

**Institute of Internal Auditors**

January 2012



**Using analytics to drive  
predictability and efficiency in  
the Internal Audit Function**

 **ERNST & YOUNG**  
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# Efficiency

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## Perspectives on Efficiency (audit analytics automation)

- ▶ Provide IA with the primary benefit of decreasing audit hours needed to test given areas, as well as freeing up resources to address other high-risk audit areas e.g., estimation, professional judgment, changing processes, etc.
- ▶ These procedures provide the most measureable benefit to IA based on hours incurred to develop vs. cost savings.
- ▶ Focusing on efficiency does not help IA achieve its goal of becoming a predictive risk advisor to the organization.

# Predictive value

## Perspectives on predictive value (operational analytics)

- ▶ Allows IA to monitor risk proactively throughout the organization and provide business insight. IA's value is the minimization of inherent risk per auditor.
- ▶ The value of IA can be expressed as follows:

$$V_{AI} = \frac{R_i - R_r}{R_{AI}}$$

VAI = Value of IA  
R<sub>i</sub> = Inherent risk  
R<sub>r</sub> = Residual risk  
RAI = IA resources

- ▶ We have seen through restatements and frauds that subsequent root cause analysis of identified problems always come back to IA with the question, "Why didn't your department find this?" or rather, "Are our current audit procedures really minimizing inherent risk?"
- ▶ Audit committees intuitively understand that ex-post audit procedures are incomplete methods of mitigating organizational risk. Predictive capabilities also allow IA to assess operations to decrease inherent risk.
- ▶ This is where IA can add strategic value to the organization.

# Audit methodology updates

What is the goal of the use of analytics?

Internal audit's goal in using analytics is to increase the effectiveness and efficiency of planning and conducting audits using a standardized technology architecture, well trained resources and a robust methodology to support a high standard of delivery.

How will we use analytics to meet our goals?

## Annual planning

Analytics can be used to perform risk-based comparisons of audit entities using quantitative key performance indicators (KPIs). These KPI's will provide input into the annual planning process and periodic refresh.

## Audit planning

Analytics can assist in highlighting areas of risk for individual audits across multiple categories. Trends and outliers can be analyzed to help identify areas for further inquiry or assessment.

## Audit execution

Analytics can be used to validate the design and operating effectiveness of IT dependent manual and automated controls. Analytics can help to highlight both control operating deficiencies, as well as the potential need for expanded control to mitigate design gaps or deficiencies.

What are impacts to the audit department and process?

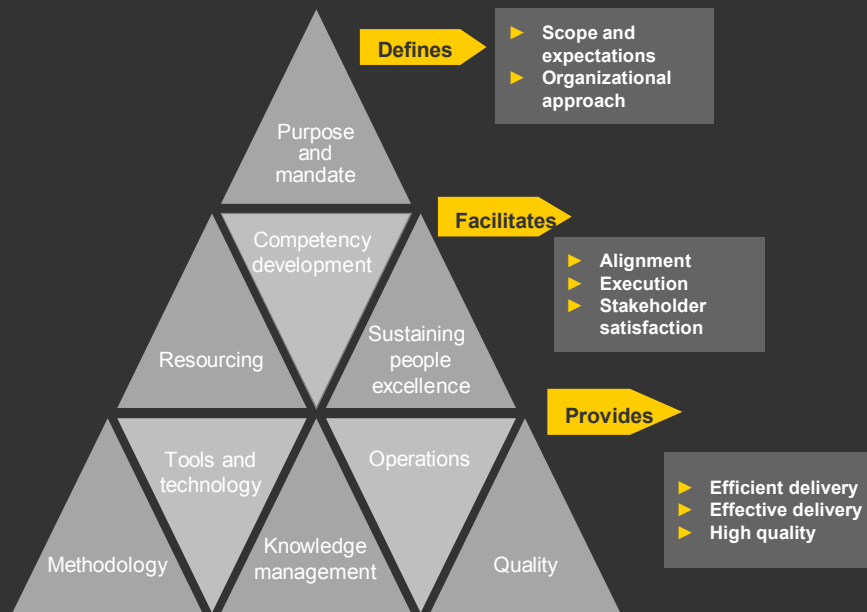
- ▶ Targeted high-risk areas with emphasis on driving higher levels of assurance and efficiencies
- ▶ An organizational model that provides appropriate resources to execute analytics
- ▶ Availability of multiple resource pools through partnering and leveraging across IA groups

- ▶ Enablers to assist with the scoping of high risk areas
- ▶ Documented roles and responsibilities on ownership
- ▶ Clearly defined toll-gates for review and approval
- ▶ Measureable efficiency and effectiveness of control testing (i.e., control exceptions vs. prior year)

- ▶ Analyzing complete populations vs. samples providing greater assurance
- ▶ Deeper analysis and targeted focus on audit areas
- ▶ Supervisory review protocols
- ▶ Quantifying risk and exposure in the audit findings

# Strategy framework

The assessment of these areas should be conducted through interviews with key stakeholders, review of available standards and methodology documentation and an analysis of how leading analytics practices could be implemented in the organization. The following depicts the framework we use to define the needs and develop an analytics strategy.



