



Institute
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of Actuaries

GIRO Conference 2022

21-23 November, ACC Liverpool

#GiroConf22





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Capital Modelling Robots

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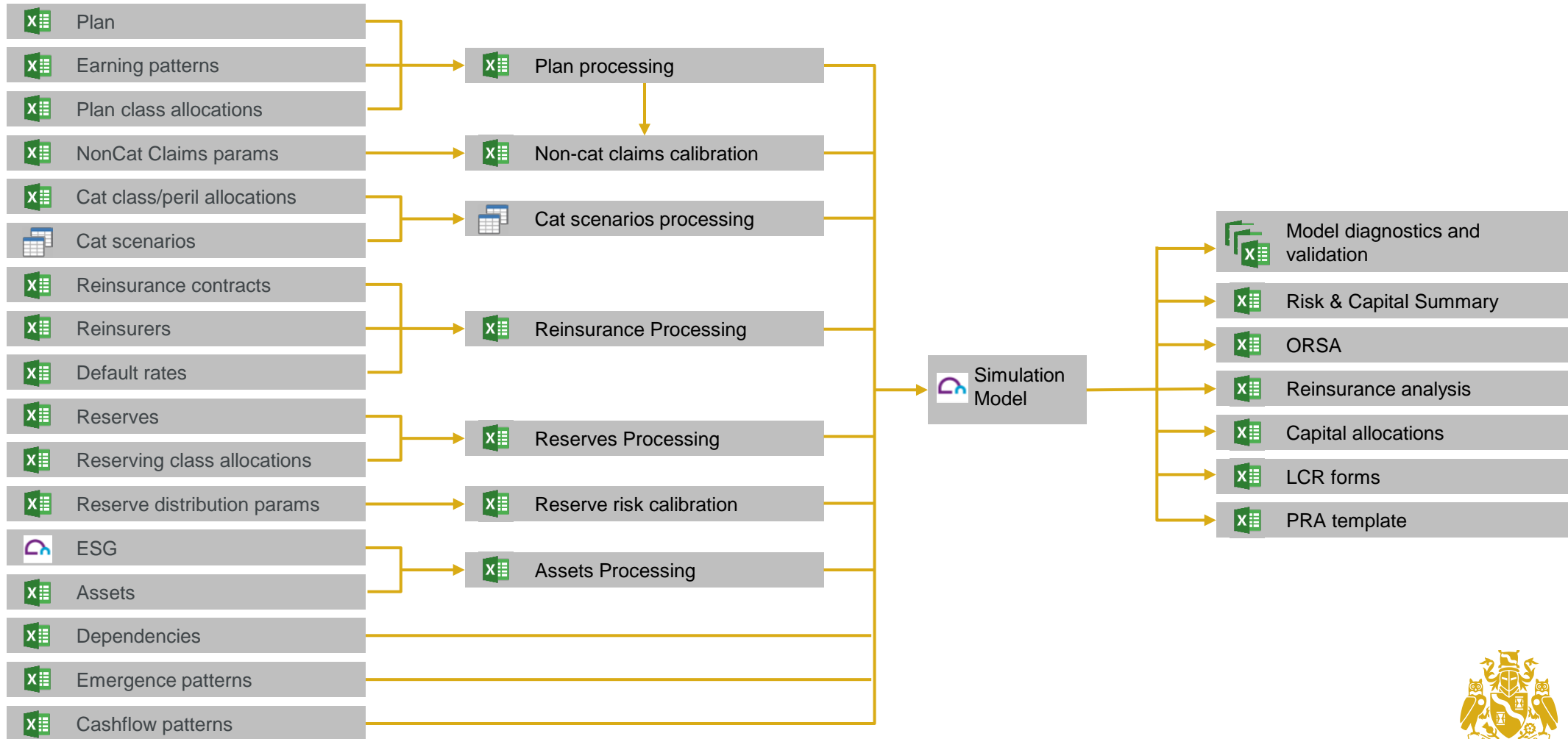


