Session 029: Technology Considerations for FASB LDTI Implementation

RGA Overview

Tim Pauza

RGA is Unique

RGA is the only global reinsurer focused exclusively on the life and health industry

RGA applies global resources and proven expertise to help clients achieve their goals

RGA anticipates market needs to help clients navigate an evolving insurance landscape

RGA combines industry-leading capabilities and a flexible approach to deliver customized client solutions

Operations in 26 Key Markets Globally

Canada
Ireland
United Kingdom
Netherlands and Nordics
Poland
Germany/CEE
France
United States
Italy/Turkey
China
Japan
South Korea
Spain/Portugal
Taiwan
Hong Kong
United Arab Emirates
India
Singapore
Malaysia
Bermuda
Australia
New Zealand
Barbados
Mexico
South Africa
Brazil

RGA is a global leader serving multinational and domestic clients in more than 80 countries

RGA Solutions

RGA Traditional Reinsurance

Mortality	Long-term care
Critical illness	Personal accident
Health/Medical	Longevity
Disability income	Takaful

RGA Financial Solutions

Statutory capital optimization	External (GAAP) accounting optimization
Tax planning	Financing
Volatility management	Asset-intensive solutions
Investment risk management	Acquisitions, joint ventures, reorganizations

Facts on Complexity and Scale

Valuation Systems

- RGA has 2 primary valuation platforms
- 39 valuation close sub-processes aligned to local data sourcing and business unit combinations
- ~400 cash flow scenarios are projected per Month

Finance Systems

- RGA has 1 General Ledger (GL)
- RGA's account hierarchy is managed in Master Data Management (MDM) and heavily integrated with multiple systems
- Financials have been booked to ~70k different financial keys this year

Assumption Management

- Business is assumed from ~1,500 companies
- There are thousands of assumptions defined for US GAAP and thousands more for local regulatory.
- RGA leverages developed experience studies system.

Valuation Analytics

- Actuarial analytics environment is logged into more than 20k times per month with an average of 7k unique analytic requests

RGA Response – Program ARIS

ARIS (Accounting Reporting In-Sights) is a multi-year compliance driven program aligning data, processes and systems supporting fundamental changes introduced by new US GAAP and IFRS reporting requirements.

Key implementation dates

▪ CECL	2020	JAN 01
▪ **US GAAP Targeted Improvements**	2022	JAN 01
▪ IFRS 9 and IFRS 17	*Varies by country	

RGA's Technical Response

Ed Deuser

Technical Solution

Implement <u>smart compliance</u> to meet regulatory demands while <u>bending the cost curve.</u>

RGA Case Study : Many years in the making

The Objective

Maturation of RGA's processes & systems towards greater:

- Standardization of Financial processes, technical architecture, and a simplified set of tooling
- Improved readiness for execution of complex products, emerging regulations, financial reporting, and future growth
- Refining roles to be better aligned with professional skills and career paths

The Approach

A 10 year transformational processes & systems vision including Finance, Actuarial Reporting, and Investments with emphasis on:

- Automation
- Simplification
- Consolidation
- Standardization
- Furthering our culture of continuous improvement

The Outcome

- 1 General ledger
- Establishment and strong integration of a Master Data Management (MDM) function
- Introduced a customizable valuation platform that allows for easy vendor integration and enables a largely consistent set of macro valuation processes globally
- Improved Investment maturity around feed data quality, analytics, and overall ease of onboarding new asset classes

RGA Lessons Learned

- Strengthening controls is not popular. An earlier and stronger emphasis on change management was needed.
- Federated model development was desired early on, but a more centralized approach is evolving
- Data Governance is broader than MDM. Clarify your strategy early. Data quality issues complicate history conversion and hinder standardization efforts.

Will your LDTI implementation focus on

A. Compliance only.

B. Compliance with some improvements.

C. Compliance with significant improvements.

D. Compliance only but planning for future improvement.

Poll: Will your LDTI implementation focus on

RGA

RGA Case Study : Smart Compliance

The Objective

Implement smart compliance to meet regulatory demands while bending the cost curve.

The Approach

- Minimize impact to source systems and Operations
- Reuse and Extend Actuarial Reporting capabilities
- Adapt and Enable Corporate Finance capabilities
- Extend automation, auditability and controls to deliver an accelerated close process

The Outcome

- Policy working assumptions are stabilizing confirming the approach
- Near quarterly dry runs are driving change, confirming direction and allowing early feedback on technical milestones
- A targeted Proof of Concept (POC) has confirmed the approach to GL configuration and disclosure generation
- Active emphasis on furthering analytic capabilities

RGA Lessons Learned

- Experience matters. The last 10 years of transformational investment has prepped RGA for today.
- Everyone should be involved in identifying and escalating change management opportunities
- Past standardization efforts and technical architectures have been validated by the degree of re-use RGA is achieving in our LDTI solution.
- Managing and analyzing data is the challenge.

RGA Case Study : Containing LDTI Operational Costs

The Objective

Supporting a four fold increase in month-end close projections without increasing infrastructure costs 4 fold

The Approach

- Maintain an iterative focus of monitoring and reducing cost per unit drivers
- Provide scorecards to increase cost transparency and shape end user behaviors