## Activities

### Governance

- ▶ Define scope of how analytics will be used, support from management for its use and appropriate organizational approach
- ▶ Define process to plan, design, execute, document and review analytics and standards that support consistent high-quality delivery and innovation

### People

- ▶ Define required skills sets and competencies, including updating or augmenting employee incentives
- ▶ Identify paths for filling in skill set gaps via training, strategic hiring or consultant support

### Infrastructure and operations

- ▶ Define required tool(s) for developing analytics within internal audit
- ▶ Define key data repositories and data sets for data acquisition, as well as data hosting and storage repositories
- ▶ Define knowledge management enablers for sharing information and intellectual capital related to analytics
- ▶ Define methodology impact considerations

## Work products

- ▶ Current state analysis of analytical process
- ▶ Target state analytical operating model

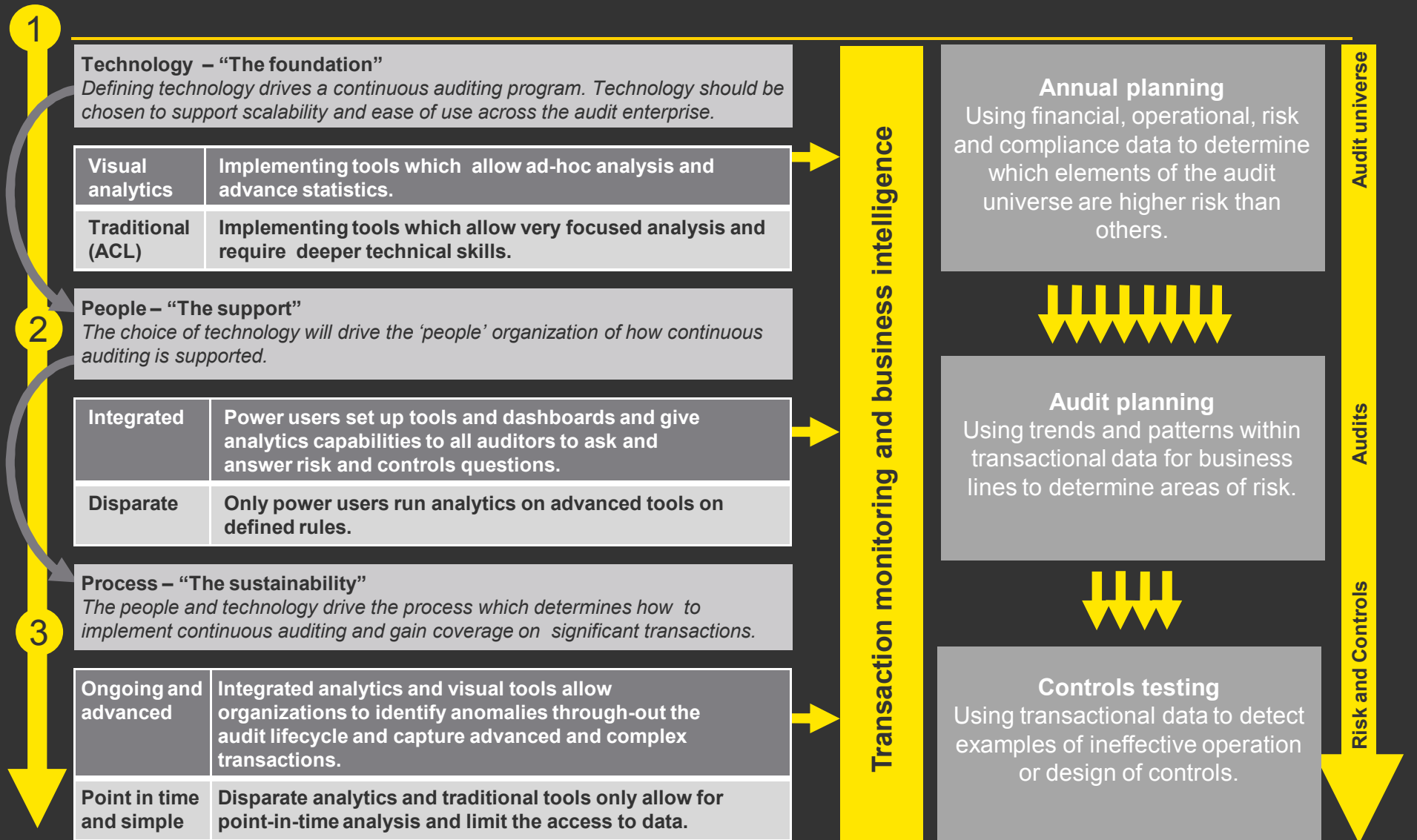
- ▶ Gap analysis of skill sets
- ▶ Resourcing model for attaining target state

- ▶ Vendor selection methodology
- ▶ Gap analysis and documented data requirements
- ▶ Strategy for information sharing

# APPENDIX



# Architecting continuous auditing

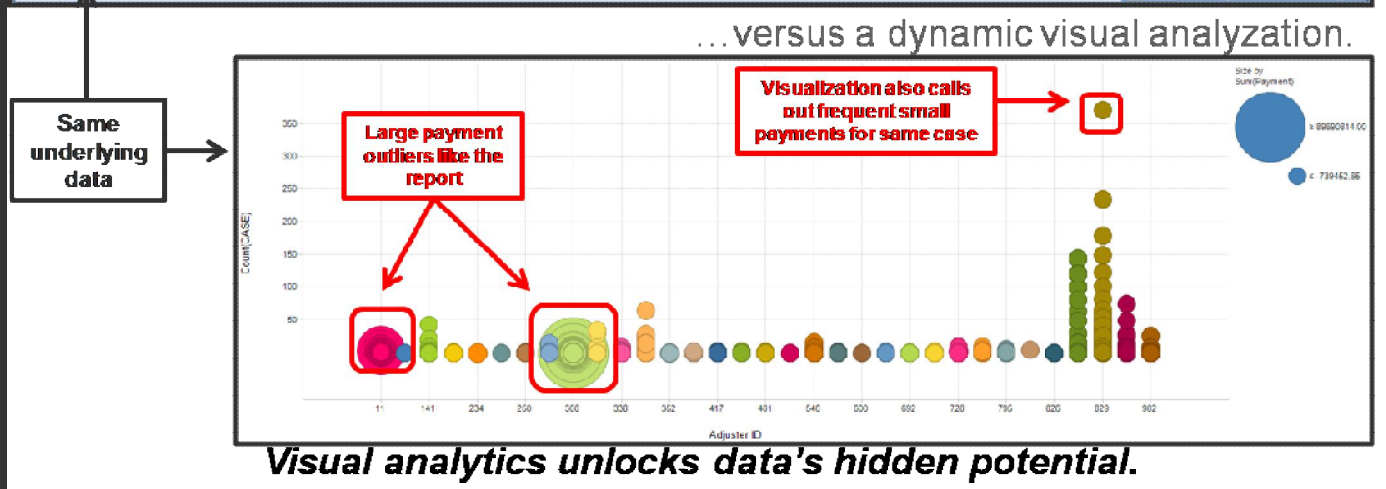


# The power of visual analytics

Compare: a generic Excel report...

