Actuarial 20/20:
Modernizing the Actuarial Function

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Agenda

Actuarial Modernization

-What, Why, Where and How

Model Governance

-Framework, Tools and Operating Model

Summary Thoughts

Q & A

What is Actuarial Modernization?

Vision	Improving business value and effectiveness of actuarial functions
Goals	To establish a strategically oriented actuarial organization that helps drive the overall company strategy by effectively utilizing and grooming top actuarial talent, efficient processes, and best-in-class tools and analytics capabilities

What is Actuarial Modernization?

- Assessing *actuarial processes*, based on industry leading practices, in order to measure efficiency and effectiveness

- Establishing an *end-state vision* and working to implement that vision

- "Freshening up" systems and related data and processes with state of the art tools and *end-to-end solutions*:

  - ➢ Fixing the foundation
  - ➢ Transforming the function
  - ➢ Enabling strategic capabilities

- Enhancing *data availability* and the effectiveness of supporting technology

- *Optimizing* actuarial *information* provided to management

- Redefining *Actuarial talent* strategies

- Building and embedding an *enhanced governance structure* around actuarial systems

Why is Actuarial Modernization Needed?

> *There are numerous drivers for the need for Actuarial Modernization, both internally-generated as well as in response to regulatory requirements*

Why is Actuarial Modernization important?
▪ Senior management demand for *greater and more timely analysis*
▪ *Pressure on growth* initiatives and capital demands
▪ *Emerging regulatory change*, such as ORSA, Fed SIFI requirements, PBR
▪ Failure to align the Actuarial and Risk functions with *enterprise IT frameworks*
▪ Lack of *standardization, automation, and efficiency*
▪ Historic *under-investment in actuarial systems and processes* and supporting technology
▪ The typical Actuarial function *one-off projects will not achieve* broader company business needs

Common Key Issues to Address

Technology

- Outdated systems with limited functionality do not support changes in valuation methodology
- Capabilities and tools cannot efficiently respond to senior management requests
- Heavy reliance on manual processes and end-user computing (e.g. spreadsheets)
- Computing power to support actuarial projection systems is insufficient
- Decentralized and segregated actuarial systems lead to redundancies and inefficiencies

Processes

- Current processes are manually intensive due to inefficiencies in the models and data
- A lack of technology tools results in manual processes
- Wasted time spent reconciling and/or explaining results
- Risk management prioritization varies across business units and functional areas
- Actuarial staff spend a material amount of time on data capture, validation and production, instead of analysis
- Lengthy valuation run times and actuarial close process

Data & Reporting

- Intensive data collection process requires significant resources
- The lack of consistent data definitions undermines consistency, drives inefficiency and creates reconciliation requirements
- Sourcing and storage of data is performed inconsistently across actuarial processes
- Plan-to-actual variance analysis is not sufficiently granular undermining the ability to explain movements in results

Governance

- Limited controls of coding changes in modeling systems result in integrity issues
- Decision rights, risk ownership, and venue for risk oversight discussions are unclear
- Limited governance of models and modeling production leads to inconsistency
- The process for risk oversight is informal and inconsistent
- Lack of documentation (e.g. undocumented controls)

Addressing these challenges will require an integrated approach with long term view

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What are the Benefits of Actuarial Modernization?
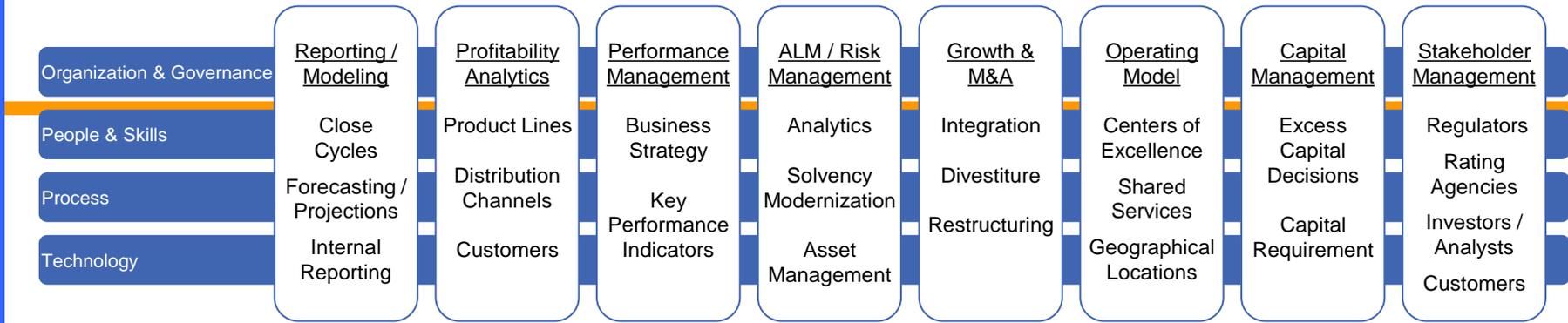
The benefits of a successful modernization program span:
- *People*
- *Process*
- *Technology*
- *Governance*

