Session 19: Actuarial Transformation and Modernization

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Transformation and Modernization

Financial reporting processes

Willis Towers Watson

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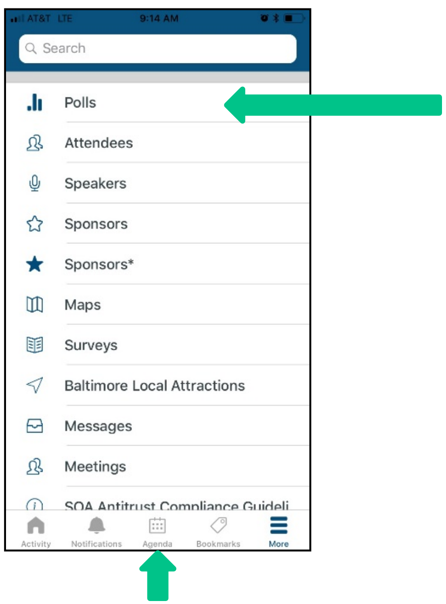

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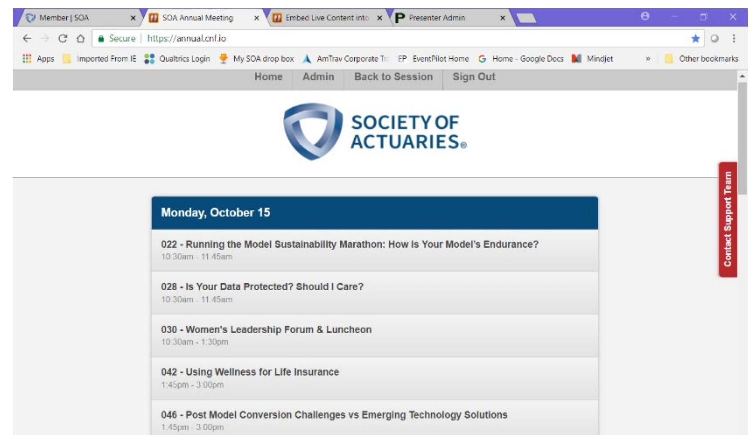

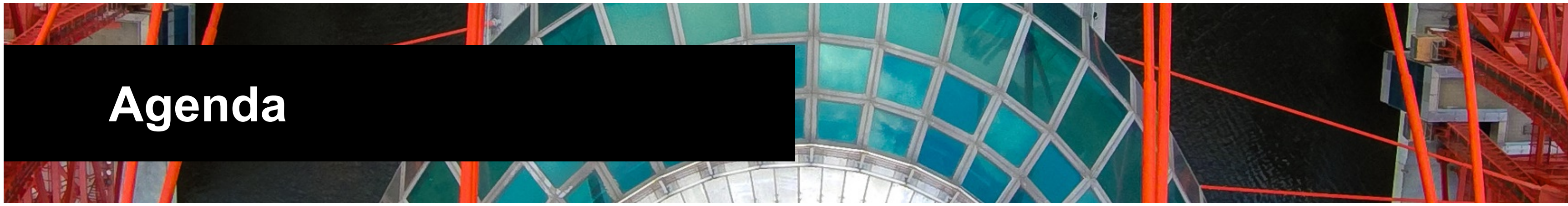

Agenda

- Why transform?
- Stages of transformation
- Roadmap development
- Organizational considerations
- Case study

Why transform?

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Poll:
Why transform your reporting processes?

Why transform?

- **Improve quality of results and manage reporting risk**
  - Controlled and auditable process
  - Reduced opportunity for errors
- **Improve timing and frequency**
  - Shorter reporting cycle to meet management's demands
  - More detailed reporting, attribution analysis and metrics
  - Report more frequently
- **Free up time for more critical tasks**
  - Analysis/Review of results
  - Recommendations to the business
  - Assuring board and senior management fully understand results
- **Reduce expenses**

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Poll:
When do you expect to start transformation?

Stages of transformation

Stages of transformation

- **Stage I – Current State**
  - Minimal automation
  - Numerous disparate processes, unique to each division, block, etc.
- **Stage II - Improved**
  - Semi-automated processes that still require manual intervention
  - Improved controls but not secure
  - Increased efficiency but not optimal
- **Stage III – Transformed**
  - Significantly automated with minimal human intervention
  - Governed processes with restricted access
  - Controls incorporated into the end-to-end process
- **Use of a Data Warehouse**
  - Secure location(s) where inputs and outputs are stored
  - Governance applied, e.g., naming conventions, data format, etc.
  - Efficient storage – hot vs. cold
  - Retention limits defined and adhered to