The Outcome

- Lessons learned from dry runs are incorporated as process & system improvements in future releases
- 2018 prototype confirmed significant cost savings opportunities related to renting (cloud) rather than owning our actuarial infrastructure
- Trending towards incremental adoption of cloud based actuarial packages
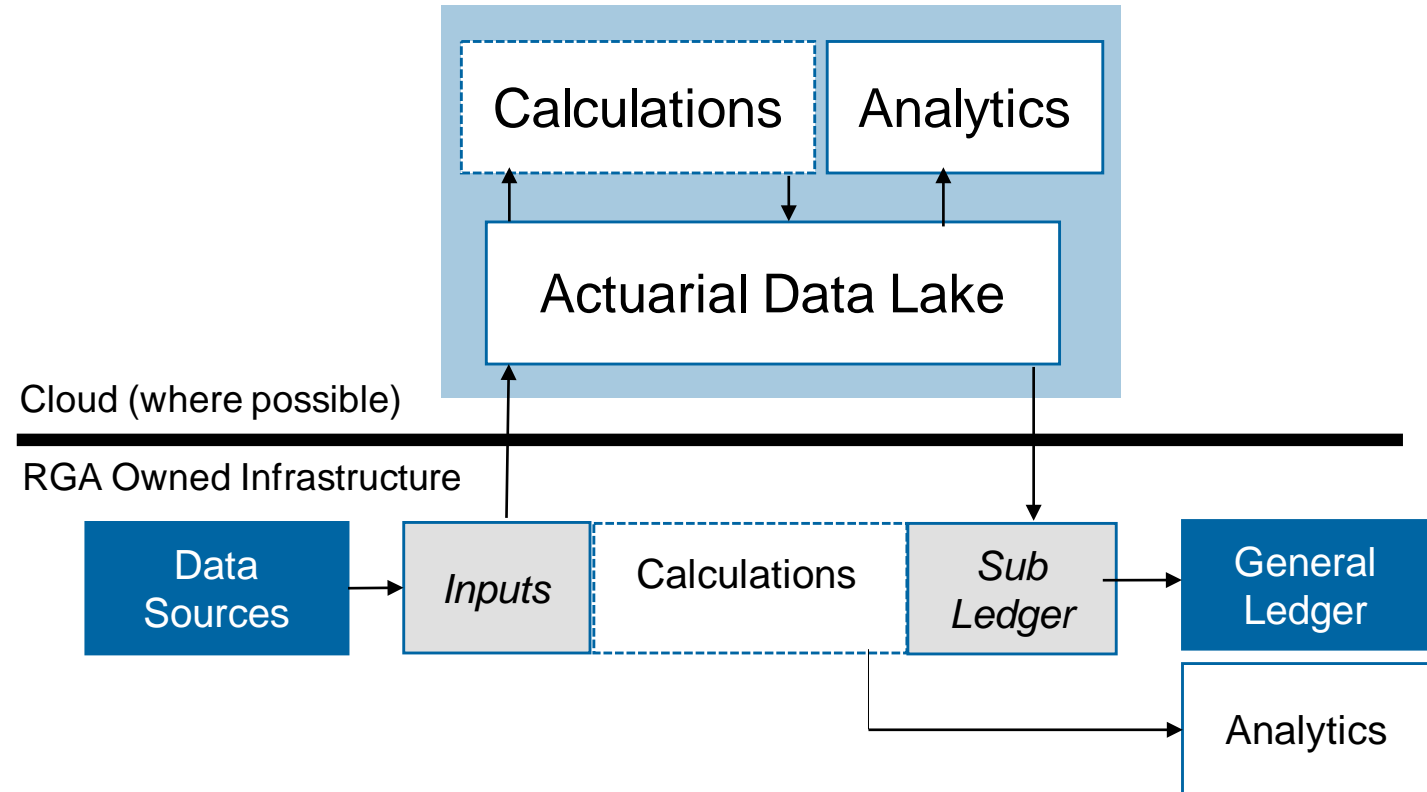
RGA Lessons Learned

- There are multiple views on where cost per unit optimization should focus
- Cloud economics rely on turning the infrastructure off when it is not in use.

RGA Case Study : Containing LDTI Operational Costs

Illustrative Problem Statements with RGA's Existing Valuation Platform

➢ *Cost optimization of significant increases in infrastructure demand during peak periods* *(see Cloud Economics)*

➢ *Existing Data Warehouse becomes overwhelmed during existing peak demand*

➢ *Increased volume of data and diversity of analytics use cases is pushing us toward a fit for purpose Analytics solution*

Calculations | Analytics

Actuarial Data Lake

Cloud (where possible)

RGA Owned Infrastructure

Data Sources → *Inputs* | Calculations | *Sub Ledger* → General Ledger

Analytics

For your company or your client, is cloud likely to be part of the LDTI compliance solution?

A. Yes, we are cloud users.

B. Yes, likely to be leveraged.

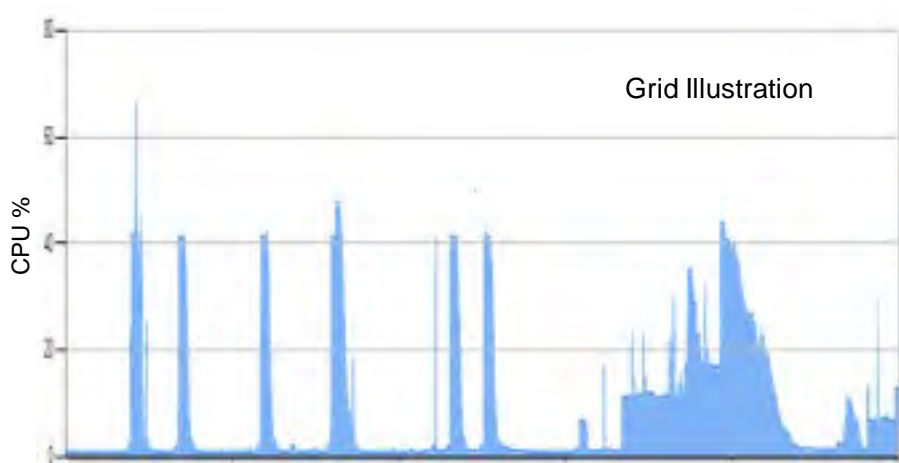C. No, this is not likely to be leveraged.

D. I don't know.

Poll: For your company or your client, is cloud likely to be part of the LDTI compliance solution?

Cloud Economics

Bending the Curve on RGA's US Prophet Grid Compute findings

PROBLEM:

- How do you run 4-10x projections in the same time while not increasing costs 4-10x ?

