
# 61 - Targeted Improvements: Data is the Real STAR!

# 2019 Valuation Actuary Symposium

**SIEW CHEN OW, BEN NICHOLS, BRIAN CARTER, JOHN ADDUCI**

**Session 61 – Targeted Improvements: Data is the Real STAR!**

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# Objectives

- Discuss about data governance/management framework and how it can be applied to US GAAP LDTI and VM-51 regulations.

# Topics for Discussion

- Overview of Data Management?
- What is Data Governance?
- Case Study – Actuarial Data Needs for VM-51 and Model Governance
  - Questions
- Case Study – Data Needs to support GAAP LDTI on Market Risk Benefits
  - Questions

# Panelists and Moderator

## John Adduci

Vice President, Actuarial Services

PolySystems, Inc.
Actuarial Software & Data Solutions

## Ben Nichols

Executive Director, Information Management

RGA

## Brian Carter

Executive Director, Information Management

RGA

## Siew Chen Ow (Moderator)

Executive Director and Actuary, Global Analytics and In-Force Management

# What is Data Management and Data Governance?

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# Data Management - Overview

A systematic approach to collecting, storing, securing, and sharing data that provides a framework by which your company uses data

- Data Governance
- Database Management
- Business Intelligence
- Data Quality
- Data Integration
- Master Data Management
- Data Security
- Data Modeling and Architecture
- Metadata Management

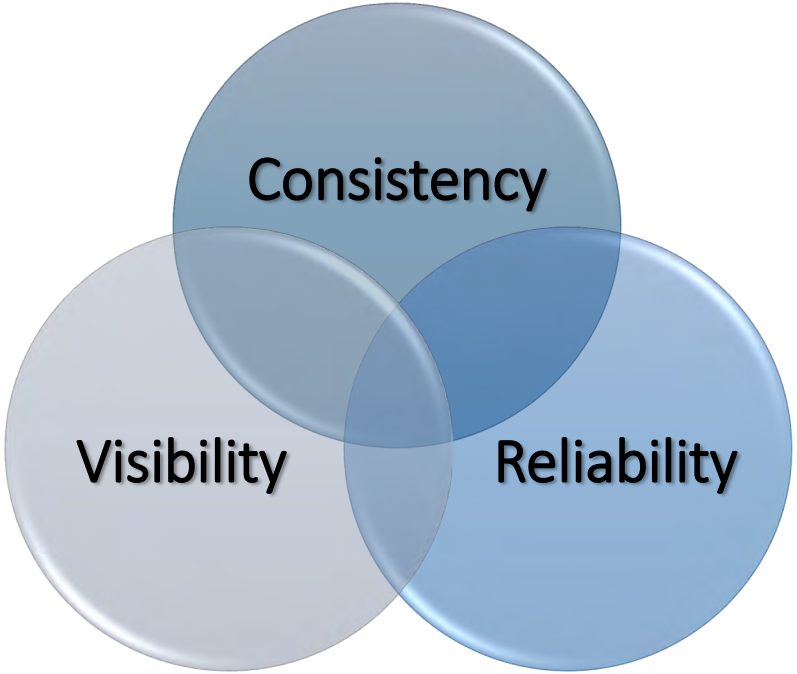
# What is Data Governance?

A collection of processes and tools that:

- Enforce data policies and standards
- Define data ownership/accountability
- Ensure data quality and consistency
- Protect a company's data assets
- Establish guidelines for proper data usage

# Why Do You Need Data Governance?

Establish trust in your data



# Actuarial Data Needs for VM-51 and Model Governance:  A Case Study

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# VM-51 Overview

- VM-51: “Experience Reporting Formats”.
- Submissions will be made by end of September.
- Industry average experience report will be made available to the regulators on the following March 31.
- Collection of experience data provides a data base to establish industry experience tables or factors (e.g. valuation tables for PBR)
- 3 sub sections of data collection and report formats
  - Mortality
  - Policyholder behavior
  - Expenses.

