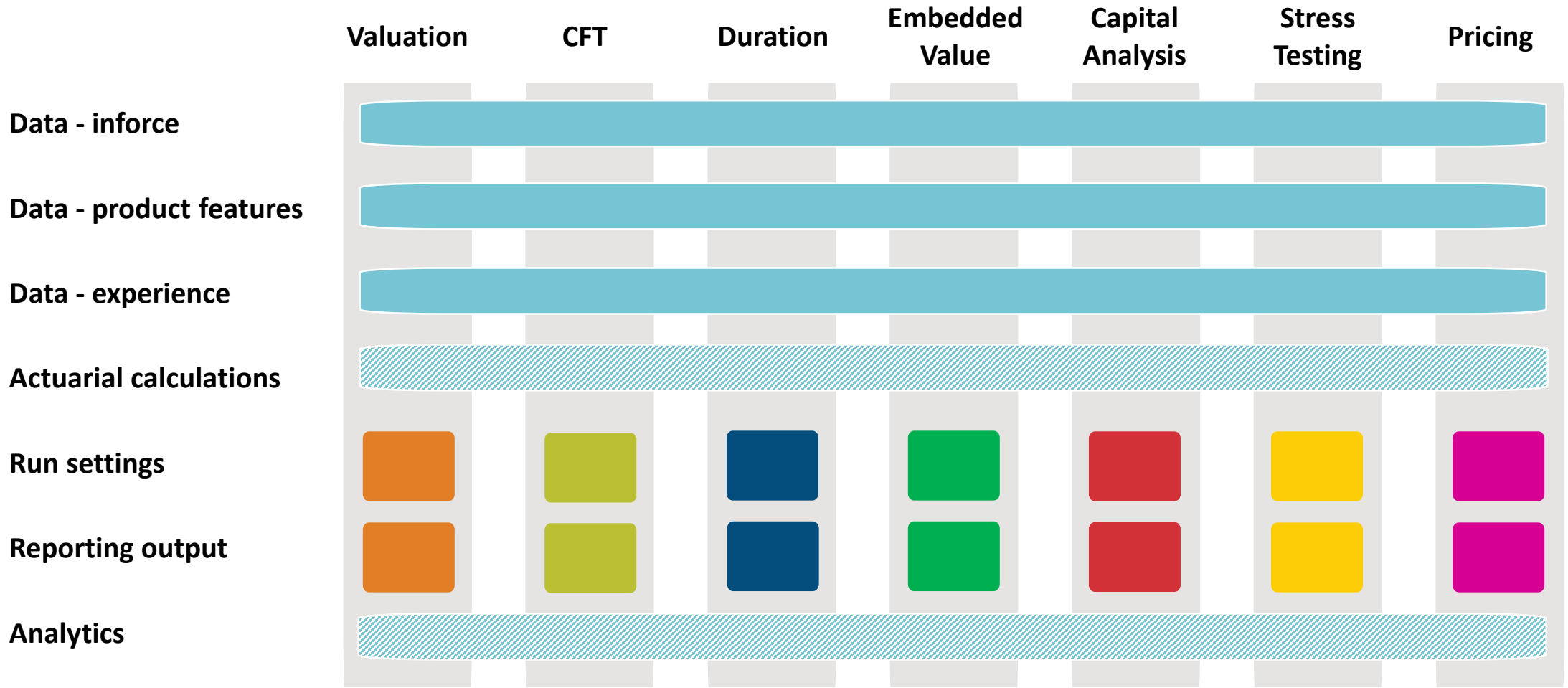
Model architecture

Ideally, the setup for data, calculations, and analytics can be leveraged across functions