Grid Illustration

	Current	RGA Prototype Findings	
	ON-PREMISE 1	CLOUD 4	CLOUD 5
Scenario	700 cores in RGA's Data Center	Rent equivalent cores in the Amazon Cloud as needed	Rent higher end cores in the Amazon Cloud as needed
Run Time	3 Hrs / Projection	3 Hrs / Projection	**45 Min** / Projection
Expense Compute	**~51k / Month**	** **130 / Projection**	** **170 / Projection**
Storage	X / Projection	50 / Projection	50 / Projection
4x Expense Compute	204k / Month		
Storage	X / Projection		

** Adoption of Cloud technologies has implications to IT labor and hourly bill rates that have not been factored in above

RGA's Technical Response

Tim Pauza

RGA Case Study: Iterative approach

The Objective

Leverage our learning from past major change initiatives regarding approach to effecting change

The Approach

Allow valuation team to iterate through solutions early and often to build understanding and identify gaps… fail fast

The Outcome

- We are just completing our second dry run
- This is the first dry run for many of the global offices

RGA Lessons Learned

- The teams are getting comfortable with their ability to produce results
- Gaps are being identified early and addressed
- A need to a repeat of the education session completed in 2018 now that our people have gone through the process

RGA Case Study: Iterative approach

It took a year or more with monthly iterations to fully adopt new technologies and processes from our last transformation program… Respect the impact of change!

Polling Question

How many iterations are you planning to complete prior to going live?
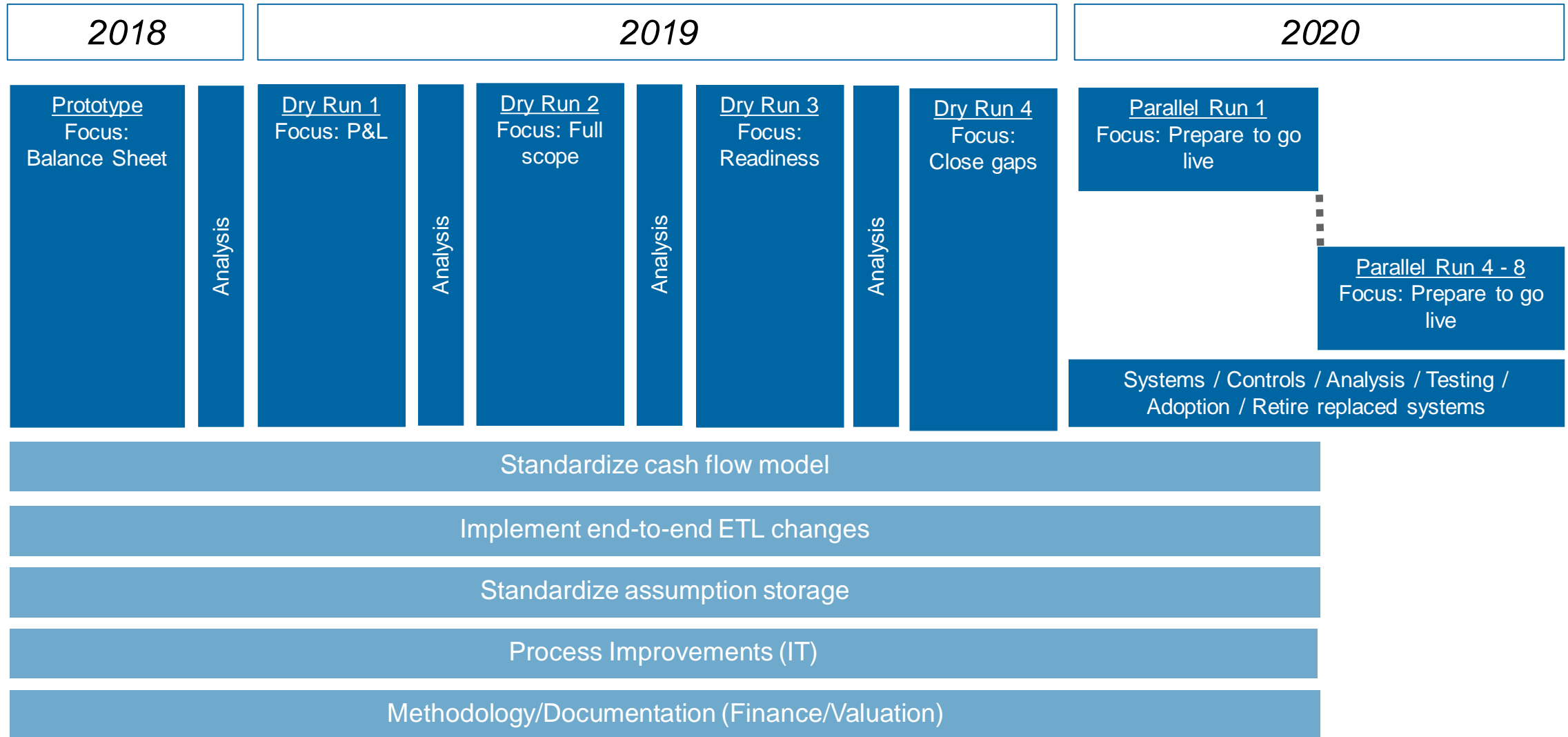
A. 1 to 2

B. 3 to 4

C. 5 to 7

D. More than 7

Poll: How many iterations are you planning to complete prior to going live?

RGA Case Study: Iterative approach

2018	2019	2020

Prototype
Focus: Balance Sheet

Analysis

Dry Run 1
Focus: P&L

Analysis

Dry Run 2
Focus: Full scope

Analysis

Dry Run 3
Focus: Readiness

Analysis

Dry Run 4
Focus: Close gaps

Parallel Run 1
Focus: Prepare to go live

Parallel Run 4 - 8
Focus: Prepare to go live

Systems / Controls / Analysis / Testing / Adoption / Retire replaced systems

Standardize cash flow model

Implement end-to-end ETL changes

Standardize assumption storage

Process Improvements (IT)

Methodology/Documentation (Finance/Valuation)

Iterative Implementation Approach

Expand scope and finalize decisions through each iteration

- *Dry runs of IFRS balance sheet, P&L and disclosures*
- *Dry runs of LDTI balance sheet, P&L and disclosures*

- *Summarize findings*
- *Refresh gap items*
- *Establish approach for next dry run*

Dry Runs

Analysis

Deploy Updates

Make Updates

- *Implement changes to production environment through current release process*
- *Update documentation*

- *Make changes to cash flow models*
- *Make changes to reporting models*
- *Make changes to underlying IT architecture*

How does your company plan to use the extension?