# CASE STUDY #1a: VM-51 Data implementation

| | |
|---|---|
| VM-51 Data Implementation: | • Traditional Life Insurance, FAS 60 type product. VM-51 Experience Reporting formats applies.<br>• Task is to create reports to feed the formats required for VM-51 for this block of business.<br>• Verify Results are correct and accepted by the regulators by the deadline (September 30). |
| Methods / Challenges: | • IT / Actuarial model users will use the existing historical data build that experience studies use today and build out additional functionality.<br>• VM-51 requires some additional fields and the historical database needed to be modified. Determine all new requirements for VM-51 and whether changes are needed to support them.<br>• Generate first draft of reports and review. Verify results by auditing single coverages.<br>• Validate the existing and output files. Investigate any issues:<br>  ◦ Rider coverages missing termination dates, PUA coverages missing monthiversary face amounts |
| Conclusions: | • Changes to the process for building data need to be reviewed by all stakeholders<br>• Regression Testing<br>• IT / Actuarial need to both be involved in testing any changes to the data produced |

# CASE STUDY #1: Communication and Defining Data

| | |
|---|---|
| Description of work tasks, general | • Review of VM-51 and how that impacts data<br>• Review any other changes to data needs for new regulations (GAAP LDTI, for example).<br>• Review existing historical data built |
| Challenges that need to be addressed | • IT / Actuarial model users will use the existing historical data build that experience studies use today.<br>• Determine how to build the actual historical cashflows for premiums and claims.<br>• VM-51 requires some additional fields and the historical database needed to be modified.<br>• GAAP LDTI requires as of 1/31/2021 the restatement of the past two years of financials. Therefore, the insurance company needs to develop cashflows starting with 12/31/2018.<br>• Consider the need for additional inputs to the process<br>• Validate the existing and output files |
| Key takeaways | • Data Items – Discuss data mapping, validating results. Be conscious of timing issues<br>• Regression testing – Verify there are no unexpected changes to results.<br>• Governance issue – Communication is key. Discuss the process and discuss expectations. |

# CASE STUDY #1b: Data Governance

| | |
|---|---|
| Model Conversion | • Traditional Life / FAS 60 type product.<br>• Statutory valuation, GAAP valuation, and Experience study maintained in one model with one data feed |
| Methods / Challenges | • There is one model and all areas need to work off the model<br>• Combine three separate data feeds into one data feed used for all three purposes<br>• Different actuarial personnel support different models, all are now using the same database and model.<br>• Establish procedures around updating the data or model. Implementation testing should proceed any move to production<br>• Maintaining the model, model upgrade procedures<br>• Consistency of data from period to period |
| Potential Upside: | • One model to maintain<br>• No need to explain differences between two different models within the same block of business<br>• Quicker to close since only one model is maintained |

# Data Governance:  Case Study #1b

- One model is created and put into production
- Actuarial Staff has more time for analysis
- Management is happy with results and reduced time to close… but then:
- Actuary in charge of experience studies sees issues with actual to expected ratios.  What is the root cause?
  - Death Benefit Field definition changed at some point
  - No record of when or who made the change
  - Possibly need to re-submit experience study results.
- How can this be avoided in the future?