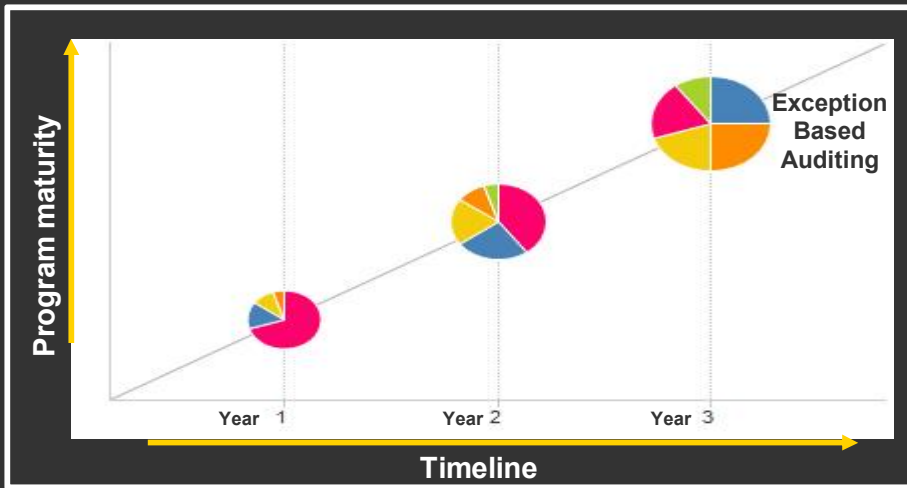
- ▶ Decrease cost by decreasing time spent performing analysis and writing code.
- ▶ Provide greater audit coverage by creating the ability to perform multi dimensional analytics and identifying unanticipated outliers.
- ▶ Provide greater coverage by continuously monitoring transactions rather than performing point in time testing.

BRANCH	CASE	Transaction Type	Payment Date	Payment	Adjustor ID	Payment Limit	Reserve Limit	Authority to Payment difference	Real Date	Average Payment	Percent of Payment Limit	Over Limit Test
4998	162 5132	21	12/9/2008	730.3135	149990	250000	-143259.58	12/8/2008	1859.414351	0.00292121	Under Limit	
4999	162 5444	21	12/9/2008	42.5335	149990	250000	-143947.47	12/8/2008	1859.414351	0.00017012	Under Limit	
4999	162 5444	21	12/9/2008	42.5335	149990	250000	-143947.47	12/8/2008	1859.414351	0.00017012	Under Limit	
4999	162 5119	21	12/9/2008	213.9230	149990	250000	-143479.08	12/8/2008	1859.414351	0.00047608	Under Limit	
4999	162 5962	21	12/9/2008	510.9235	149990	250000	-143479.08	12/8/2008	1859.414351	0.00204768	Under Limit	
4999	162 5010	21	12/9/2008	1643.9735	149990	250000	-143346.03	12/8/2008	1859.414351	0.00657588	Under Limit	
4994	162 5010	21	12/9/2008	126.2435	149990	250000	-143863.76	12/8/2008	1859.414351	0.00050496	Under Limit	
4995	162 5010	21	12/9/2008	116.2535	149990	250000	-143873.75	12/8/2008	1859.414351	0.000465	Under Limit	
4996	162 706	21	11/9/2008	743.4110	149990	350000	-140246.6	11/6/2008	13417.145	0.002124	Under Limit	
4997	162 22220	21	2/22/2008	125609.95422	50000	150000	75060.95	2/22/2008	32936.79857	0.0424066	Over Limit	
4998	163 3662	21	5/29/2008	1203409.5511	999899599	1983717.543	-998899599	1983717.543	Under Limit			
4999	163 10313	21	6/23/2008	1032125.4111	9998995774	1883717.543	-998995774	1883717.543	Under Limit			
5000	163 17659	21	11/1/2008	-99009011	9998995999	1883717.543	9998995999	1883717.543	Under Limit			
5001	163 4721	21	2/17/2008	9694.06422	50000	150000	-43305.92	2/17/2008	32936.79857	0.0446272	Under Limit	
5002	163 21103	24	1/25/2008	6224.6422	50000	150000	-43775.4	1/26/2008	32936.79857	0.041497333	Under Limit	
5003	163 21103	24	1/29/2008	6224.6422	50000	150000	-43775.4	2/14/2008	32936.79857	0.041497333	Under Limit	