A. No change, our roadmap already extended beyond 2021

B. No change, we are still targeting a 2021 go-live

C. No change, we will use the additional time for analysis and explaining results

D. We are adjusting our roadmap to be more realistic

E. We are expanding our roadmap to improve systems and/or controls

Poll: How does your company plan to use the extension?

RGA Case Study: Iterative approach

RGA plan for deferral is to reduce financial reporting and operational risks through:

- Additional time for management and its auditors to document and test new systems and processes effecting internal control over financial reporting

- The standardization and enhancement of new models and technology components

- Additional analytics and further enhancement of the assumption management processes

- The education of upper management, board of directors, analysts and others regarding the changes to the financial statements, potential increased volatility and how profits will emerge differently

RGA | SOA Annual Meeting

RGA Case Study: Accounting Systems

The Objective

Improve accounting automation and controls while reducing the Chart of Accounts (CoA)

The Approach

- Expand MDM to support LDTI cohort level accounts
- Transfer account mapping functionality from sub-ledger to MDM
- Evaluate adoption of accounting hub capabilities for accounting rules and sub-ledger to shift ownership of accounting systems from actuarial to finance

The Outcome

- We started our current MDM program about 3 years ago and have made significant progress
  - Standardized reporting across the globe
  - Reduced posting errors
  - Better controls
- Reducing the CoA will require adoption of a more robust sub-ledger with aggregation capabilities

RGA Lessons Learned

- LDTI puts significant pressure on the accounting systems
- IFRS 17 is an even bigger challenge
- Our internally developed sub-ledger and MDM capabilities were able to solve some issues with modification
- Additional challenges remain and we will explore Enterprise Reporting Platform (ERP) options

How is your company addressing the accounting systems aggregation issue?

A. We already have sub-ledger capabilities that allow for aggregation to a thin ledger

B. We will be aggregating the accounting information in actuarial to send ledger ready information to accounting

C. We are adding sub-ledger capability in accounting to accommodate aggregation

D. I don't know, the accountants are taking care of that

Poll: How is your company addressing the accounting systems aggregation issue?

RGA Case Study: Accounting Systems (ERP)

RGA's "actuarial sub-ledger"

Challenges

- Large Chart of Accounts (CoA)
- Difficulty tracking and controlling adjustments
- Some accounting rules are applied and journal entries are produced by actuarial
- Difficulty for accounting function to understand what is being posted
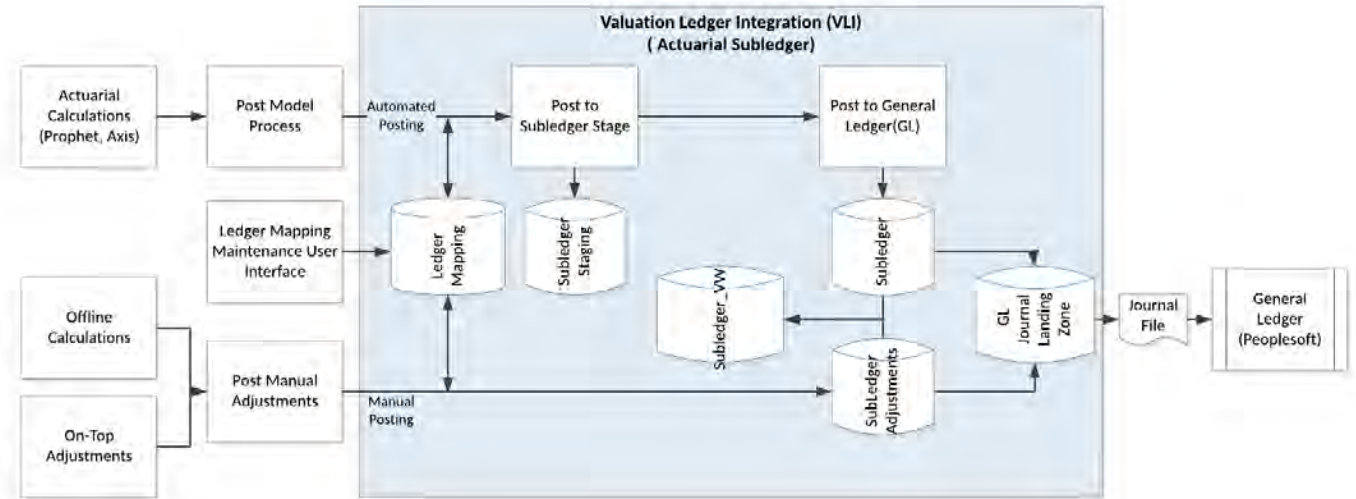
Response

- Automation of feeds into and out of the sub-ledger
- Integration of sub-ledger with finance owned MDM to automate and control account mapping
- Early planning stages for implementing an accounting hub concept for accounting rules, sub-ledger and potentially planning and forecasting capabilities

Q & A

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The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities.   The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

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- **Do not** discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- **Do not** speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- **Do** leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- **Do** alert SOA staff and/or legal counsel to any concerning discussions
- **Do** consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

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Presentation disclaimer

Agenda

- *Introductions*

- *RGA overview*

- *Technology challenges and opportunities — from source data to actuarial models*
  - *Industry perspectives*
  - *Case studies and technical solutions*

- *Technology challenges and opportunities — processes, disclosures and reporting to Finance*
  - *Industry perspectives*
  - *Case studies and technical solutions*