What are the Organizational Benefits?

- Timely results to inform *strategic decision making*

- *Flexibility to analyze* "what if" scenarios on a timely basis

- *Enhanced quality* and consistency of actuarial results

- Enhanced *risk awareness* capabilities and culture

- *Shift of focus* from operational to strategic activities

- More *effective teaming* between the company's Actuarial and Technology functions

- Improved ability to *attract, manage and develop* top talent globally

What are the Benefits of Actuarial Modernization?

Organization & Governance	Reporting / Modeling	Profitability Analytics	Performance Management	ALM / Risk Management	Growth & M&A	Operating Model	Capital Management	Stakeholder Management
People & Skills	Close Cycles	Product Lines	Business Strategy	Analytics	Integration	Centers of Excellence	Excess Capital Decisions	Regulators
Process	Forecasting / Projections	Distribution Channels	Key Performance Indicators	Solvency Modernization	Divestiture	Shared Services	Capital Requirement	Rating Agencies
Technology	Internal Reporting	Customers		Asset Management	Restructuring	Geographical Locations		Investors / Analysts
								Customers

Improved Efficiency

- **Accelerate benefit realization** through standardized processes and integrated system environment
- **Standardize reports and metrics** to improve the management information need to accelerate the close process
- **Reduce manual processing** through automation and improve the effort needed to complete tasks
- **Reduce overall costs**

Enhanced Controls

- **Provide "Single Version of the Truth"** for financial information
- **Reduce financial reporting and audit related risk** and decrease the potential for material misstatements
- **Improve risk awareness and capital management**; Increase accountability through governance, incentive mechanisms
- **Shift away from manual processes** to reduce the risk and improve the control environment

Increased Effectiveness

- **Improve execution of business strategy**; enhance decision making capabilities
- **Provide timely, accurate, and meaningful insights** delivered across the enterprise to enable strategic partnering with the business
- **Improve financial forecasting predictability**
- **Improve confidence in information** produced by Actuarial functions

Improved Talent Management

- **Improve ability to attract, manage and develop** top talent globally
- **Provide effective talent management** programs for professionals
- Provides Actuarial talent the opportunity to **focus on development of analytic skills** and reduce the time spent on manual processes

Where Should Actuaries Spend Their Time?

Actuarial Modernization seeks to shift the Actuarial function from Operational roles into more Strategic roles for the business.
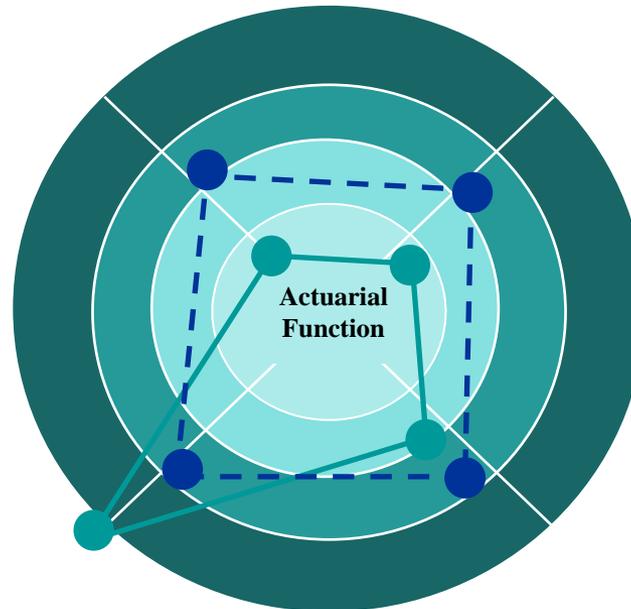
"Four Faces" of Actuarial Capabilities