# Illustrative execution roadmap

Tactical results, strategic vision

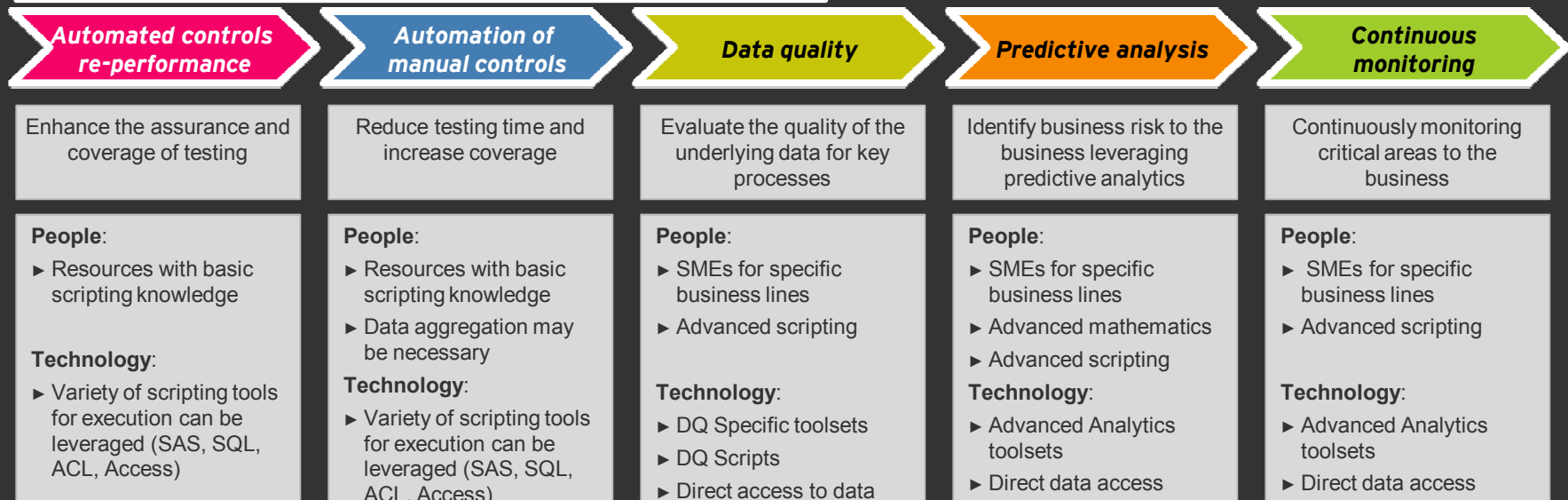


**Our recommendation is to utilize a phased approach to achieve early wins while establishing the foundations for the long term strategy.**

- ▶ This model also considers how the team and value to the organization would expand over time.

**The ultimate goal is to increase the effectiveness of the internal audit team by applying:**

- ▶ A robust methodology and governance to support sustainability and growth
- ▶ Commitment to growing and developing a highly skilled internal audit team
- ▶ A standardized technology and data architecture



# Execution procedures – pilots

	Process assessment	Procedures	Acquire data	Perform analytics	Interpret results	Knowledge management
Objectives	Identify the risks and controls which will be covered by analytics. Develop the testing methodology and understand the risk tolerance / coverage.	Document the procedures for running analytics and what the auditor expects the results to be. As well as requesting, obtaining, assessing and preparing the data needed for the analytics.		Execute the agreed-upon analytical procedures, validate test results (refining and re-executing if necessary) and finally to interpret the results in the context in which they were run, i.e., annual planning vs. audit planning vs. audit execution.		The auditor should remove all transactional data while retaining the framework of logic developed in order to allow the analytics to be re-run in the future with minimal time needed for setup.
Key activities	<b>Annual planning and audit risk assessment</b> <ul style="list-style-type: none"> <li>▶ Evaluate audit universe</li> <li>▶ Define KPIs and risks</li> <li>▶ Evaluate year after year</li> </ul> <b>Controls testing</b> <ul style="list-style-type: none"> <li>▶ Test coverage</li> <li>▶ Test data integrity</li> <li>▶ Conduct re-performance</li> <li>▶ Rules-based testing, sampling, limit, breach analysis, outliers, recalculations, conditional logic, re-performance, reconciliations</li> </ul>	<b>Procedures</b> <ul style="list-style-type: none"> <li>▶ Create outline of the type of analytical procedures the auditors would like to perform</li> <li>▶ Understand expected outcomes of analytics</li> </ul> <b>Acquire data</b> <ul style="list-style-type: none"> <li>▶ Obtain data and supplementary information</li> <li>▶ Assess data using outlined guidelines</li> <li>▶ Prepare data for analysis</li> </ul>		<b>Perform analytics</b> <ul style="list-style-type: none"> <li>▶ Create analytics routines</li> <li>▶ Validate results</li> <li>▶ Refine and re-execute procedures</li> </ul> <b>Interpret results</b> <ul style="list-style-type: none"> <li>▶ Compare to expected outcomes</li> <li>▶ Compare against industry benchmarks</li> <li>▶ Identify control weaknesses, areas for further testing or risks for audit planning</li> </ul>		<b>Records retention</b> <ul style="list-style-type: none"> <li>▶ Cleanse documentation of sensitive, transactional data</li> <li>▶ Consult with chief auditor on special retention requirements</li> <li>▶ Retain work papers and code in centralized repository or library</li> </ul>
Execution deliverables	Audit planning memos	Analytics procedures document Data requests Scripts and data pulls		Test scripts and programs Program logs Audit findings report		Audit workpapers Work-paper archive

# Value proposition for using analytics

Analytics when used in conjunction with traditional audit techniques (walkthroughs, interviews, control tests, etc.) can yield significant value

Key objectives	Potential benefits	Implementation considerations
<b>Deeper business understanding and focus on risk</b>	<ul style="list-style-type: none"> <li>▶ Analytics allows an auditor to link data to business processes driving a deeper understanding of the business and risk</li> <li>▶ Broader sampling increases comfort with coverage and the likelihood of identifying control gaps</li> </ul>	<ul style="list-style-type: none"> <li>▶ Early deployment of analytics in the audit planning process can drive focus of audit attention on emerging/key issues</li> <li>▶ Quantitative analytical techniques for risk based sampling and polling</li> </ul>
<b>Lower costs</b>	<ul style="list-style-type: none"> <li>▶ Analytical audit techniques are more cost effective than traditional techniques</li> <li>▶ A recent study from Rutgers University found that “Analytic procedures cost US\$0.01 compared to US\$4 for a standard audit of the same evidence”</li> </ul>	<ul style="list-style-type: none"> <li>▶ Offshore basic analytic techniques</li> <li>▶ Leverage benchmarking techniques</li> <li>▶ Ability to re-perform audits more quickly</li> </ul>
<b>End-to-end testing and ability to rapidly execute “deep-dive” audits</b>	<ul style="list-style-type: none"> <li>▶ Analytics can track data across corporate functions and business units allowing a view and ability to capture issues missed by focused testing and business/compliance groups</li> <li>▶ Ability to provide audit evidence independent from reliance upon management</li> </ul>	<ul style="list-style-type: none"> <li>▶ Recreation from source of data</li> <li>▶ More horizontal audits</li> <li>▶ Use of predictive modeling</li> </ul>
<b>More population and control coverage; greater assurance</b>	<ul style="list-style-type: none"> <li>▶ Analytics for 100% testing of transactions vs. sampling</li> <li>▶ Additionally, analytics allows an auditor to analyze more deeply gaps in controls, which allows for a broader design and operating effectiveness assessment</li> </ul>	<ul style="list-style-type: none"> <li>▶ Scenario testing</li> <li>▶ Methodology impact</li> </ul>
<b>More value to stakeholders; better “quality of evidence”</b>	<ul style="list-style-type: none"> <li>▶ Stakeholders can see control deficiencies more comprehensively and can’t argue samples weren’t representative</li> <li>▶ The audit naturally leaves behind intelligence and tangible material for business units to accelerate the implementation of new controls</li> </ul>	<ul style="list-style-type: none"> <li>▶ Tangible evidence for issues</li> <li>▶ Leave behind frameworks for potential future controls</li> </ul>
<b>Meet regulatory expectations</b>	<ul style="list-style-type: none"> <li>▶ Address regulators increasing expectations regarding the use of CAATs</li> </ul>	