Leverageable across functions

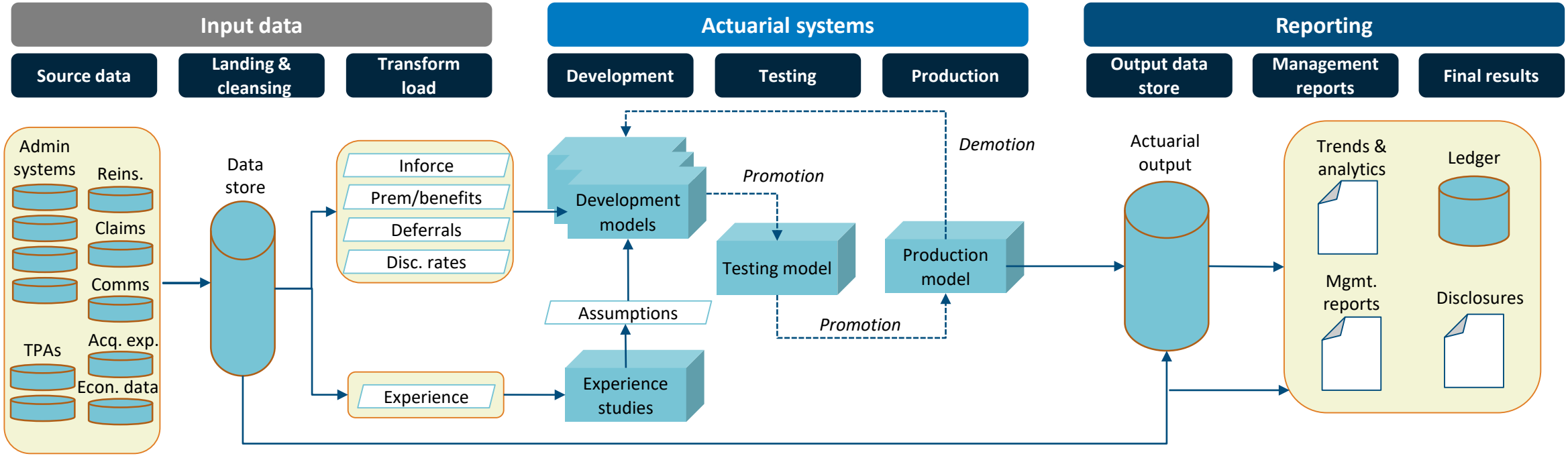
Leverageable across functions with customizations

*** Colors illustrate potential distinct functionality



Model architecture flow

Upcoming regulatory changes demand the industry evaluate the entire ecosystem in which the model operates and evolves



While inforce data is generally currently available, **additional data extracts, reconciliations, and controls** will likely be required and **historical data quality and granularity** should be addressed

Regulatory changes lead to increased scrutiny, increasing the requirement for **strong governance** and a **foundational model design** that is **scalable, "future proof", and auditable**

Back-end data storage and reporting to the ledger will need to be **updated, scaled**, and ideally **automated** for management reporting and extensive new **disclosure requirements**

Case Studies

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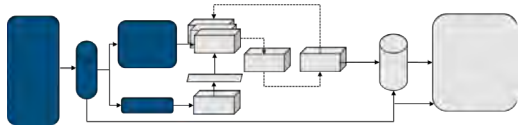
Case study: Production needs actuals for year-end



SCENARIO: ABC Life is executing year-end GAAP financial reporting. The production team needs actual information including claims, premiums, lapses, etc. The information is provided by multiple areas of accounting, finance, and IT. During the most recent quarter close, a last minute error was discovered: IT had updated claims but not premiums in the quarterly actuals data file emailed to the actuaries for production. An emergency run was required to fix the issue in time for close, and actuaries stayed up until 3 am to compile the results.

How could this error have been prevented? Was an emergency run the right solution?

KEY CONSIDERATIONS

- Manual processes
- Coordination between actuarial and IT / accounting / finance
- Governance and controls on data
- Governance on emergency runs

1. **WHAT** • What controls or process changes could have prevented this error?
2. **HOW** • How are your data processes being impacted by regulatory changes?
3. **WHO** • Who is accountable for accurate actuarial input data at your company?

Observations on actuarial calculation model inputs

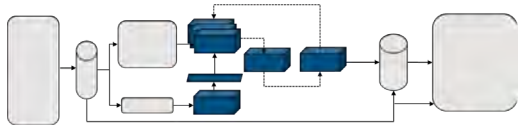
Changing requirements provide an opportunity to revisit data infrastructure, input processes, and ownership holistically

Potential Implications

- Single source of data which is clean and reliable for all modeling processes
- Movement to entirely IT-controlled data processes will require increased interaction and communication between IT and actuarial
- Automated processes and controls reduce the likelihood of errors and controls failures as well as the onus placed on model owners
- Insurers will need to manage more granular input data to feed downstream calculations

Movement to centralized data repositories and IT-controlled / automated processes will result in significant process efficiencies and ease the burden of new requirements

Case study: Too many models



SCENARIO: Jim works on the model development team for Universal Life. Currently, separate models exist for STAT and GAAP. Jim is proposing the models be merged across valuation bases to prevent duplicated efforts and potential inconsistencies when making model changes. However, management is uncertain because different actuaries are responsible for STAT and GAAP results.