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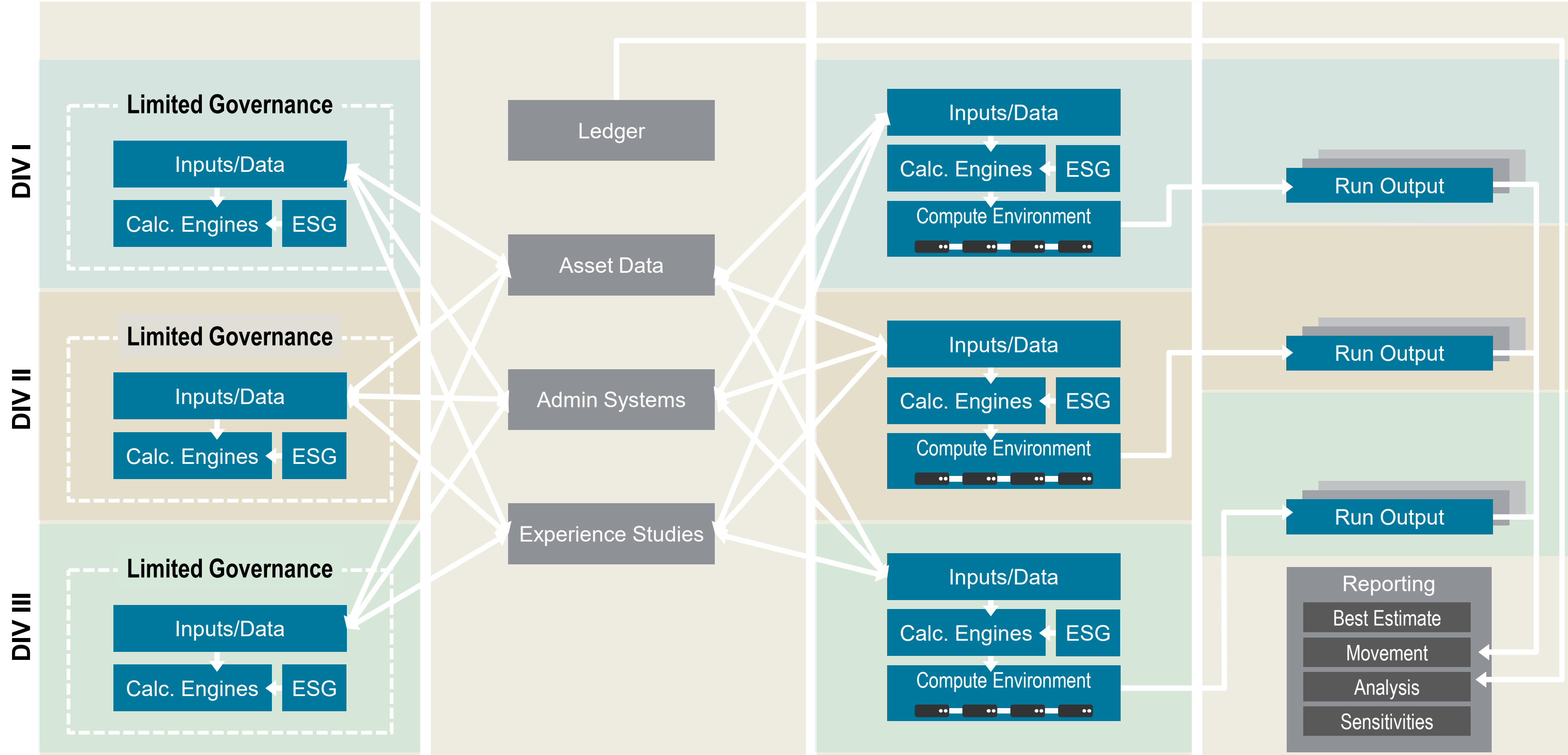
Poll:

What technology is used in your current reporting processes?

Stage I: Significant manual processes with limited controls



Model Development

- Independent processes at business division level
- Limited governance such as model backups, change log for major items
- Limited regression testing