- *Panel discussions and Q&A*

Presenters' biographies

Tim Pauza, ASA
RGA

Tim has over 20 years of actuarial experience in life insurance financial reporting, defined benefit pension administration, and consulting. He also has over 10 years of experience in IT, in data mining and warehousing, business intelligence, and software development. Tim is currently with RGA, and he focuses on accounting change and leads the company's finance modernization activities.
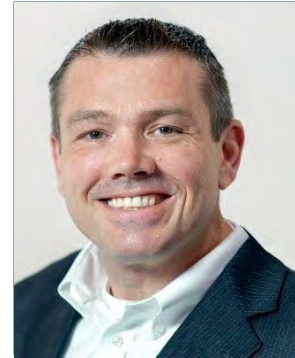
Ed Deuser
RGA

Ed Deuser is a lead principal architect with RGA Reinsurance Company. In this role, Ed is responsible for technical solutions that support RGA's global business units, including Valuation, Financial Solutions, Investments, and Global Research, Development and Analytics. He also serves as the technical lead for DLT, the RGAx Distributed Ledger team, and guides other digital objectives for RGA. He is accomplished at transforming actuarial processes and emerging technology fields in life and health insurance. In addition to his experience in the insurance sector, Ed has worked in financial services, government and law enforcement. Ed received his Bachelor of Science in Information Systems from the University of Missouri–St. Louis. His article "From R Studio to Real-Time Operations," which he co-authored with RGA Lead Data Scientist Jeff Heaton, was published in the December 2017 issue of the Society of Actuaries newsletter, in the Predictive Analytics and Futurism section.

Presenters' biographies

Eric Wolfe, FSA, MAAA, FRM
EY

Eric Wolfe is a senior manager in the Insurance and Actuarial Advisory Services practice of Ernst & Young LLP's Financial Services Office. He is based in the firm's New York office. He has over 10 years of experience in the life insurance industry. During his time at EY he has led a large-scale end-to-end actuarial transformation for a major life and annuity insurance provider. He has also led audits and performed valuation services for annuity and long-term care providers.

Prior to joining Ernst & Young, Eric held actuarial roles at two global insurance companies. His experiences included pricing, product development, enterprise risk management and modeling. Eric is a Fellow of the Society of Actuaries (FSA) and holds his Financial Risk Manager (FRM) designation as well.

Gaurav Rastogi, FSA, FCIA, CFA
EY

Gaurav Rastogi is a senior manager in the Insurance and Actuarial Advisory Services practice of Ernst & Young LLP's Financial Services Office. He is based in the firm's New York office. Prior to Joining EY, Gaurav held multiple valuation and pricing roles with a leading global life insurance company in their Canada offices. Gaurav is an actuarial transformation specialist and has close to 10 years' experience in the actuarial modeling and financial reporting space. Gaurav has been focusing on data and systems changes required by insurers as a result of regulatory updates, such as IFRS 17, long duration targeted improvements and PBR.
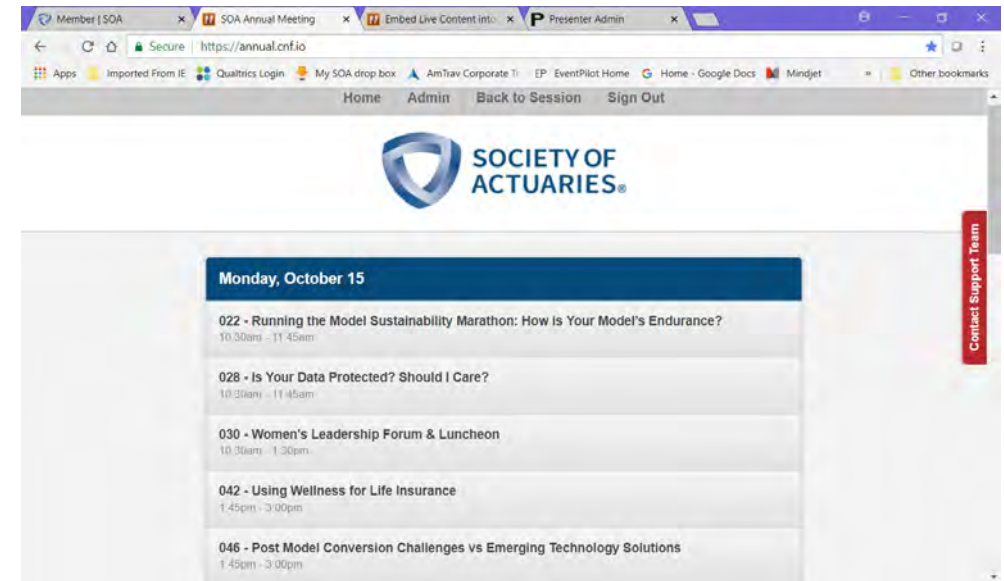
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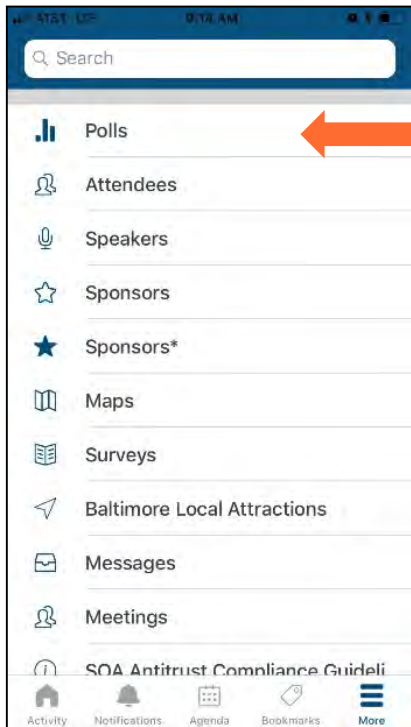
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or

Polling questions

Polling question

How do you categorize your company?

    A. Public

    B. Privately held stock

    C. Mutual/fraternal/not for profit

    D. Consulting

    E. Other

Poll: How do you categorize your company?

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2019 ANNUAL MEETING & EXHIBIT

Polling question

Which work streams have been the most challenging? *(Select all that apply)*

    A. Data

    B. Accounting policies

    C. Actuarial

    D. Finance

    E. Integration across work streams

Poll: Which work streams have been the most challenging?