# Updated audit methodology

## Promoting the use of analytics throughout the audit lifecycle

### Goals

- ▶ Define an updated audit methodology that embeds the use of analytics, pulls auditors away from basic sample controls testing, and focuses on all stages of the audit lifecycle.

### Key activities

- ▶ Identify enhancements to current ARR methodology and impact to overall audit scoping and audit execution utilizing analytics
  - ▶ Planning – informed scoping for targeted approach
  - ▶ Execution – analyzing complete populations and reviewing anomalies and exceptions
- ▶ Develop and deliver training on revised methodology including enablers, such as guidelines for data access and requests, template(s) to document consideration of analytics in planning and testing phases including hypothesis and expected results
- ▶ Develop competencies and performance expectations to be incorporated into the performance evaluation process

### Assumptions

- ▶ ARR executive sponsorship
- ▶ ARR leadership team buy-in
- ▶ Core ARR project team integrated with Ernst & Young team
- ▶ Streamlined review and approval process

### Work products

- ▶ Refined audit methodology that reflects the use of analytics through the various stages of the audit lifecycle
- ▶ Competency maps and performance requirements
- ▶ Training on revised methodology

### Estimated duration

8-12 weeks

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**Preparing for change –  
IASB/FASB insurance contracts  
project**

Update and business implications

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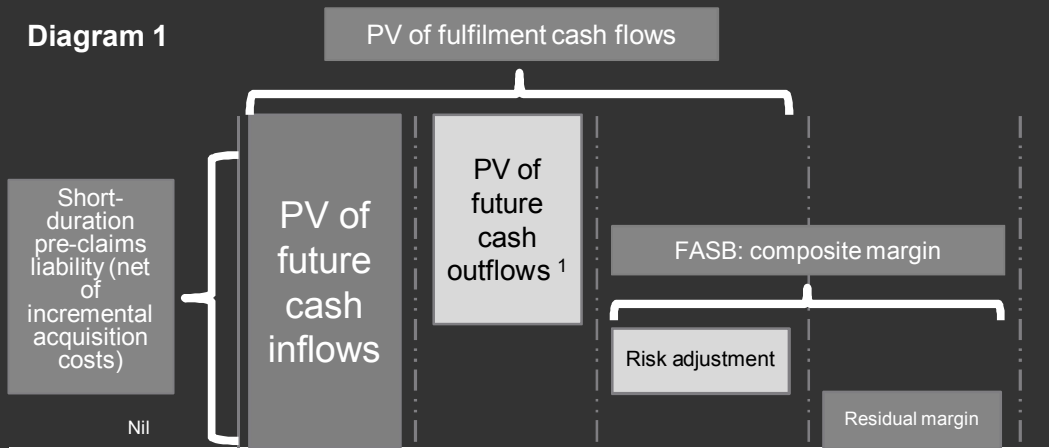
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- ▶ IASB-FASB insurance contracts accounting overview
- ▶ Business implications
- ▶ Appendix
  - ▶ IASB-FASB timeline and current developments
  - ▶ Operating model for insurers

# IASB/FASB measurement model – initial measurement

Diagram 1



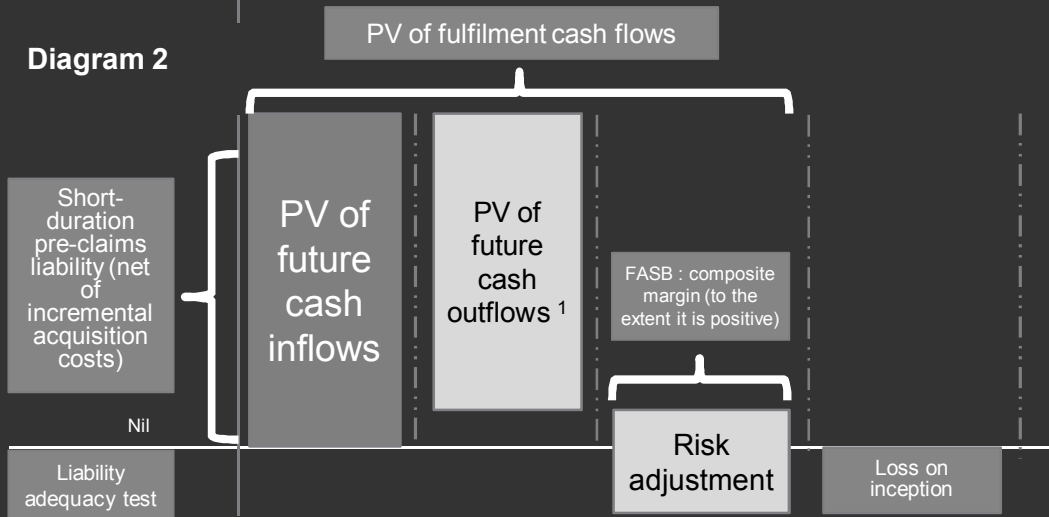
## Cash inflows

- ▶ Premiums, including initial premiums and instalments
- ▶ Potential recoveries (e.g., salvage and subrogation)