Agenda

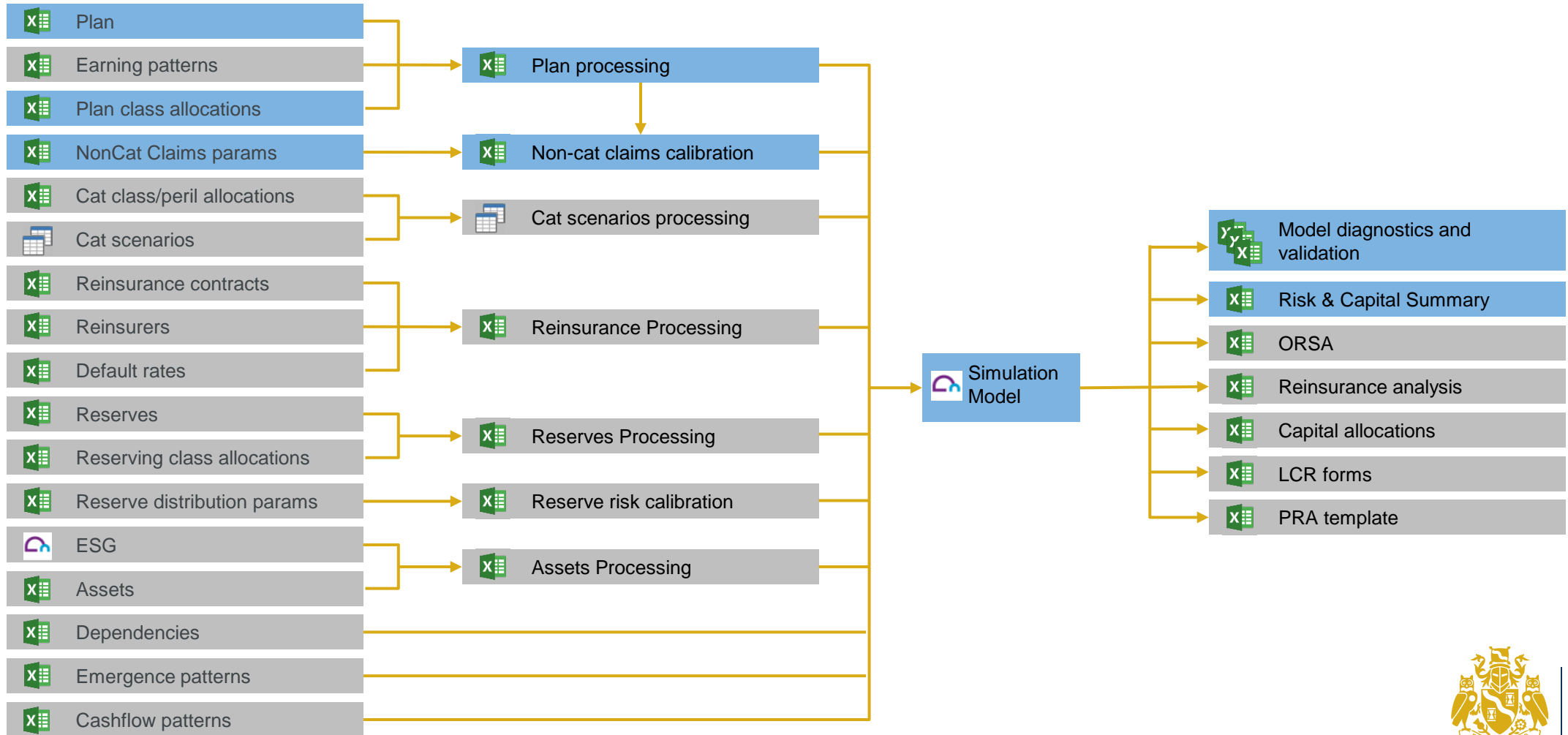
- Case study - Automation of a business plan update process
- Approach to automation
 - Right processes for automation
 - Considerations across Technology, Processes and People
 - Implementation methodology
- Business user applications
 - Business plan testing, Reinsurance testing...
- Regular updates
 - Quarterly updates, daily updates