Data Sources

- Independent data extraction work flow

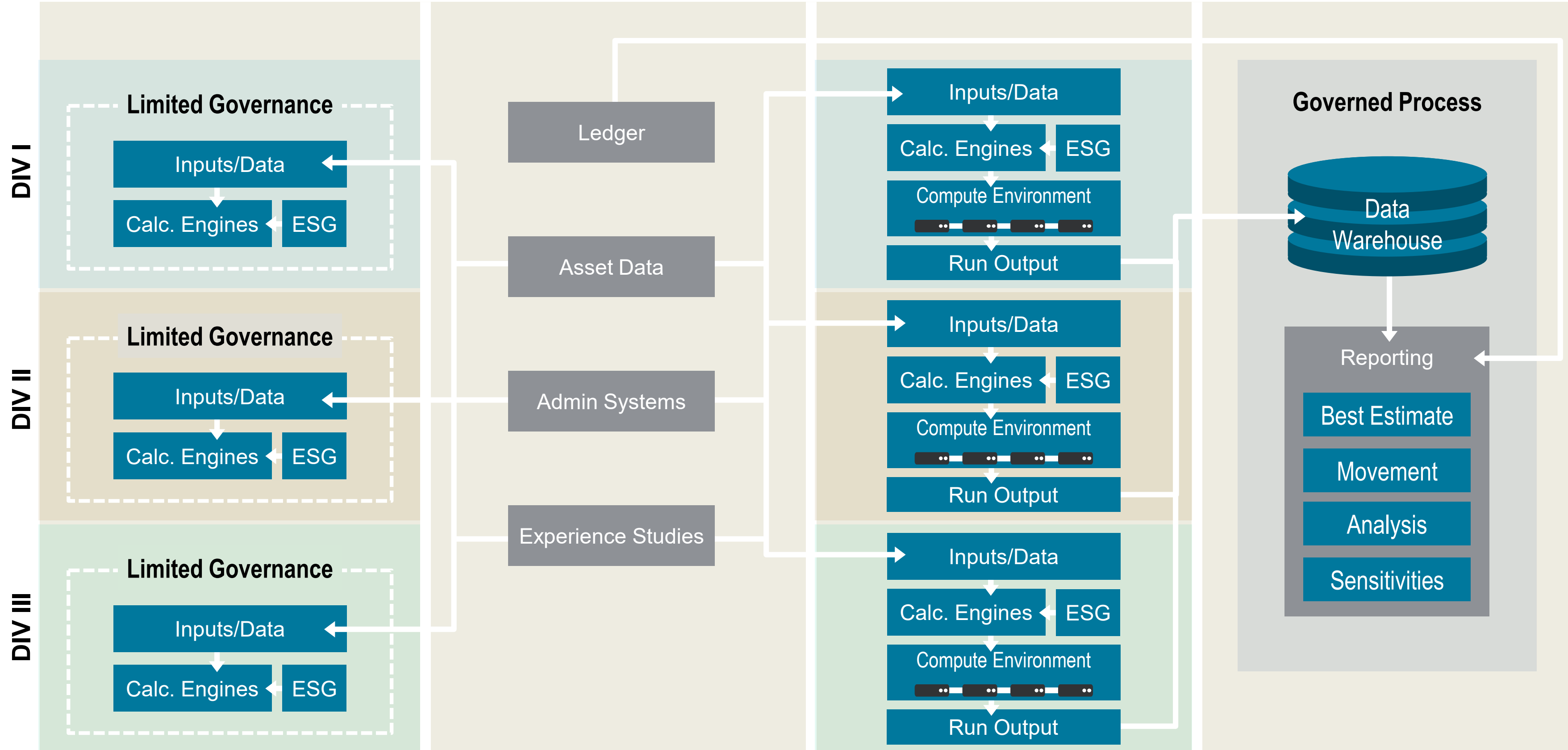
Model Execution

- Decentralized environments
- Mostly manual run execution
- Some version control and backup of all runs
- Manual model and input sign-off

Reporting

- All divisions produce separate spreadsheet output
- Manual report generation
- Informal data retention and backup policies
- Informal adjustment requests
- Manual approval and sign-off of results

Stage II: Semi-automated processes with improved controls



Model Development

- Independent processes at business division level
- Limited governance such as model backups, change log for major items
- Limited regression testing

Data Sources

- Streamlined and consolidated data extraction work flow

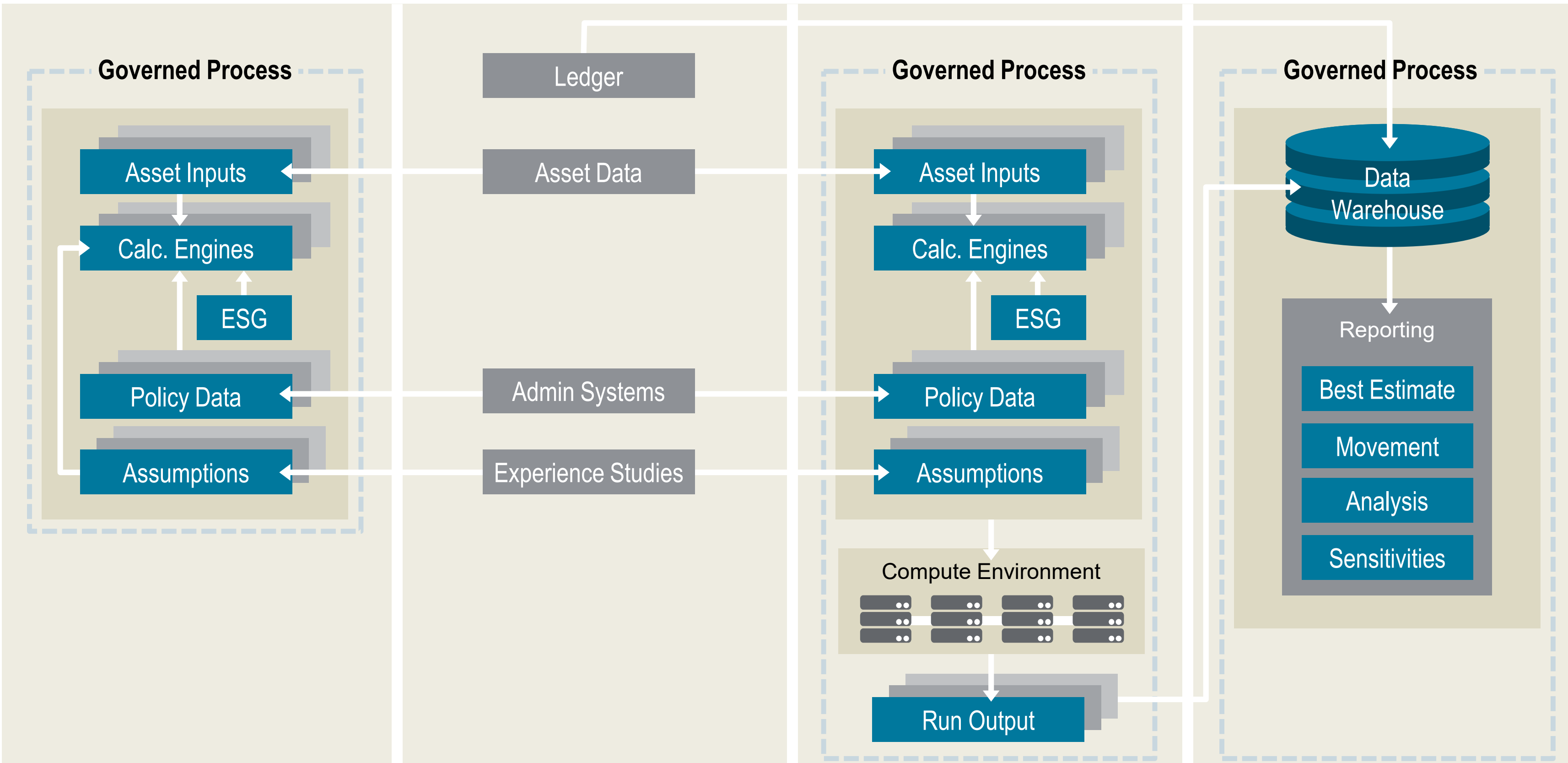
Model Execution

- Decentralized environments
- Mostly manual run execution
- Some version control and backup of all runs
- Manual model and input sign-off