## Cash outflows

- ▶ Costs of selling, underwriting and initiating insurance contracts (FASB: successful efforts only)
- ▶ Transaction-based taxes and levies
- ▶ Payments to (or on behalf of) policyholders, including payments in kind
- ▶ Claim handling costs
- ▶ Cash flows that will result from options and guarantees embedded in the contract
- ▶ Policy administration and maintenance costs
- ▶ Payments to policyholders as a result of a contractual participation term

Diagram 2



<sup>1</sup> Cash outflows include incremental acquisition costs

# Business implications of the proposed guidance

Implication	Issues	Potential actions
Impact on product design and pricing	<ul style="list-style-type: none"> <li>▶ “Real world” pricing does not reflect new accounting</li> <li>▶ Greater reflection and transparency of options and guarantees</li> <li>▶ Earnings emergence pattern will differ and be more volatile, and the cost of avoiding income statement volatility may be prohibitive</li> </ul>	<ul style="list-style-type: none"> <li>▶ Supplement traditional pricing view with proposed guidance view</li> <li>▶ Modify product designs and reduce options and guarantees</li> <li>▶ Refine ALM strategies</li> <li>▶ Exit or de-emphasize certain products</li> </ul>
Impact on inforce management	<ul style="list-style-type: none"> <li>▶ Potential increase in liabilities for minimum rate guarantees</li> <li>▶ More liabilities converted to more volatile FAS 133-type liabilities</li> </ul>	<ul style="list-style-type: none"> <li>▶ Consider divesting in certain blocks prior to transition</li> <li>▶ Consider modifying ALM and hedging practices</li> <li>▶ Consider modifying reinsurance strategies</li> </ul>
Impact on investment strategy and ALM	<ul style="list-style-type: none"> <li>▶ Current strategies often do not involve tight matching</li> <li>▶ If assets at fair value through income, even duration matched portfolios will have increased volatility related to key rate or convexity mismatches and asset spreads.</li> <li>▶ Proposed financial instruments guidance may cause additional mismatches</li> <li>▶ Transparency will highlight the issues more readily than current framework</li> <li>▶ Embedded options may require more dynamic hedging strategies (similar to variable annuities)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Establish and document new ALM guidelines and strategies</li> <li>▶ Develop near real time Value at Risk (VaR) or similar approaches to align with earnings emergence pattern</li> <li>▶ Consider additional risk mitigation and hedging strategies</li> <li>▶ Implement tighter risk appetite and limits on business with greater earnings variability</li> </ul>

# Business implications of the proposed guidance

## Implication

## Issues

## Potential actions

### Impacts on risk and capital management

- ▶ Any new risk mitigation or hedging strategies will likely impact earnings volatility and capital requirements differently
- ▶ More difficult to perform accurate planning, forecasting, and variance analysis
- ▶ Federal oversight of US insurers will be GAAP/IFRS based
- ▶ Federal will require accurate and reliable balance sheet and income statement forecasts under stress scenarios

- ▶ Enhance modelling capability for capital and liquidity at a more granular level
- ▶ Implement tighter risk appetite and limits on business with greater surplus strain
- ▶ Integrate finance, risk and capital models to understand impacts on multiple metrics

### Impact on close and reporting processes

- ▶ Major changes to the income statement presentation
- ▶ Volatility will occur when assumptions are unlocked or economic conditions change
- ▶ Significant additional disclosures
- ▶ Earnings analysis is more difficult requiring multiple stochastic model runs and different skill set of financial analysts
- ▶ Accurate calculation of residual margin requires more frequent valuation of new business
- ▶ More coordination between different lines of business, country units and investments

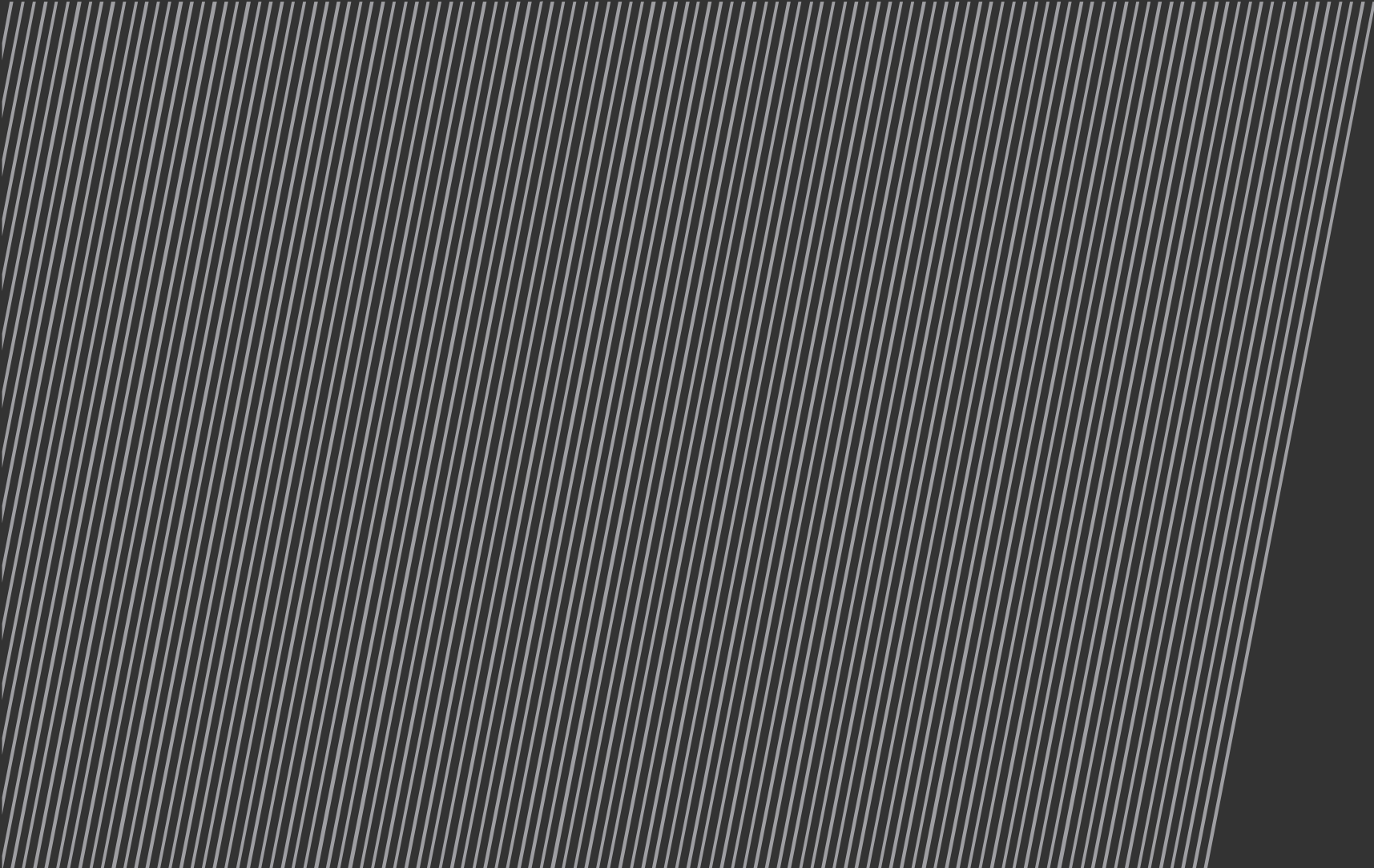
- ▶ Train accountants to think like economists
- ▶ Revise loan covenants and incentive compensation plans
- ▶ More integration between accounting of assets and liabilities
- ▶ Redefine management reporting package and key performance indicators, such as new definition of "operating earnings"
- ▶ Design analyst communication strategy
- ▶ Define operating model for actuarial, data management and financial reporting functions