Drive Strategy

- Identify strategic market opportunities
- Identify new product opportunities
- Set long term capital objectives
- Assess strategic fit of M&A opportunities

Measure Risk & Financial Metrics

- Value actuarial assets and liabilities
- Conduct ALM and hedging
- Develop actuarial cashflows to support the development and updating of the financial plan
- Calculate Economic capital and other risk metrics
- Identify and measure risk
- Foster risk culture

Embed Strategic Behaviors

- Embed disciplined behaviors to execute strategic and financial objectives
- Create a risk-intelligent culture with appropriate risk oversight
- Optimize capital strategy based upon capital objectives
- Monitor experience against expectations to assess progress against plan
- Monitor and report source of earnings, changes in actuarial assets and liabilities, and overall experience to management

Carry Out Operations

- Balance capabilities, talent, costs and service levels to efficiently fulfill the actuarial organization's core responsibilities
- Maintain actuarial models, process, and reporting tools
- Set economic and experience assumptions

Actuarial Function

——— Current Role
- - - Future Role

Goal for improvement is to provide more robust analysis and strategic business insight

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Execution of an Actuarial Modernization Project

| Diagnostic | Scoping & Planning | Implementation | Continuous Improvement |

| Future State Capability and Gap Analysis | Develop and Prioritize Initiatives | Create Roadmap |

Objectives

- Develop understanding of current organization, roles and responsibilities and key issues
- Develop end-state Finance function definition
- Develop/validate target architecture

- Develop and group initiatives and begin to prioritize
- Begin to sequence initiatives into an implementation plan

- Validate preliminary roadmap and high level cost estimates with internal and external subject matter advisors

In order to create the critical path for system/process transformation, a diagnostic approach is needed to generate a strategic roadmap and set of initiatives for implementation which fulfills the needs of the business

Model Governance Framework

The Need for Model Governance

Drivers of the Need

Actuarial model governance is gaining importance in the industry given:

- Potential for adverse consequences from decisions based on incorrect or misused model results
  - Financial loss
  - Poor business and/or strategic decision-making
  - Damage to an organization's reputation

- Actuarial projection models are becoming more integral to financial reporting, planning, and management at insurance companies, and their importance is being recognized by senior management

- Multiple uses of a common model require additional care in the maintenance and management of model changes

- Increased scrutiny of regulation (ORSA, Federal Reserve SIFI requirements)

> *While many companies acknowledge the need and benefits of Enhanced Model Governance, several hurdles remain to be overcome including resource constraints, company cultural barriers and organizational structures, and company's collections of systems and related processes*

Representative Model Governance Framework

Effective model governance establishes a cohesive framework to govern the actuarial and risk modeling activities within the organization.

MODEL ARCHITECTURE STANDARDS

Establishes the principles for modeling within the organization, including coding standards and the model structure.
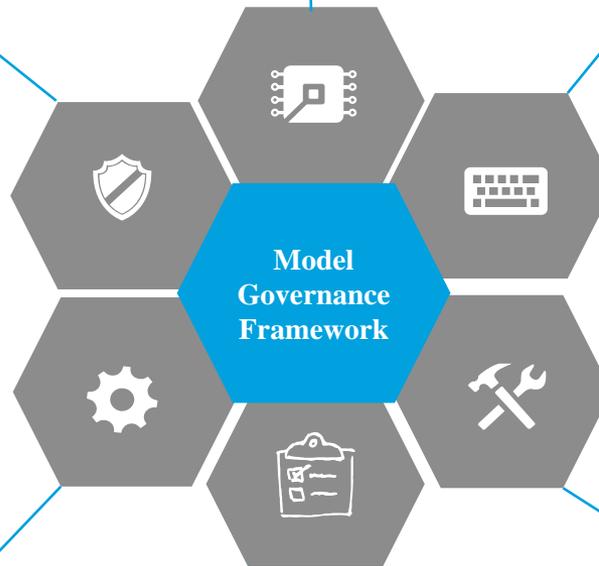
INFRASTRUCTURE AND ENVIRONMENTS

Establishment of computing environments for actuarial models, including disaster recovery and grid/cloud.