Technology challenges and opportunities
From source data to actuarial models

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Summary of Long Duration Targeted Improvements (LDTI)

LDTI changes	Targeted improvements	Summary-level impacts

Liability for future policyholder benefits (FPB)
- ▶ Update cash flow assumptions and actual experience on cumulative catch-up basis
- ▶ Update discount rate assumption (i.e., single A rate) each period
- ▶ Loss recognition testing is eliminated

Market risk benefits (MRB)
- ▶ Creates a new classification for these features
- ▶ Measure at fair value with changes through income (except for own credit spread impact)

Deferred acquisition costs (DAC)
- ▶ Simplified DAC amortization; a constant basis over the life of the contract
- ▶ Impairment testing is eliminated

Disclosures
- ▶ Significant new and granular disclosures
- ▶ New qualitative disclosures about significant inputs, judgments and assumptions

1 — Data feeds and allocations
- ▶ Capture actual historic cash flows at the cohort level or group level for remeasurement
- ▶ Synchronize feeds between actuarial and finance
- ▶ Define and implement actual allocation logic

2 — Actuarial models
- ▶ Disclosure requirements for FPB, MRB, and DAC require multiple runs, which impacts run time, data storage and cost
- ▶ Assumption management and governance to produce components of presentation and disclosure

3 — Financial reporting & disclosures
- ▶ New disclosures require proper level of granularity for roll forwards
- ▶ Subledger and General Ledger chart of accounts, validation rules and journalization
- ▶ Update product and portfolio hierarchies for finance/actuarial

LDTI technology challenges and opportunities

What is changing?	What are some technology challenges?	What are some opportunities?

Liability for future policyholder benefits (FPB)

Market risk benefits (MRB)

Deferred acquisition costs (DAC)

Disclosures

Data integration, storage and management
- ▶ Data quality, volume and granularity
- ▶ Cohorting and allocation of actuals with consistency across Finance and Actuarial
- ▶ Experience studies and assumption review require more granular data more easily available
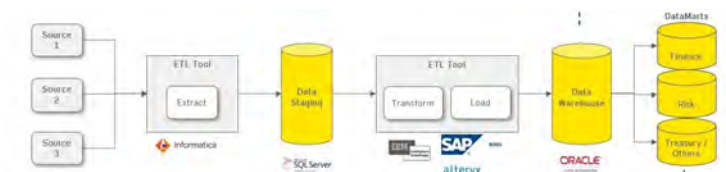
Actuarial modeling
- ▶ Assumption management for presentation and disclosures
- ▶ Large volume of runs required may lead to high run times, cost and data volumes
- ▶ Balancing cost, accuracy and ability to explain results qualitatively and quantitatively

Financial reporting and disclosures
- ▶ Large volumes of model runs require robust data management and storage
- ▶ Data lineage for transparency and controls
- ▶ Data preparation required for disclosures
- ▶ Master data management to manage and standardize the data definitions and metadata

Enterprise ETL and ELT tools

Cloud migration

Scale at speed

Big data solutions

ETL (extract, transform and load) process

Traditional ETL processes can be implemented to address data challenges posed by LDTI implementation.

Data warehouse
A data warehouse is a central repository of integrated and processed data from different data sources. The data in a data warehouse is stored in a highly organized and structured form.

Data staging
A staging area is a temporary storage area that sits between the data source and the target (data warehouse). The area is used to extract data from multiple sources, minimizing the impact on the sources.

Data marts
A data mart is a subset of a data warehouse containing data specific to a business function or line of business. Data marts hold summarized data that can be readily consumed for analysis.
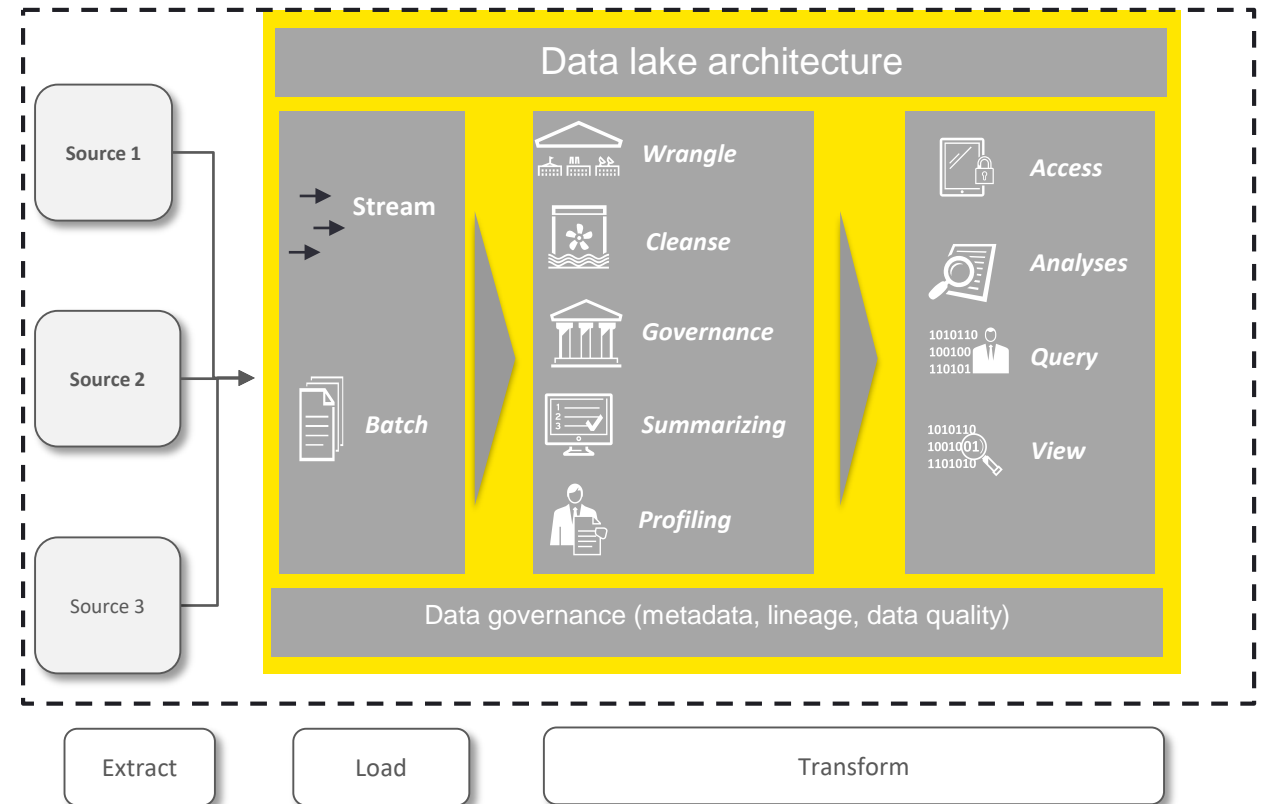
ELT (extract, load and transform) process and data lake

Alternative data management processes are available to address data challenges posed by LDTI implementation.