### Impact on financial, actuarial, risk and capital information systems

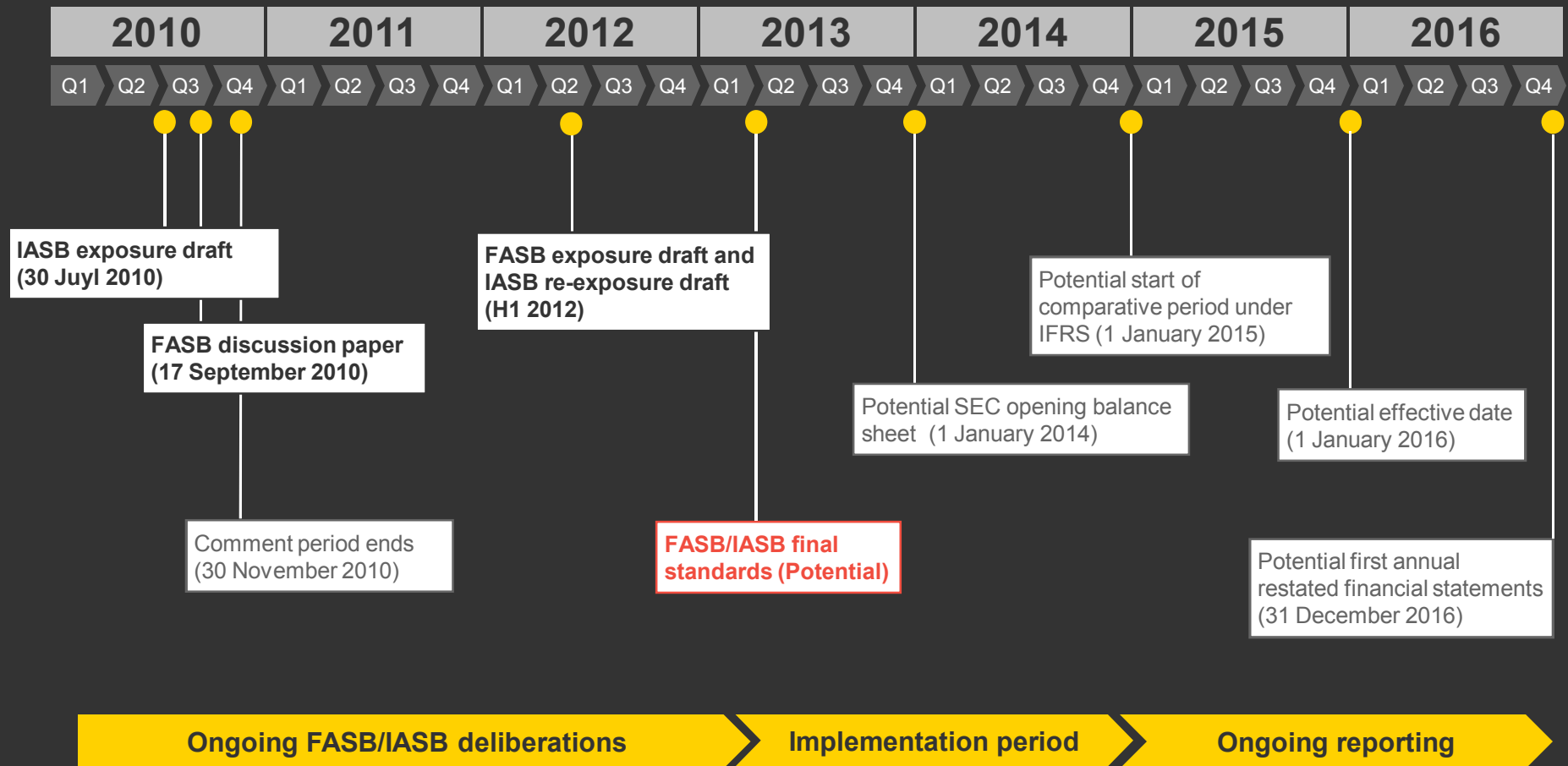
- ▶ Timely, reliable and controlled information will be required by the proposed guidance
- ▶ Will be a greater need to store large quantities of data for use in attribution and similar analyses as well as preparation of disclosures
- ▶ Greater computing power required to run necessary models