Reporting

- All divisions populate a data warehouse with model results
- More automated report generation
- Formal data retention and backup policies
- Informal adjustment requests
- Formal approval and sign-off of results

Stage III: Significantly automated and governed process



Model Development

- Optimal number of models/engines
- Version control
- Backups
- Formal change requests
- Regression testing
- Approval and sign-off process

Data Sources

- Fully optimized data extraction work flow

Model Execution

- Centralized environment
- Automated run execution
- Version control and backup of all runs
- Ensure a repeatable process
- Model and input sign-off

Reporting

- Central data warehouse
- All data is standardized and stored in the data warehouse
- Dynamic report generation
- Data retention and backup policy
- Formal adjustment request and sign-off
- Approval and sign-off of results

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Poll:
In which stage is your company?

Roadmap development

Roadmap development

Where are you?

- **Choose manageable block**
  - Well understood and material size
- **Choose knowledgeable staff**
  - Backfill BAU to allow staff to focus on future state
  - Instills ownership and passion
- **Inventory projections, sensitivities, reporting bases, tools, platforms, etc.**
- **Define reporting requirements**
  - Frequency (monthly, quarterly, annually, ad-hoc)
  - Granularity (seriatim, cohort, block, division)
- **Identify required inputs**
  - Identify similarities and differences between the various projections
  - Consider plan code consolidation
- **Define infrastructure requirements**
  - **Storage needs** – hot vs. cold – based on reporting requirements
  - **Grid** – size, location – based on runtime requirements
  - **Retention period** – check with Legal, Business, etc.
  - **Scheduled submissions** – leverage same process, which allows limited modifications e.g., assumption changes, for all projections
  - **Specify modeling environments** – Development, Sandbox / Testing, Pre-Production, Production, Post-Production
- **Identify current Key Performance Indicators (KPIs)**
  - Use to measure success
  - Days to report results, number of manual adjustments, etc.

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Poll:

What is the budget allocated for transformation?

Roadmap development

Where do you want to go?

- **Automate data feeds**
  - Leverage ability of your platform to automate admin data and assumption feeds
    - Policy data such as issue date, gender, face amount, plan code, loan amounts, etc.
    - Fund data – current, shadow, separate account(s)
    - Tabular data from the admin system, such as COI rates, premiums, etc.
    - Asset data from investment area
  - Automate feeds from other sources such as Experience Studies, Pricing, Ledger, etc.
  - Design data feeds to minimize maintenance
    - Formulaically populate input fields, e.g. exp_qx_<plan>_<gender>_<smoking>_<risk>_<band>_YYYYMMDD.tbl
- **Automate reports and reported results**
  - Integrate model output with financial systems
    - Source of Earnings report that connects ledger data to model output
  - Automate feed of model output to ledger
- **Develop production process**
  - Use scheduler to automate submissions, control reports, spreadsheets, file copies, etc.
    - Provides automated audit trail
  - Capture breadcrumbs to trace output to input

Roadmap development

Stops along the way

- **Potential pitfalls**
  - Consider as-of-dates for admin data and what the platform is expecting, e.g., fund as of monthaversary while platform assumes it's as of first day of the month
  - Ensure periodicity of admin rates is consistent with what platform is expecting, e.g., monthly COI rates or annual
- **Don't forget about low hanging fruit**
  - Quick wins to fix elements of a broken process
    - Use workflow to automate workbooks which will ultimately be replaced
  - Gain street cred
- **Periodically revisit your roadmap**
  - Ensure headed down the right path
  - Assess any route alterations needed
- **Begin the next journey**
  - If staff is available, look ahead to the next block
  - Reflect lessons learned in earlier blocks
  - Use a mix of experienced and new staff

Roadmap development

Other considerations

- **Roles and responsibilities for each environment**
  - Modeling Environments
    - Development
    - Testing
    - Model Office / Pre-Production
    - Production
    - Post-Production / On-top adjustments
  - Access for each environment
    - Read/Write vs. Read-only
  - Separation of duties
    - Developer vs. Tester vs. Model Owner
    - Roles of model steward vs. peer reviewer
- **Establish governance and controls**
  - Create control points throughout process
    - Verify data-in equals data-out
    - Require approval before automated process continues
  - Engage Risk / Internal Audit

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Poll:

Who is working on transformation?