# Governance Concepts and IT Practices That Promote Quality Data Solutions

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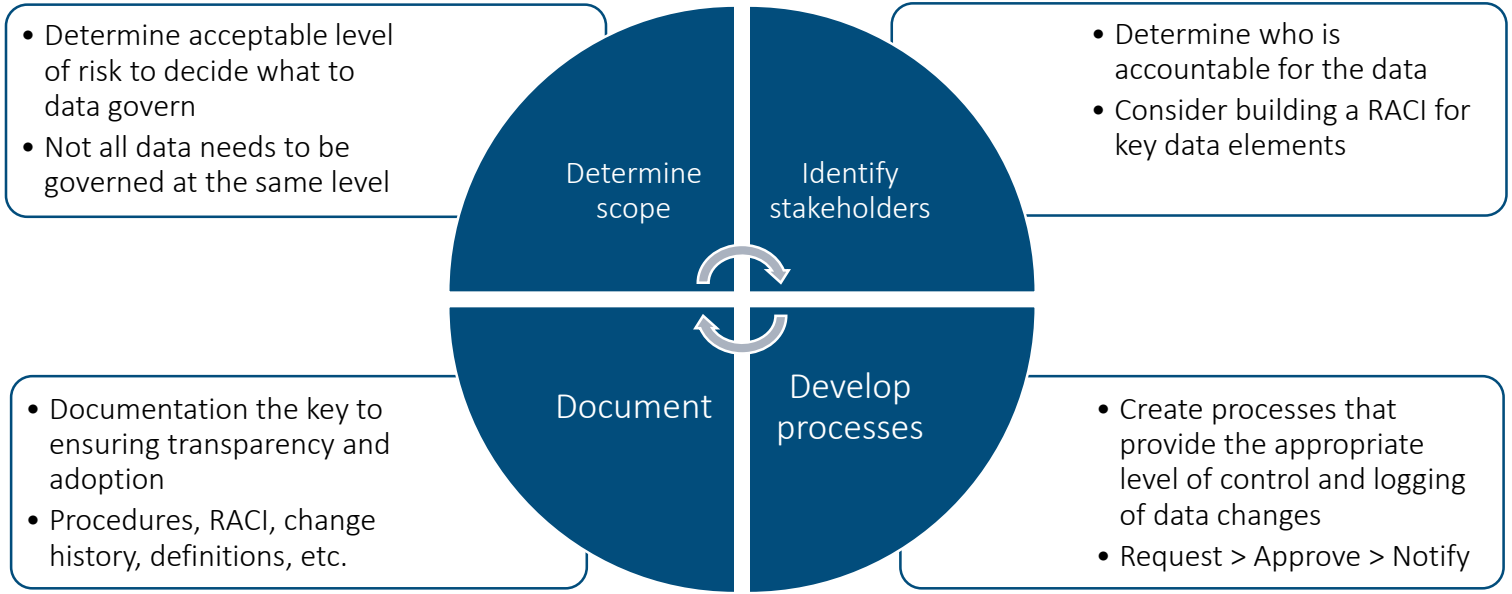
# Benefits of Effective Governance Practices


Consistent, accurate answers to business questions

More time spent analyzing data than gathering data

Better, more efficient data-driven decisions

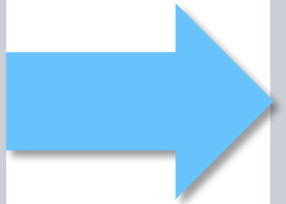
# How do I get there?



# Moving from Compliance to Governance

## Compliance

- Focuses on policy enforcement
- Driven by legal and regulatory requirements
- Rigid guidelines often imposed by legal or risk departments
- Activities are reactive in nature



## Governance

- Goes beyond compliance to deliver business value
- Collaboration between business functions to meet organizational data needs
- Proactive approach to managing data

# Ensure Success of Your Data Initiatives

## Know your target!

- Identify the business problem you are trying to solve
- Define the scope to maintain focus on your key goals
- Clearly document and communicate requirements to maintain alignment within the project team
- Engage stakeholders throughout the process

# Ensure Success of Your Data Initiatives

## Minimize your risk!

- Avoid surprises by understanding your current state
- Determine who is using your data and for what purpose
- Consider the impact of alternative solutions (i.e. build new vs. modify)
- Develop a comprehensive test strategy that includes regression testing

# Case Study #2:  Data Needs to support GAAP LDTI on Market Risk Benefits

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# Market Risk Benefits (MRB)

- New concept: MRB and the definition of "protection"
- Definition of a Market Risk Benefit:
  - "A contract or contract feature that both provides protection to the contract holder from other-than-nominal capital market risk and exposes the insurance entity to other-than-nominal capital market risk"

# Targeted Improvements (TI) will have a significant impact to actuarial reserving and reporting processes across long-duration products