What are the pros and cons of what Jim is proposing?

KEY CONSIDERATIONS

- Governance on model changes
- Software for managing model changes
- Different stakeholders / owners by valuation basis
- Model size, model runtime, data sources, timing

1. **HOW** • How can you maintain strong governance with multiple users accessing the same model?
2. **WHEN** • When does it make sense to have multiple models on the same business?
3. **HOW** • How are models divided at your company?

Observations on model inventory

Consolidating models can decrease redundant development efforts; however, strong modeling standards and governance processes are required

KEY RECOMMENDATIONS FOR MODEL CONSOLIDATION

CONSOLIDATE MODELS WHEN POSSIBLE

- Maintaining multiple models on the same business often leads to duplication of development efforts or inconsistencies between models

STANDARDIZE OBJECT NAMES

- Clear naming convention to indicate purpose of all inputs, tables, calculation files and outputs
- E.g., consider including “STAT” in the name of inputs and outputs specific to stat reporting

OTHER MODEL DEVELOPMENT CONSIDERATIONS

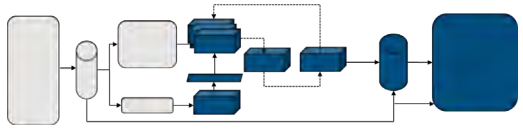
VERSION CONTROL

- As models are consolidated, version control is increasingly important to allow parallel development
- Assign a model steward to act as the gatekeeper for model development
- Regression test to prevent unintended changes

MODEL ALIGNMENT

- To the extent models cannot be consolidated, frequent collaboration can help prevent inconsistencies across pricing, valuation, hedging, etc.
- Establish clear governance framework for all models regardless of function

Case study: Populating LDTI disclosures



SCENARIO: A large public company is required to populate the disclosure per FASB's Long-Duration Targeted Improvements. After reviewing the disclosure, management realizes their current infrastructure cannot easily populate the disclosure. What should management consider for their back-end processes in order to easily populate the disclosure?