Organizational considerations

Organizational considerations

- **Partner IT with Actuarial**
  - Technical competencies of IT team – database design, data transformation, process automation, etc.
  - Technical competencies of Actuarial team – data knowledge, platform knowledge, requirements, etc.
- **Centralized support staff**
  - May include IT members with strong actuarial interest or vice-versa
  - May require flexible working hours to support the actuarial teams and the reporting cycles
  - Financial reporting process can no longer be segregated between IT and Actuarial
  - Triage model runs
  - Provide training on process
- **Modeling Center of Excellence (CoE)**
  - Monitor all aspects of modeling to ensure practices and principles are followed
  - Ensure consistency and efficiency across all modeling processes
- **People management**
  - Consider staff availability and priorities
  - Engage superior staff to ensure retention
  - Play to the strengths of individuals

Additional thoughts

- **Hand-off / roll-forward of transformed models**
  - Provides opportunity to try out new process
- **Decommission obsolete tools and processes**
  - Reduce license and maintenance fees as usage declines
- **Monitor KPIs throughout to quantify improvement**
- **Monitor budgetary constraints**
- **Rapport among team critical to success**
  - Dysfunction will impede progress and impact quality
- **Manage expectations**
  - 80% right on first block, 90% on second block. Make a second pass to correct

Case study

Case Study: LTC Actuarial Modernization

Shihao Li

May 20, 2019

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OVERVIEW

- Introduction and background
- Main components
- LTC assumption database
- Dynamic loading and model run
- Post processing and seriatim SOE results
- Automated python process
- Challenges and lesson learned

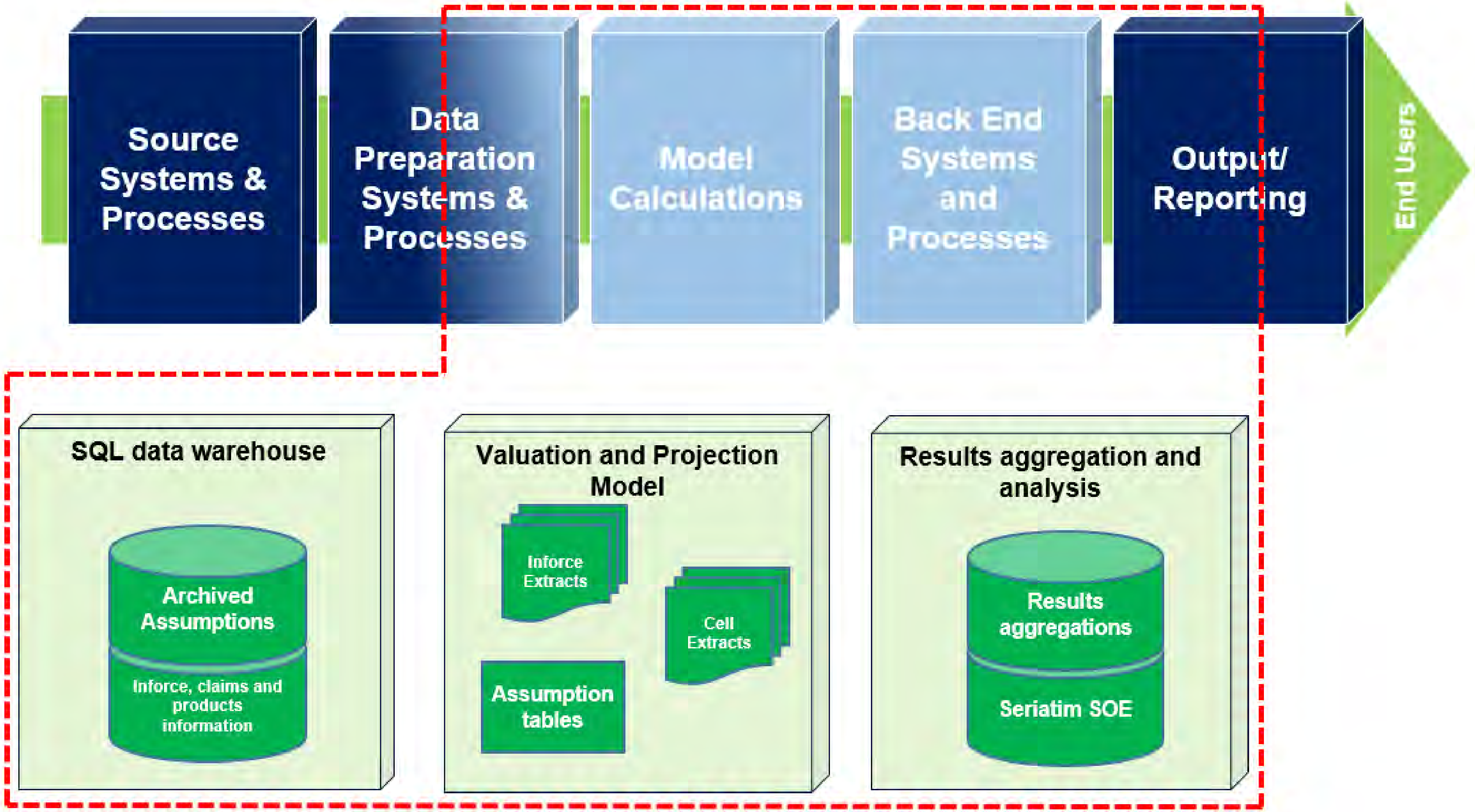
INTRODUCTION AND BACKGROUND

- Transamerica has been selling standalone LTC, and has a material LTC block
- Highly visible nature of the LTC block from both internal and external stakeholders
- In 2012, our company management decided to modernize the LTC model and its process, and to create a source of earning analysis for the block
- Started in 2013, we spent the next three years on transforming the LTC process