## Liability model for future policy benefits

**Cashflow Assumptions:** Updated to current estimate: "unlocking" with catch-up adjustments

**Discount Rate:** "Upper Medium Grade", two discount rates (locked in, current)

**Net Premium Ratio:** Capped at 100%

**Products:** "FAS60" products, e.g, Traditional Life, Health, Life-Contingent Payout Annuities

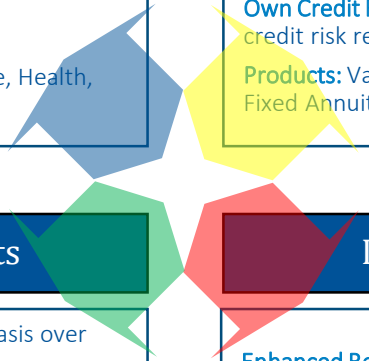
## Market Risk Benefits

**New Classification:** Market Risk Benefits (MRBs), includes all types of "GMXB" benefits

**Methodology:** All MRBs measured at fair value

**Own Credit Risk:** Change in reserve due to change in own credit risk reported through other comprehensive income

**Products:** Variable Annuities, Fixed Indexed Annuities, Fixed Annuities



## Deferred Acquisition Costs

**Simplified Model:** Amortization on a constant basis over the anticipated life of the contract

**One-way write down:** Adjust DAC balance actual terminations for the period in excess of expected

**Products:** All long-duration products

## Disclosure Requirements

**Enhanced Reporting:** Reserve and DAC rollforwards, details about assumption and changes to assumptions

**Products:** All long-duration products

# **CASE STUDY #2:** GAAP LDTI for Market Risk Benefits (MRB)

| | |
|---|---|
| Description of work tasks | • ASU 2018-12, aka GAAP LDTI, aka GAAP Targeted Improvements<br>• Update data provided to satisfy requirements |
| Challenge that needs to be addressed | • Retrospective transition – resurrection of prior models<br>• Locked in Attributed Fee percentage at issue<br>• Multiple scenario runs required for close. Is computing power sufficient?<br>• Own Credit Spreads and other new model assumptions<br>• Aggressive implementation date, restatement of the past two years financials<br>• Disclosure Requirements / Analysis of Change for internal purposes. |
| Key takeaways | • Data Archive – Is it accessible and complete? Can it be resurrected quickly? Do policy counts match prior reported model results<br>• Computing Resources – Projects that require more computing power need to be identified early so that resources can be allocated |

# Disclosure Requirements – ASU 2018-12

- Balance from prior run
- Prior Inforce, initial credit spread
- New Issuances
- Benefit Payments / Fees collected
- Market Assumptions
- New Inforce: "Theta"
- Unlocking Assumptions
- New credit spread

- Conclusion: Numerous data and assumption requirements. Multiple runs required in time for business close.

| | December 31, 20X2 | | December 31, 20X1 | |
|---|---|---|---|---|
| | Variable Annuities | Indexed Annuities | Variable Annuities | Indexed Annuities |
| Balance, beginning of year | $ AAA | $ FFF | $ XXX | $ XXX |
| Balance, beginning of year, before effect of changes in the instrument-specific credit risk | XXX | XXX | XXX | XXX |
| Issuances | XXX | XXX | XXX | XXX |
| Interest accrual | XXX | XXX | XXX | XXX |
| Attributed fees collected | XXX | XXX | XXX | XXX |
| Benefit payments | (XXX) | (XXX) | (XXX) | (XXX) |
| Effect of changes in interest rates | XXX | XXX | XXX | XXX |
| Effect of changes in equity markets | XXX | XXX | XXX | XXX |
| Effect of changes in equity index volatility | XXX | XXX | XXX | XXX |
| Actual policyholder behavior different from expected behavior | XXX | XXX | XXX | XXX |
| Effect of changes in future expected policyholder behavior | XXX | XXX | XXX | XXX |
| Effect of changes in other future expected assumptions | XXX | XXX | XXX | XXX |
| Balance, end of year, before effect of changes in the instrument-specific credit risk | XXX | XXX | XXX | XXX |
| Effect of changes in the instrument-specific credit risk | XXX | XXX | XXX | XXX |
| Balance, end of year | $ GGG | $ LLL | $ AAA | $ FFF |
| Reinsurance recoverable, end of year | $ XXX | $ XXX | $ XXX | $ XXX |
| Balance, end of year, net of reinsurance | $ XXX | $ XXX | $ XXX | $ XXX |