► A **data lake** is a centralized repository built on a big data platform that contains large amounts of data that are organized into identifiable data sets made available to data consumers

➢ A data lake stores data in its **raw, as-is form, without having to first structure the data**

➢ One of the advantages of a data lake is that it can store and manage all types of data (e.g., **structured, semi-structured, unstructured**)

➢ A data lake implements "zones," which function to progressively **cleanse** and **transform** the data

➢ Without proper **governance**, a data lake can deteriorate into a data swamp**,** which makes it very difficult to identify, manage, and consume stored data

Opportunities	Volume	Veracity
	Variety	Velocity

Data lake architecture

Source 1 · Source 2 · Source 3

Stream · Batch

Wrangle · Cleanse · Governance · Summarizing · Profiling

Access · Analyses · Query · View

Data governance (metadata, lineage, data quality)

Extract · Load · Transform

Cloud migration

Due to the volume of processing, the need for flexibility and the ability to scale quickly, cloud migration may provide value during LDTI implementation.

Challenges

Technology
- ▶ Legacy technology compatibility
- ▶ Interdependencies across technology stack
- ▶ Integration with existing processes

Realizing cost savings
- ▶ Incomplete understanding of enterprise-wide needs
- ▶ Application migrations and technology refreshes
- ▶ Software license portability to cloud

Change management
- ▶ Lack of comprehensive understanding of the impacts to stakeholders
- ▶ Decentralized change strategy

Opportunities

Agility
- ▶ Increase flexibility when delivering customer needs
- ▶ Reduce provisioning time for new IT capabilities
- ▶ Improve competitive advantage

Efficiency
- ▶ Decrease delivery times for new services and business channels
- ▶ Improve governance and management of IT capabilities
- ▶ Strengthen project, service and business delivery

Innovation
- ▶ Align business and IT implementation models
- ▶ Create new value propositions through innovative
- ▶ Enable experimentation with reduced capital expense

Actuarial modeling: vendor landscape

Summary-level business needs

- ▶ LDTI calculation enhancements

- ▶ Disclosures and reporting

- ▶ Scalability to meet run-time needs

- ▶ Data management

- ▶ Assumption management and governance

- ▶ Controls, auditability and standards

Summary-level vendor capabilities

- ▶ Library enhancements for LDTI updates

- ▶ Canned reports and dashboard features

- ▶ Cloud-based solutions with scaling

- ▶ Integrated data solutions and tools for ETL, ELT, and big data

- ▶ Input, table and assumption management tools

- ▶ Environments for development, quality assurance, production, post-production

- ▶ Workflow and automation tools

Technology challenges and opportunities
Processes, disclosures and reporting to Finance

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Polling questions

Polling question

Do you believe that the current technology solutions in your company (or your clients'), will be sufficient to meet the needs of accounting change?

A. Yes

B. No

C. Maybe

Poll: Do you believe that the current technology solutions in your company (or your clients'), will be sufficient to meet the needs of accounting change?

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2019 ANNUAL MEETING & EXHIBIT

Polling question

In order to supplement the solution needs of your company, are you more likely to buy, build or use a mixed solution?

A. Buy

B. Build

C. Use a mix of external and internal solutions developed both externally and internally

Poll: In order to supplement the solution needs of your company, are you more likely to buy, build or use a mixed solution?

Overview of key LDTI impacts on process and technology

1   **Data feeds**
▶ Actual historicals needed

2   **Actuarial models**
▶ Update models to do cohort calculations

3   **Ledger/rules engine**
▶ Impacts to chart of accounts

4   **Allocations**
▶ Allocation of actuals to more granular levels required

5   **Multiple data stores**
▶ Source and reconcile actuals required

6   **Management reporting**
▶ Update systems and processes for planning, forecasting and stress testing