End-to-end setup

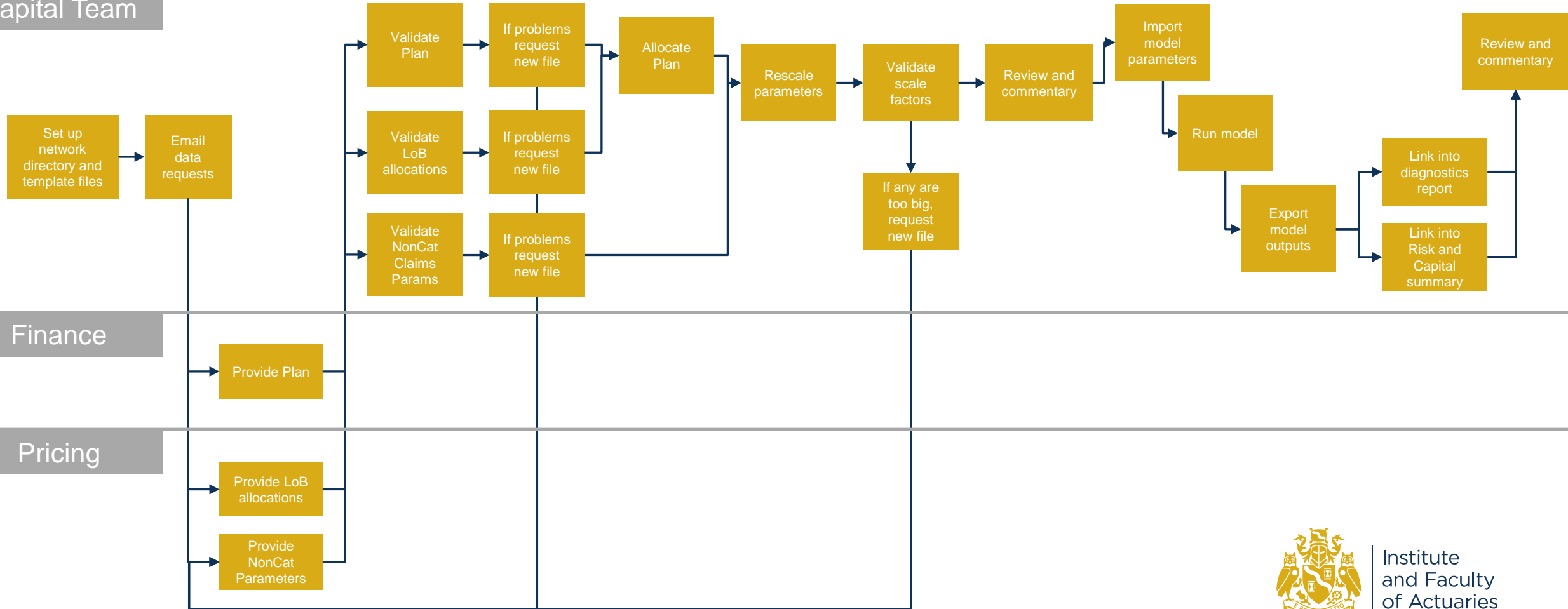


New Plan update



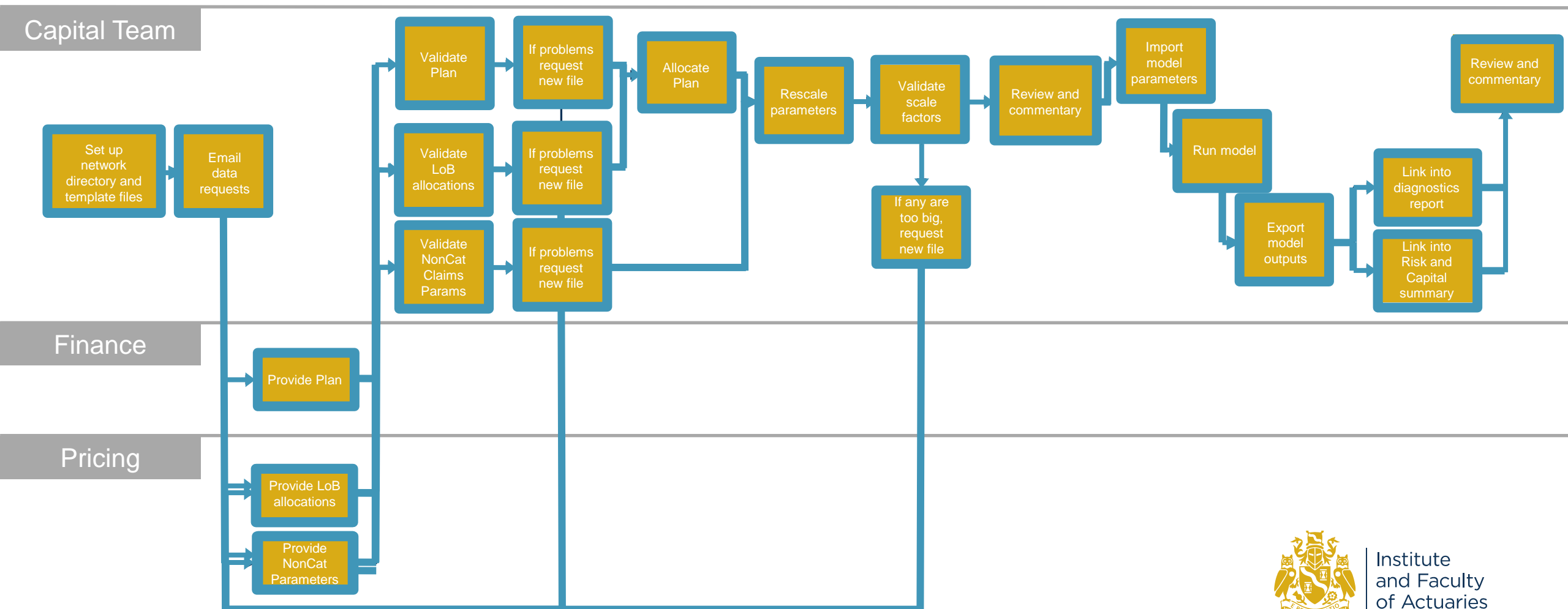
Process flow