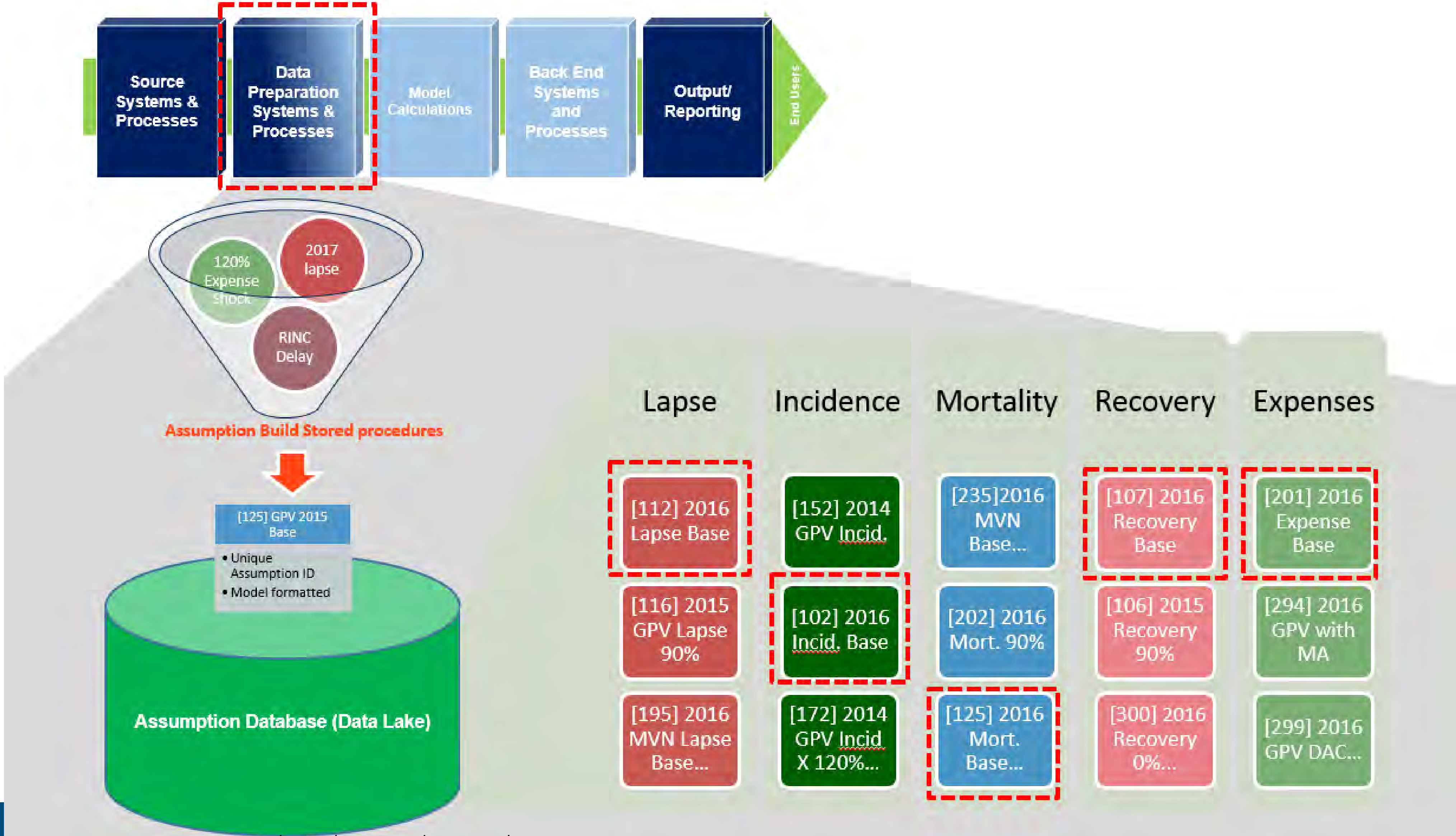
WHAT WE BUILT

- Claim cost to a principle based model
- Valuation and projection model on a single platform
- Assumption database
- Dynamic assumption loading
- Seriatim source of earning analysis
- Ability for predictive analytics
- Python automation