# Meet Increased Granularity Demands with Scalable Infrastructure

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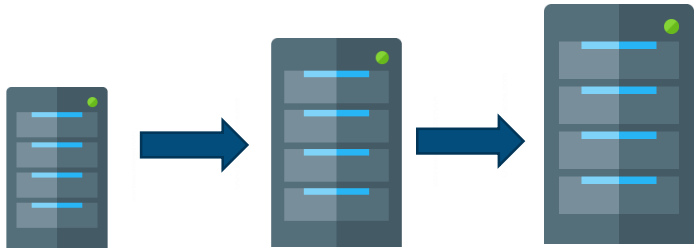
# Transition to Horizontally Scalable Platforms

Drivers for Increased Data Volume and Performance Demands

- **Granularity**: additional level of detail is needed to fulfill regulatory requirements
- **Additional Calculations:** multiple scenario runs required for close cycle
- **Greater Historical Detail:** increased breadth of historical data included in analysis

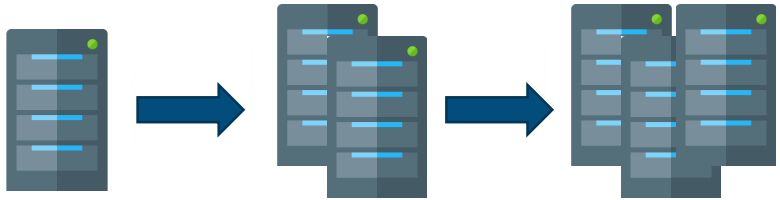
**Vertical Scaling**

Increasing capacity of existing hardware by adding resources



**Horizontal Scaling**

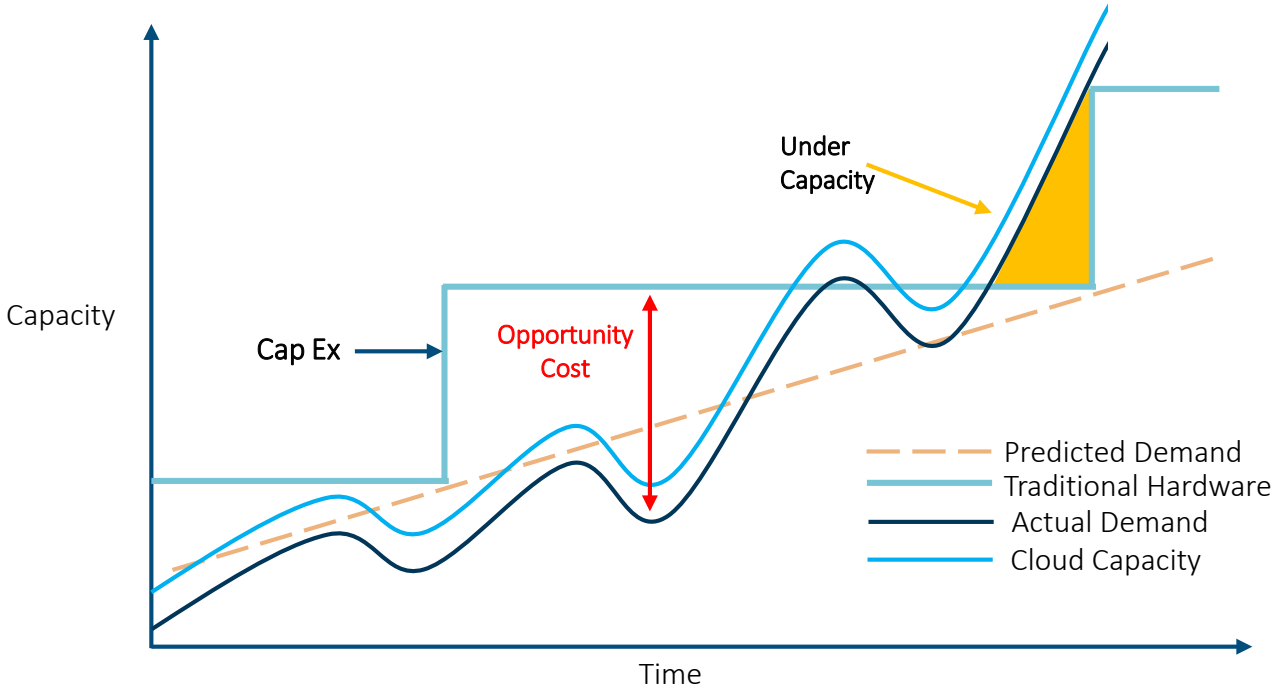
Increasing capacity by adding more servers to a clustered system that performs as one unit