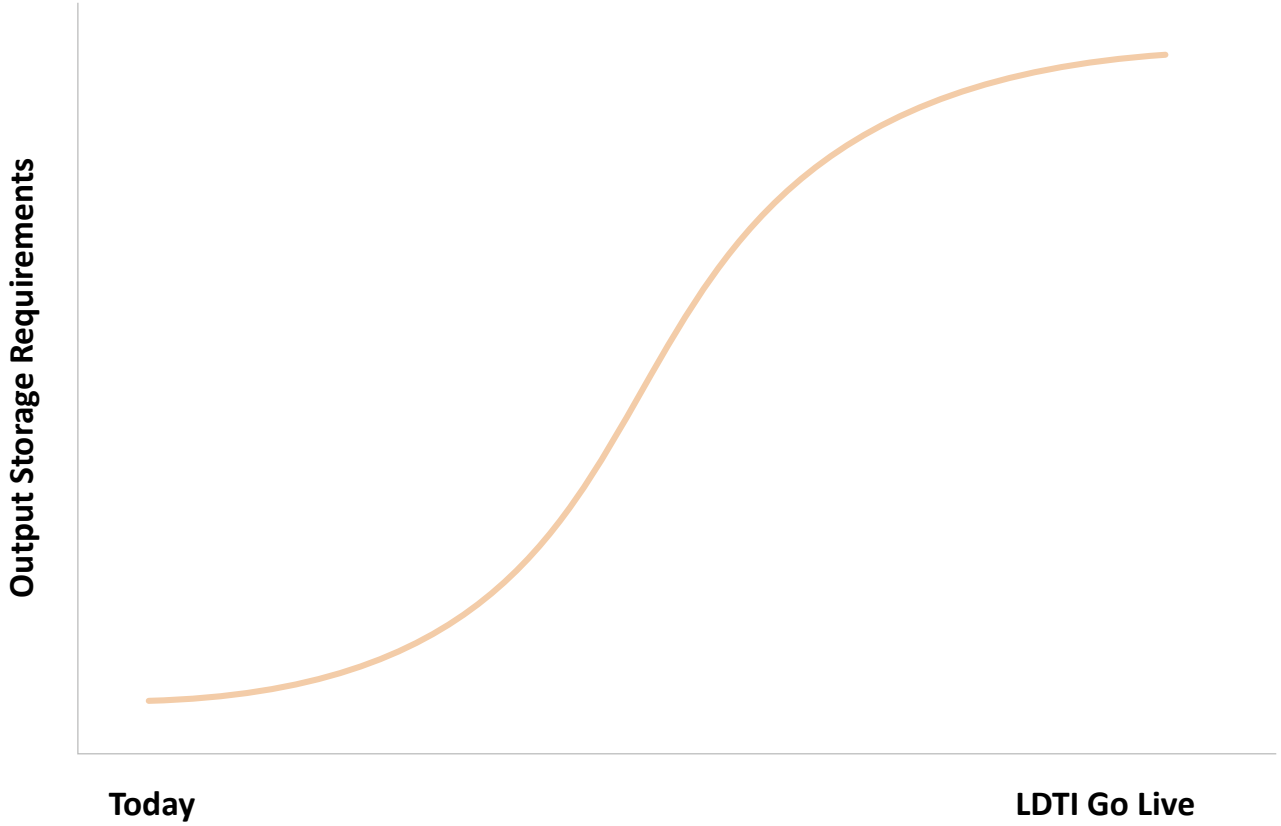
KEY CONSIDERATIONS

- Coordination between actuarial and IT / accounting / finance
- Modeling capabilities
- Results storage solution
- Automation opportunities

1. **WHAT** • What changes to the model architecture need to occur?
2. **WHY** • Why does model output get manipulated? Can we reduce these instances?
3. **HOW** • How will the way results are stored and accessed change going forward?

Assess your storage capabilities

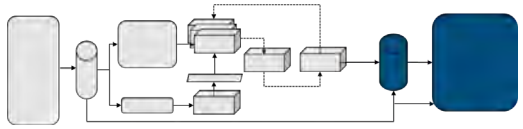
Disclosure requirements require an increase in the volume of data which must be stored, controlled, and reported



Future state storage considerations

- **Numerous runs** for each line item in the disclosure
- **Cohort** level calculations and **aggregation**
- Utilizing a **single, controlled, and reconcilable output repository** with back-end adjustments minimized
- **Vendor solutions** and **automation tools** can support efficient storage

Case study: Management wants more insight



SCENARIO: After presenting financial results to management, multiple questions were asked with respect to the movement in reserves and DAC. Your team was asked to conduct further analysis which management needs ASAP in order to gain comfort on the financials. After spending multiple days and nights digging through results, you provide the explanations to management. How can this process be improved?

KEY CONSIDERATIONS

- Coordination between actuarial and IT
- Results storage solution
- Talent
- Automation opportunities

1. **WHAT** • What output data by the model is produced for investigation purposes?
2. **WHY** • Why are you asked to investigate / how can you anticipate it better? (provide examples)
3. **HOW** • How can you change models to embrace new technology to improve explanations?

Enabling strategic analysis

Embracing and developing new tools can enable insurance companies to provide not only insight on actual experience, but also forward-looking analyses

Today → **Future**

React – address inquiries from management and other stakeholders on an as-needed basis

Anticipate – Standard multi-level reporting and analyses completed and provided to management

Foresight – Forward-looking analyses about what may happen in the future using flexible tools and technology

Table stakes

- Typically done through **cumbersome** querying and investigation
- Provides **requested explanations** only

Business insight

- Executed through **standard templates** in Excel with ability to **analyze key drivers**
- Inability to **slice and dice**

Strategic analyses

- Utilize tools such as Tableau or others, to develop **executive dashboards** and dynamic **drill-down capabilities**
- Increase **speed to act** in the market

Summary and Q&A

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Learning outcomes

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Questions?