LTC PROCESS MAIN COMPONENTS

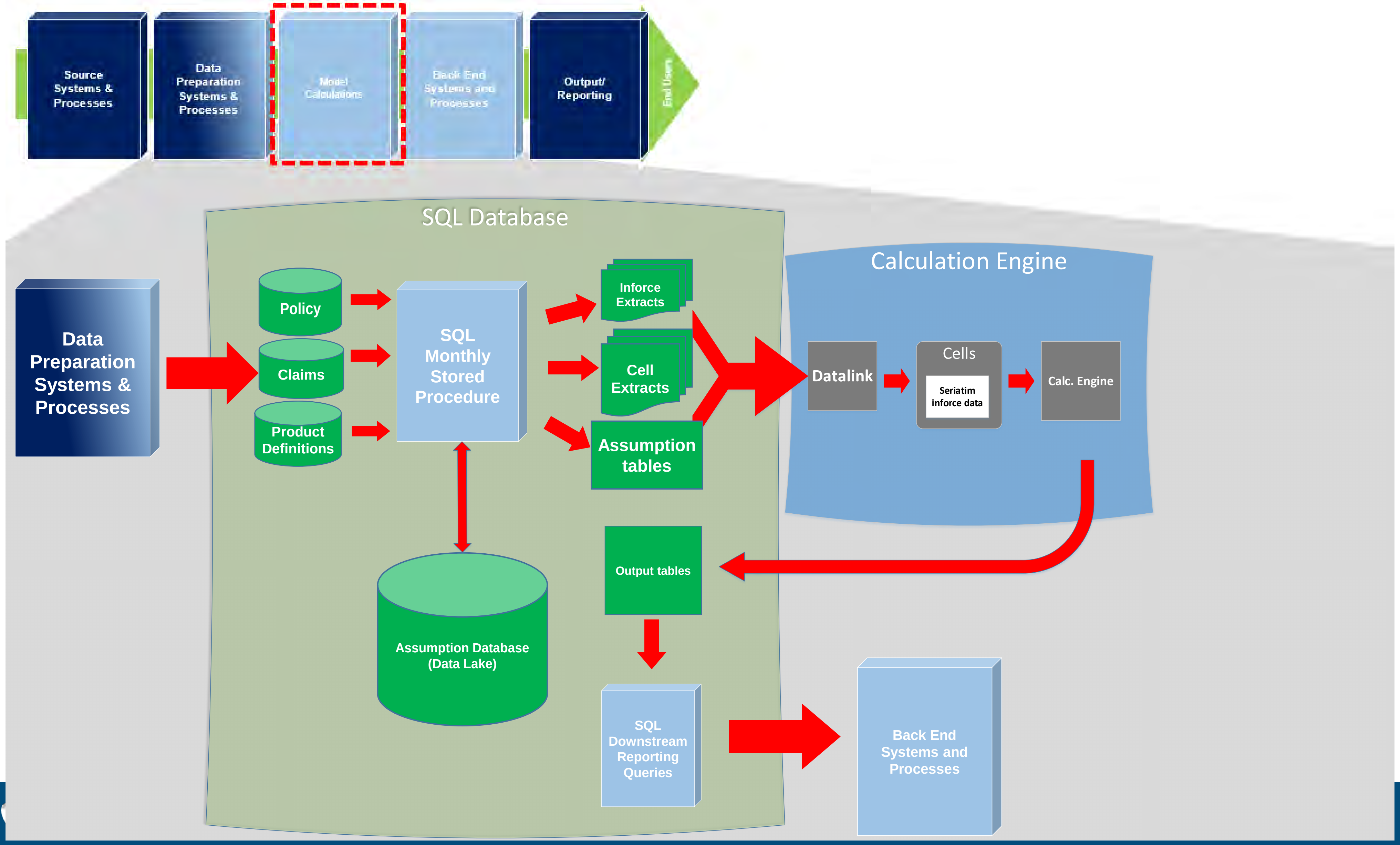


LTC ASSUMPTION BUILD

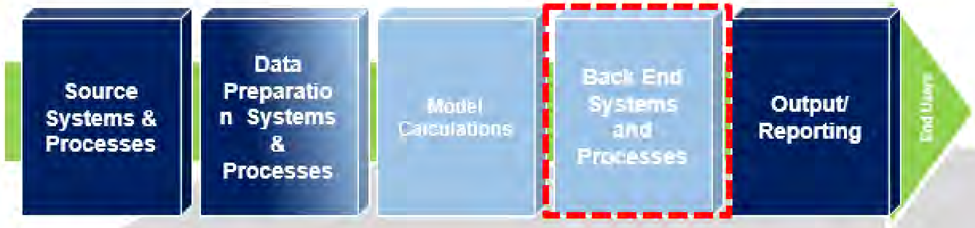


Assumption names and combos are demo only

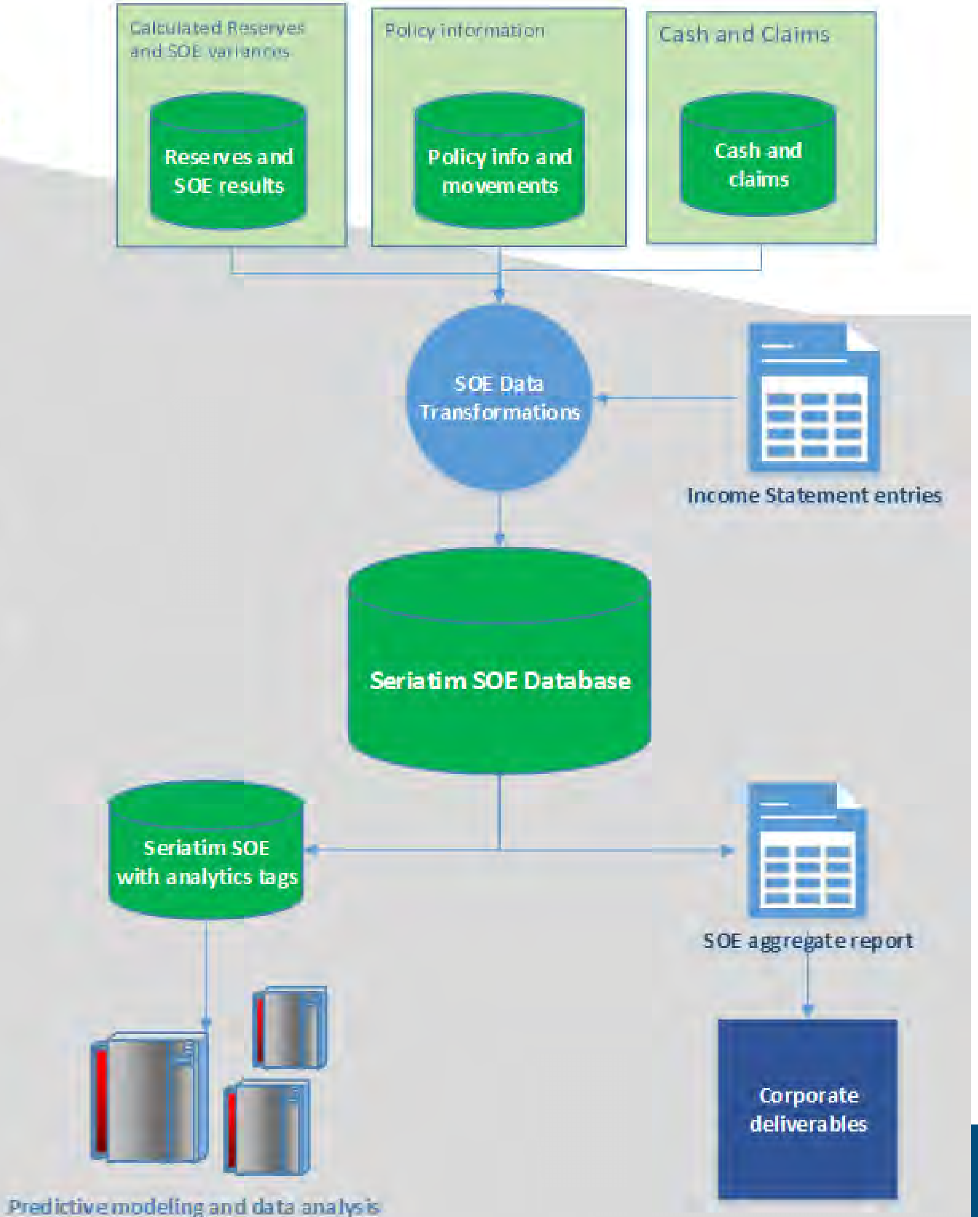
MODEL LOAD AND RUN



POST PROCESSING AND SERIATIM SOE ANALYSIS



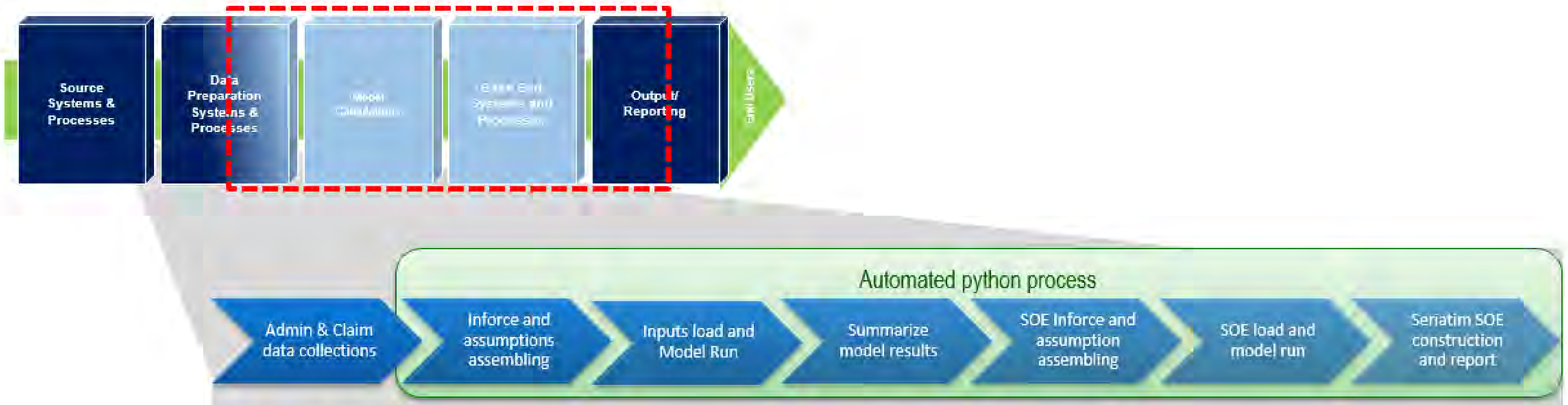
- Policy level SOE analysis
- Automation of SOE process
- Detailed data contains all policy level information, all levels of aggregations and all calculations
- Ability to use SOE workbook at any level of detail
- Enable predictive modeling and data analysis on all the seriatim SOE data



AUTOMATED PYTHON PROCESS

- Fully automated, only need instruction file
- Queuing of runs with flexible settings
- Modulated steps with the ability for parallel loading
- Automatic archive datasets and results

SUMMARY



- Admin and Claim data collection manage by IT and kick off at month end
- Python process kick off based on user instructions
    1. SQL Monthly stored procedure assemble inforce and assumption tables needed
    2. Load inforce, cells and assumptions table into actuarial model
    3. Valuation and projection run with outputs written to SQL database
    4. SQL post processing and valuation report creation
- Repeat 1-4 for SOE run
- Assemble policy level source of earning analysis

CHALLENGES

- We don’t know what we don’t know
- Tight management deadline
- Performance of the process
- Handling large amount of data
- Process exception handing
- Transparency vs automation
- Training and documentation

LESSON LEARNED

- We don’t know what we don’t know
- Integrity of source data, maturity of the assumptions and the existing process are going to directly affect the success of the modernization effort
- Involvement of subject matter experts(SME) in:
  - Process and framework architect
  - Database development and data transformation
  - Vendor software
  - Product feature and actuarial model development
  - Programmers and technical actuaries
- Start with manageable step -> getting results we can trust
- Deal with conflicting advice
- Think out side of the box
- Balance between performance and accuracy
- Sampling and estimating techniques are important

LESSON LEARNED

- IT involvement in setting best standard of practice
- Building the process with controls and reconciliations in mind
- Bigger database, more powerful server does not equal better process
- It takes time to modernize and transform a process, rushing to meet a deadline might cause more headache in the long run
- Throwing money at the modernization does not guarantee faster development or better process
- Setbacks and rework is normal in the modernization

Thank you

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