Capital Team



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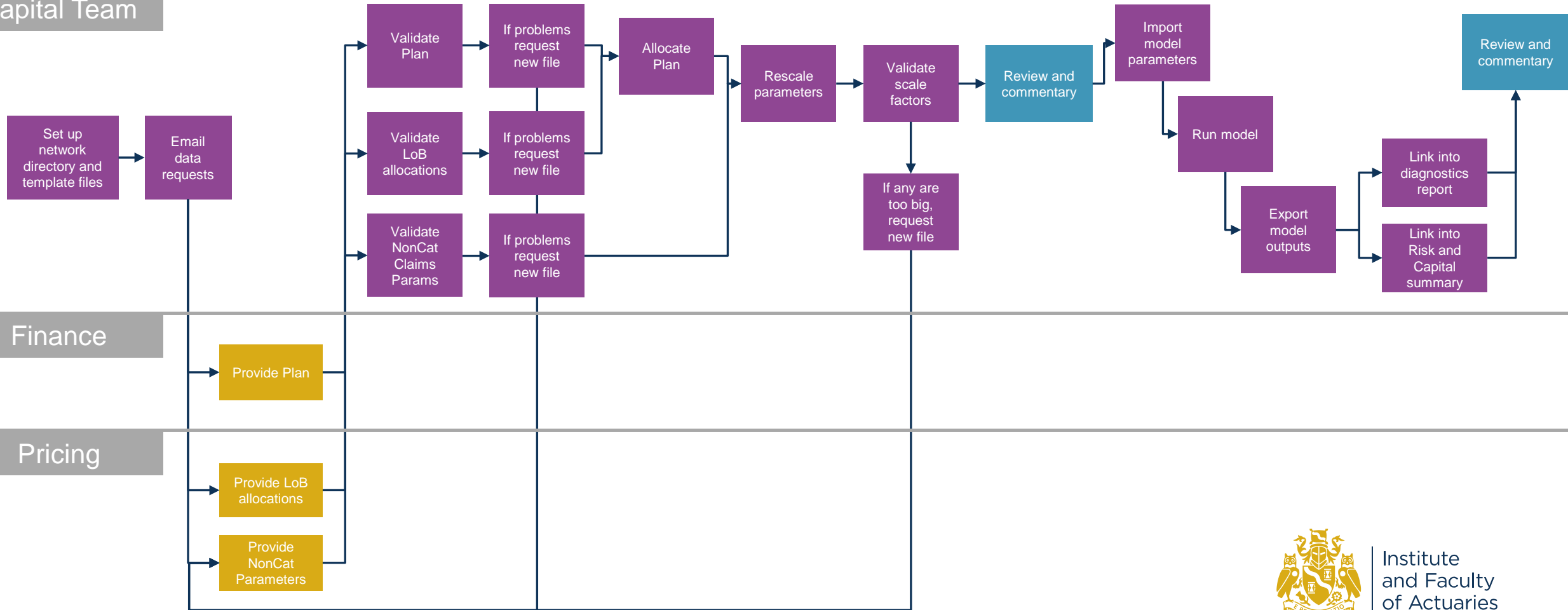
Process flow