GOVERNANCE STANDARDS

Sets out the processes to follow for ensuring system control, access rights, system change protocols, and testing requirements.

Model Governance Framework

CHANGE MANAGEMENT & MAINTENANCE

Procedures and overarching framework to monitor and govern all changes and updates to systems and models within the organization.

OPERATING MODEL

Organizational changes aligned to effectively carry out model governance, including roles and responsibilities and committee/ working group structures.

VALIDATION

Establishes an independent testing framework that provides users confidence in the accuracy of systems and models used for various purposes.

Components of Model Governance

An effective model governance program is composed of several component items:

Implementation	Operating Model	Maintenance
Focus: *Framework*	**Focus:** *Transformation*	**Focus:** *Institutionalize*

Chief Components:

- Policies & Standards
- Process Flow
- Model Inventory
- Documentation and System Clean-Up
- Testing
- Computing Environments

Chief Components:

- Organizational Structure; Adaptations
- Roles & Responsibilities
- Ownership – Who Does What Where?
- Training

Chief Components:

- Formal Change Management
- Release Calendar and Impact Documentation
- Documentation and System Lock-Down
- Formal Validation
- Ongoing Refinement

Policies & Standards

Listed below are typical standards and policies that exist in an effective model governance program.

Model Governance Framework	Sets forth the risk-based approach and guiding principles to support various activities included as part of the lifecycle of actuarial models and related systems, processes, and their oversight. Is often an over-arching document that references other supporting governance documents.
Architecture & Coding Standards	Sets the principles for the modeling platform and its structure, and the standard for coding, table structure, naming conventions, and other aspects of actuarial models.
Development / Change Cycle	Outlines the activities to be performed for all model development; defines the end-to-end process required to create/modify models and to ensure communication and documentation throughout the development process. Highlights where handoffs and sign-off are required.
Model Validation Policy	Establishes the formal, independent testing framework to help ensure the initial and on-going accuracy of actuarial systems and models.
Model Inventory & Risk Assessment	Listing of all models (following the company's definition of 'model') including a description of model purpose, use, and restrictions along with an assessment of risk for each model. Risk is often defined as a function of model complexity and materiality, and the importance of model results.

Model Documentation Templates and Reports

Documentation is key to the viable implementation of a model governance framework. To this end, five key documentation items exist to facilitate proper memorialization of governance compliance activities.

Model Documents	• Model overview, purposes, uses, limitations, architecture details • Product features • Methodologies in the model • Assumptions
Testing Package	• Test plan • Testing results • Integration, regression, and user acceptance testing
Model Release Memo	• Development summary, outstanding change log items • Library upgrades • System releases
Change Request	• Model information • Business requirements • Technical specifications • Model design
Validation Report	• Findings summary • Exceptions • Remediation actions

Documentation should be sufficiently detailed such that a) model users unfamiliar with a model can understand how the model operates, its limitations, and its key assumptions, and b) the model can be replicated by a knowledgeable developer

Test Plan

What It Is	Approach of how testing of model and model changes will be performed, and which test types will be utilized
Considerations	• Model Developers and Model Users to jointly agree on Test Plan prior to any development • Includes acceptance criteria and clarification of task ownership and required sign-offs

Types of Tests

Core Tests

- Unit Testing
- Compatibility Testing
- Integration (System) Testing
- Regression Testing
- Assumption / Version Checking