7   **External reporting and disclosures**
▶ New required disclosures
▶ Update to financial statements & management discussions
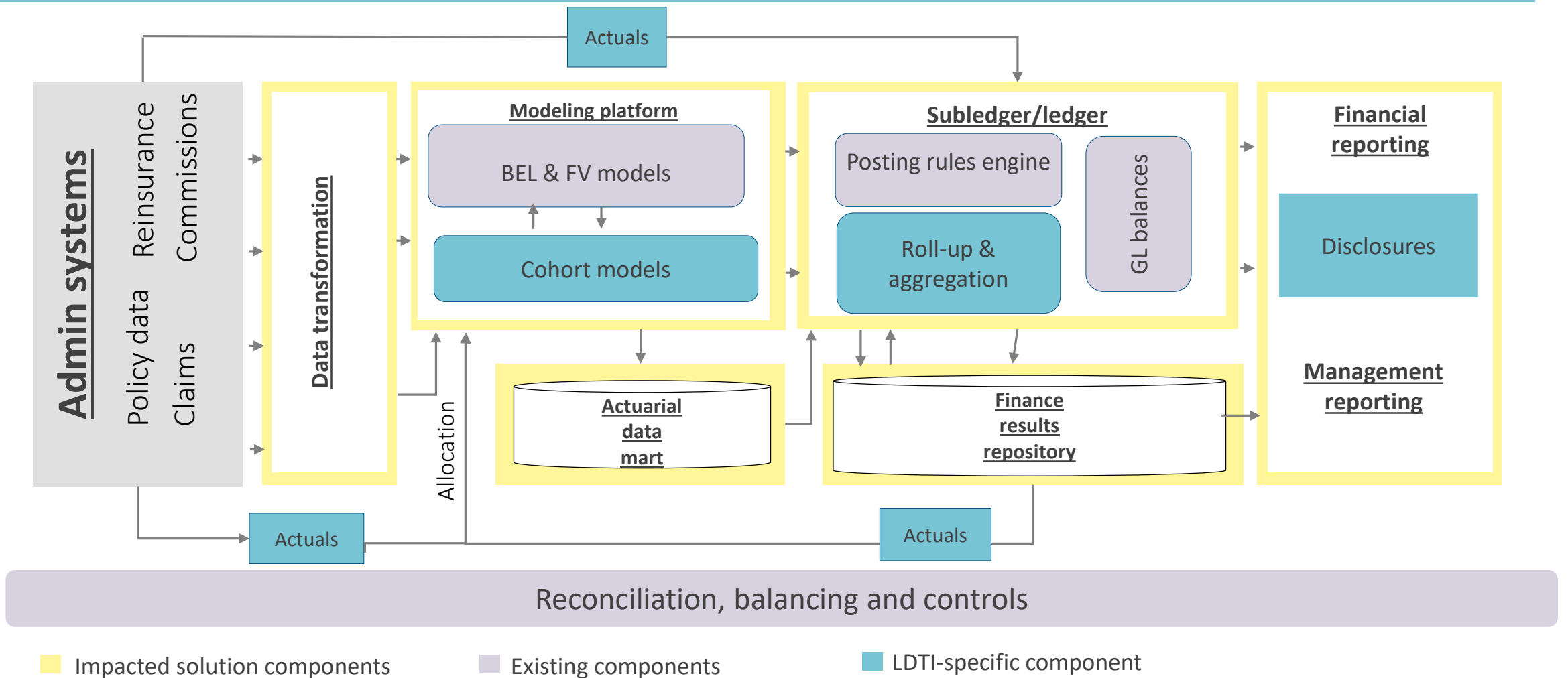
8   **Master data - RDM & MDM**
▶ Standardize the data definitions

9   **Process, controls & SOX**
▶ Consider revised/additional risk metrics as indicated

Conceptual LDTI data flow

A view of data flow

Impacted solution components   Existing components   LDTI-specific component

LDTI capabilities overview

Identifying system components supporting required and desired capabilities

Critical capabilities for LDTI	System components to support these capabilities
Development of new model components	Actuarial modeling software
Linking actuals historical data with projections	Data marts, subledger
Additional data storage to support LDTI needs	Data marts, subledger
Enhanced auditability & controls and governance framework	Data marts, subledger
New disclosure reporting	Actuarial modeling software, data marts, subledger
Updated journalizations and posting	Subledger, general ledger

Additional capabilities not critical to LDTI but present in a mature modeling and data management environment
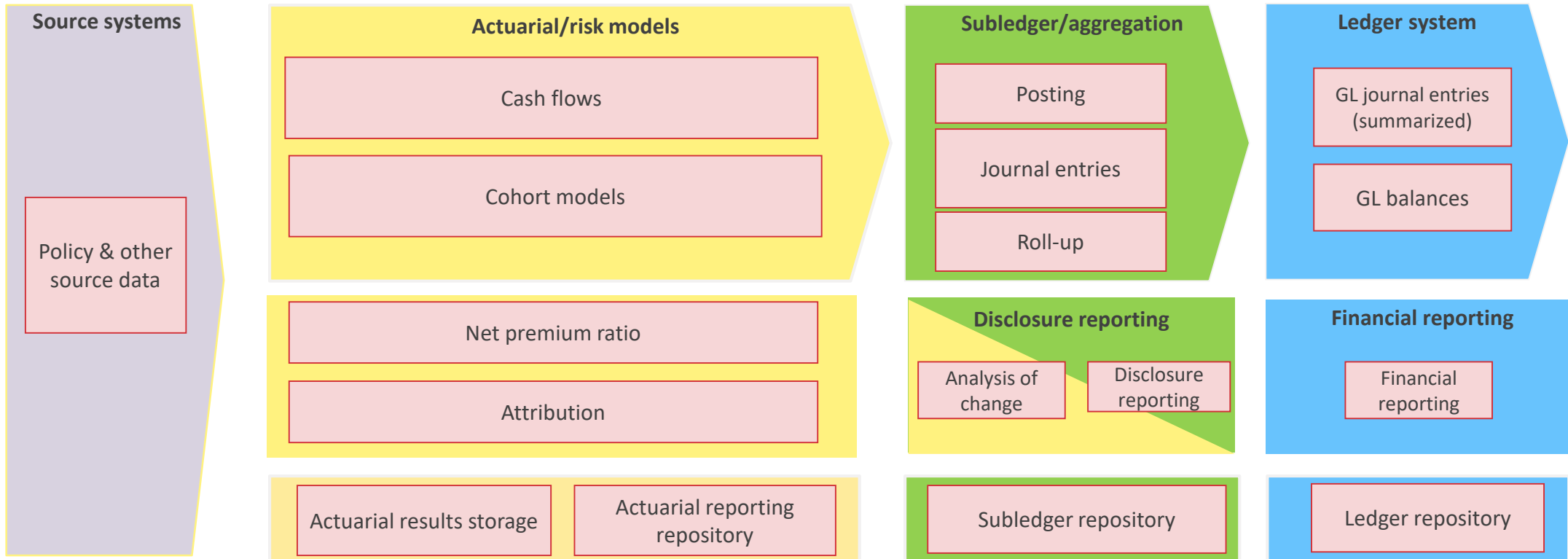
- Workflow management
- Analysis capabilities
- Effective data marts
- Decoupled assumption management
- Cloud computing

LDTI components

An overlay of actuarial, subledger and ledger systems on a LDTI-driven process flow

Panel discussion and Q&A