# Leverage Cloud Scalability for Cyclical Workloads

Leverage Cloud capabilities to optimize performance-per-dollar

- Scale Up/Down
- Separate Compute from Storage



# Improve Operational Efficiency Through Automation

- Data Quality Reporting
- Workflow validation

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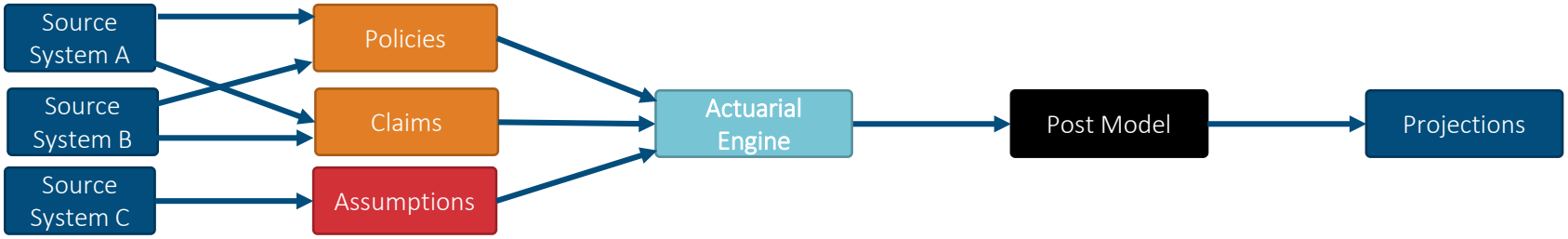
# Actuarial Projection Workflow

## Automate manual processes required to validate a projection run

- **Data Input Validation**: assess the quality, consistency, uniqueness, and logic of source data ingested
- **End-to-End Workflow Validation:** validate system processing and transformations are occurring as expected between each step for an individual run




**Source**
Source transactional and reference data

**Conform**
Consolidate disparate sources into common data model

**Model**
Execute Actuarial Model

**Post-Processing**
Perform Post Model calculations and aggregations

**Consumption**
Validate Projection and make available for consuming processes

# Data Profiling and Data Quality

Validate that the inputs into the actuarial modeling process are accurate for the intended use

- **Data Profiling**: leverage descriptive techniques and statistics – such as min, max, mean, mode, percentile, standard deviation, frequency, and variation to find unexpected values
- **Data Quality Rules:** Utilize generic, industry specific, and custom rules to validate the correctness of the data for its intended use

Example Data Quality Rules

| Type of Rule | Description | Example |
|---|---|---|
| Basic business rules | Basic business logic rules | Date of a claim cannot be before the date of policy inception |
| Data-type constraints | Values in a particular column must be of a certain type | Boolean, numeric, date |
| Range constraints | Numbers or dates should fall within a certain range | • Eligible age for contract must be > 18<br>• Minimum premium amounts |
| Mandatory constraints | Particular columns cannot be empty | Policy ID must contain a value |
| Unique constraints | A field, or a combination of field, must be unique across a dataset | Insured ID and Policy ID must be unique |