- ▶ Perform an assessment of required system needs compared to capabilities
- ▶ Identify impact on information architecture
- ▶ Improve timeliness of current production and control process

# Appendix



# Project development timeline



# IASB-FASB insurance contracts accounting guidance

## Current status and deliberations

### Tentative decisions

- ▶ Initial recognition and contract boundaries
- ▶ Expected cash flows
  - ▶ Based on market inputs, when available
  - ▶ Expected cash flows (mean), all possible scenarios not necessary as long as objective is met
  - ▶ Acquisition costs - diverging views
- ▶ Premium allocation approach
- ▶ Discount rate
  - ▶ Consistent with liability's characteristics, based on market consistent observable inputs, where possible
  - ▶ Can be determined either "top-down" or "bottom up"
  - ▶ Updated each reporting period
  - ▶ Not required where immaterial (or paid in under 12 mos)
- ▶ Unlocked residual margin for changes in cash flows
- ▶ Amortize composite margin based on release from risk
- ▶ Unbundling embedded derivatives
- ▶ Balance sheet presentation (broadly, subject to DAC)
- ▶ Certain disclosures and level of disclosure aggregation

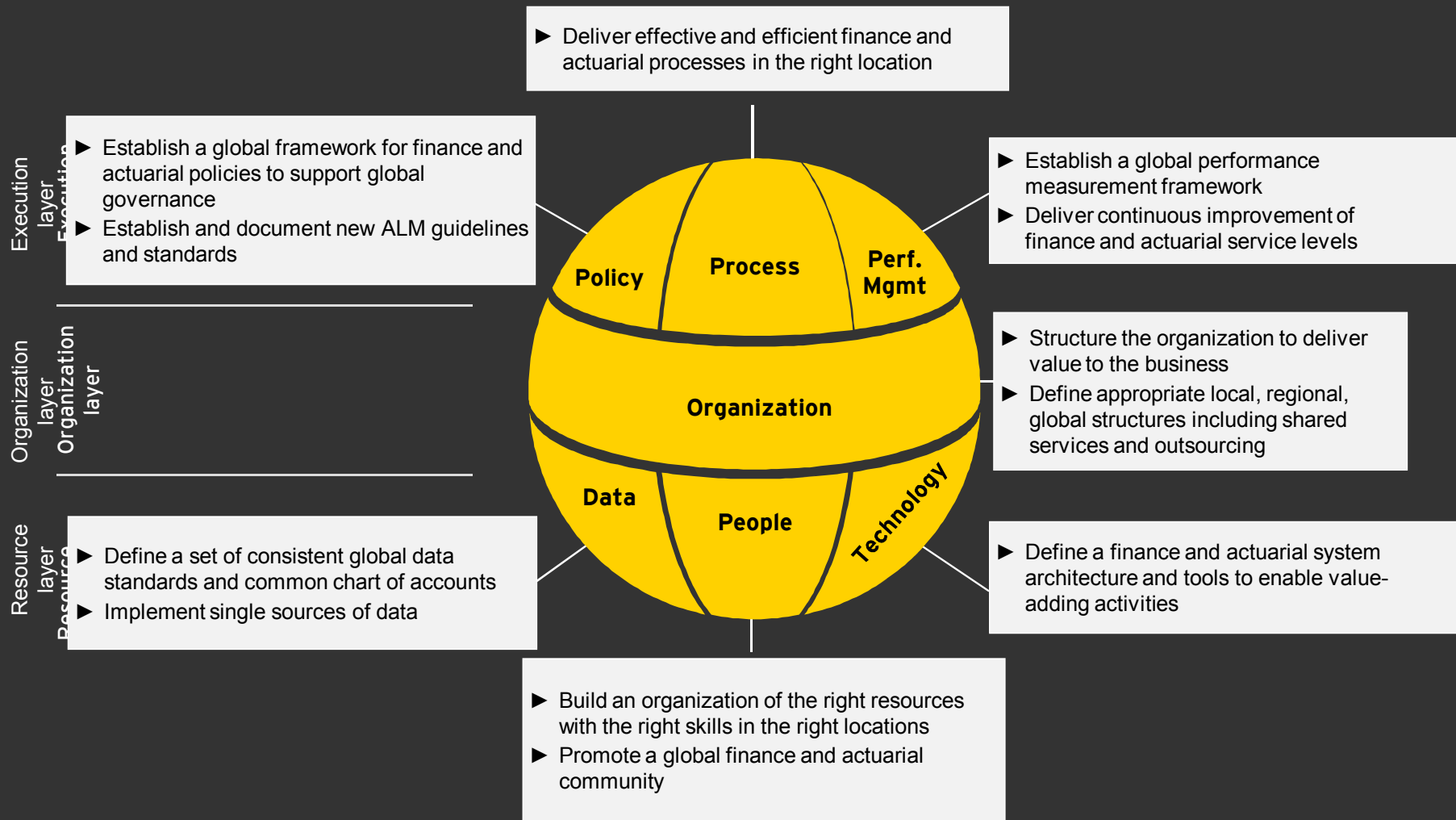
### Continued deliberations

- ▶ Onerous contracts (pre-inception and PAA)
- ▶ Criteria for using the premium allocation approach
- ▶ Recording certain changes in OCI
- ▶ What to unlock the residual margin for (IASB only)
- ▶ Risk adjustment unit of account (IASB only)
- ▶ Certain reinsurance topics
- ▶ Participating features
- ▶ Financial guarantees (FASB only)
- ▶ Unbundling or disaggregation
  - ▶ Goods and services
  - ▶ Account balances
- ▶ Presentation and disclosure
  - ▶ Ongoing income statement debate
  - ▶ Clarifying certain disclosures
- ▶ Transition
- ▶ Effective date

Although all changes are not fully defined, the tentative decisions on key components are sufficient to develop a broad based implementation plan

# Operating model for global insurers

Are the actuarial, finance and risk functions aligned to support the change?



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