Additional Tests

- Performance Testing
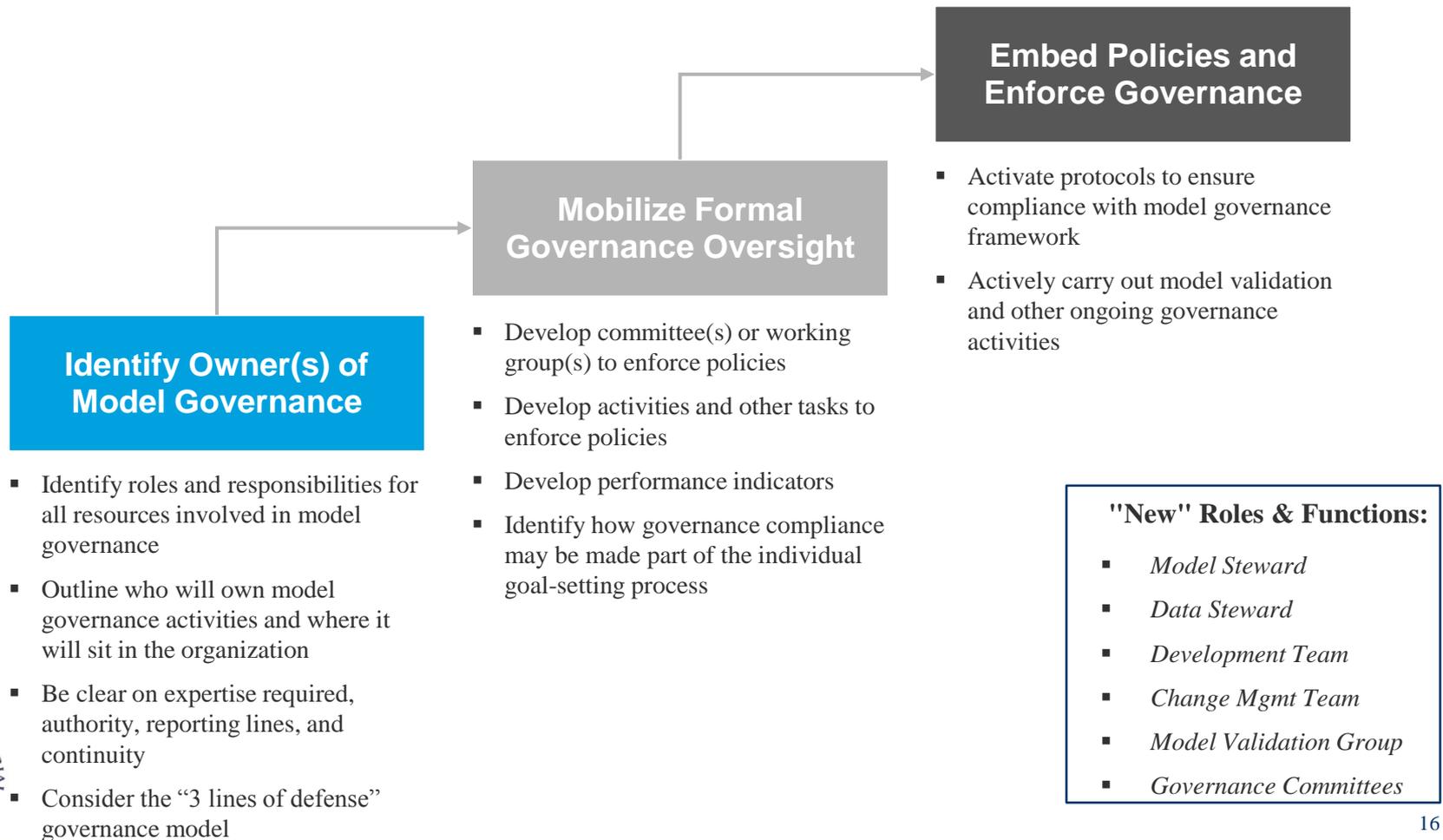- Stress Testing, Extreme Testing
- Scenario Analysis
- Destructive Testing
- Path Testing

Key Considerations

- Test Cases to be used, inforce coverage, and expectations for test results. Consider a standing test bed for regression testing
- It is often useful to incorporate testing thresholds, materiality considerations, and measurement metrics for applying thresholds within the Test Plan

Operating Model

Several activities involving the company's organizational structure must be realized before a model governance framework can be embedded as part of business-as-usual:

Embed Policies and Enforce Governance

- Activate protocols to ensure compliance with model governance framework
- Actively carry out model validation and other ongoing governance activities

Mobilize Formal Governance Oversight

- Develop committee(s) or working group(s) to enforce policies
- Develop activities and other tasks to enforce policies
- Develop performance indicators
- Identify how governance compliance may be made part of the individual goal-setting process

Identify Owner(s) of Model Governance

- Identify roles and responsibilities for all resources involved in model governance
- Outline who will own model governance activities and where it will sit in the organization
- Be clear on expertise required, authority, reporting lines, and continuity
- Consider the "3 lines of defense" governance model

"New" Roles & Functions:

- *Model Steward*
- *Data Steward*
- *Development Team*
- *Change Mgmt Team*
- *Model Validation Group*
- *Governance Committees*

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Questions?