# Data Quality Monitoring

Data Quality Monitoring is an ongoing process and should be tracked and managed over time

- **Classification**: The quality of the data is classified as either an incident, exception or an issue
- **Governance:** Roles and responsibilities for managing and resolving issues
- **Issue Management Process:** Tracking and workflows to resolve data issues
- **Root Cause Analysis:** Identifying the underlying cause of the data issues
- **Prioritization:** Evaluate impact of data quality issues and identify remediation efforts

| Name | Rows Passed | Rows Failed | Passing Fraction | Result | Action Required |
|---|---|---|---|---|---|
| Policy Type Validation | 87,000 | 8,000 | 91.6% | Passed | Continue Run – acceptable # of failures |
| Unique Policy ID | 65,000 | 30,000 | 68.4% | Failed | Stop Run - Source system correct unique values error |
| Eligible Age Range | 92,000 | 3,000 | 96.8% | Passed | Continue Run – acceptable # of failures |
| Zip Code NULL | 90,000 | 5,000 | 94.7% | Passed | Zip Code immaterial to cash flow accuracy |

# End-to-End Workflow Validation

**Leverage Data Lineage capabilities to identify anomalies occurring in the end-to-end process**

**Data Lineage:** traces data from source to destination, identifying every move the data makes and taking into account any changes that occur for full traceability.

- **Data Asset Linking:** establish links between each data repository that is utilized for an end-to-end process
- **Control Metrics**: leverage descriptive statistics on key measures(policy, face amount, term, etc..) to evaluate expected or unexpected behavior between each step in the process
- **Describe Transformation Processing:** provide explanations of transformations that are occurring at each step in the process


**Run ID:** 43223

| | | | | |
|---|---|---|---|---|
| Policy Count(Sum) | 30,231 | 30,231 | 30,105 | 30,105 |
| Face Amount(Sum) | 232M | 232M | 212M | 212M |

# Compare change in output between periods and factors contributing to that change

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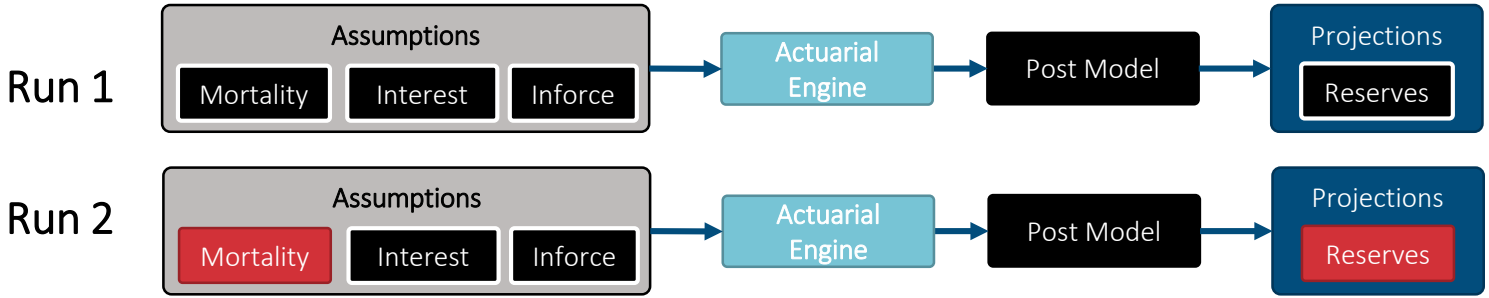
# Change Analysis

Compare multiple runs and identify what has changed in the output and the cause of that change

| | Mortality | Interest | Inforce | Reserves | Change in Reserves |
|---|---|---|---|---|---|
| Run 1 | Prior | Prior | Prior | $XXX,XXX | |
| Run 2 | Current | Prior | Prior | $YYY,YYY | $UU,UUU |
| Run 3 | Current | Current | Prior | $ZZZ,ZZZ | $QQ,QQQ |
| Run 4 | Current | Current | Current | $VVV,VVV | $TT,TTT |

Leverage data lineage and data validation testing capabilities to automate run comparisons

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