Process flow automated

Mechanical steps are automated
 Manages the required human input including review and approvals

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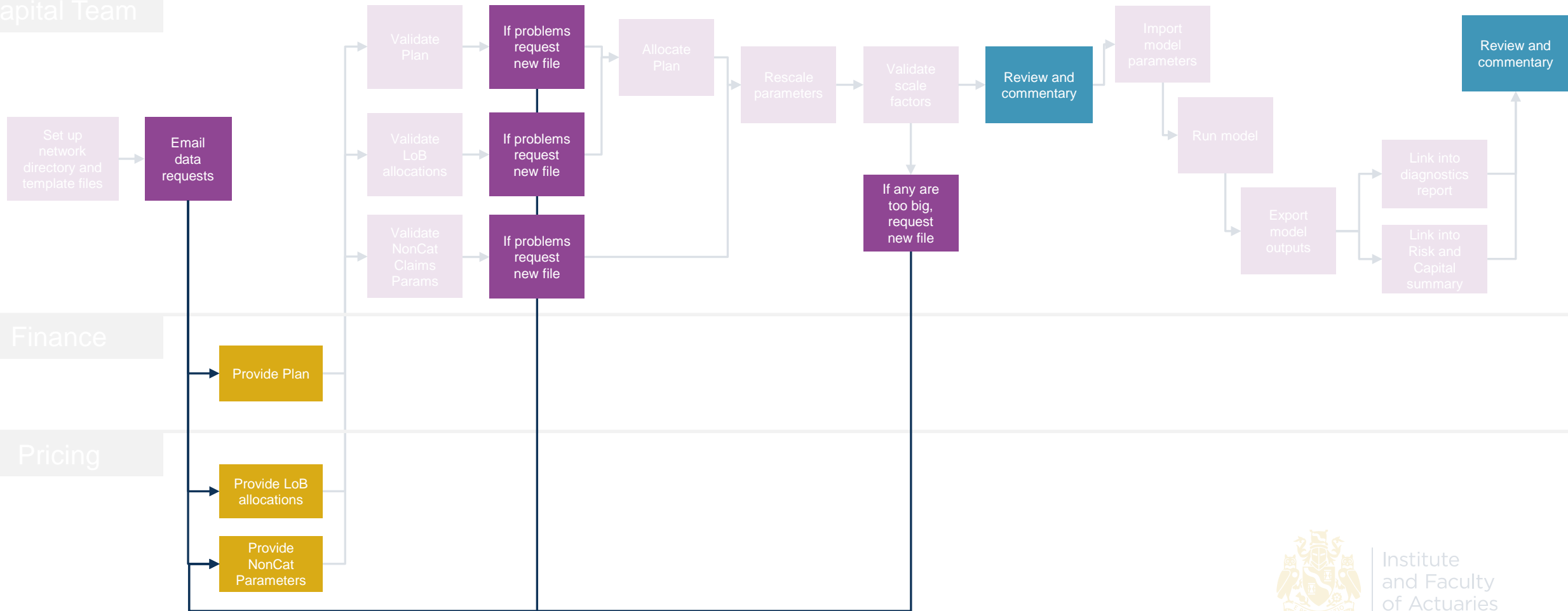
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Process flow automated



Process logic and management

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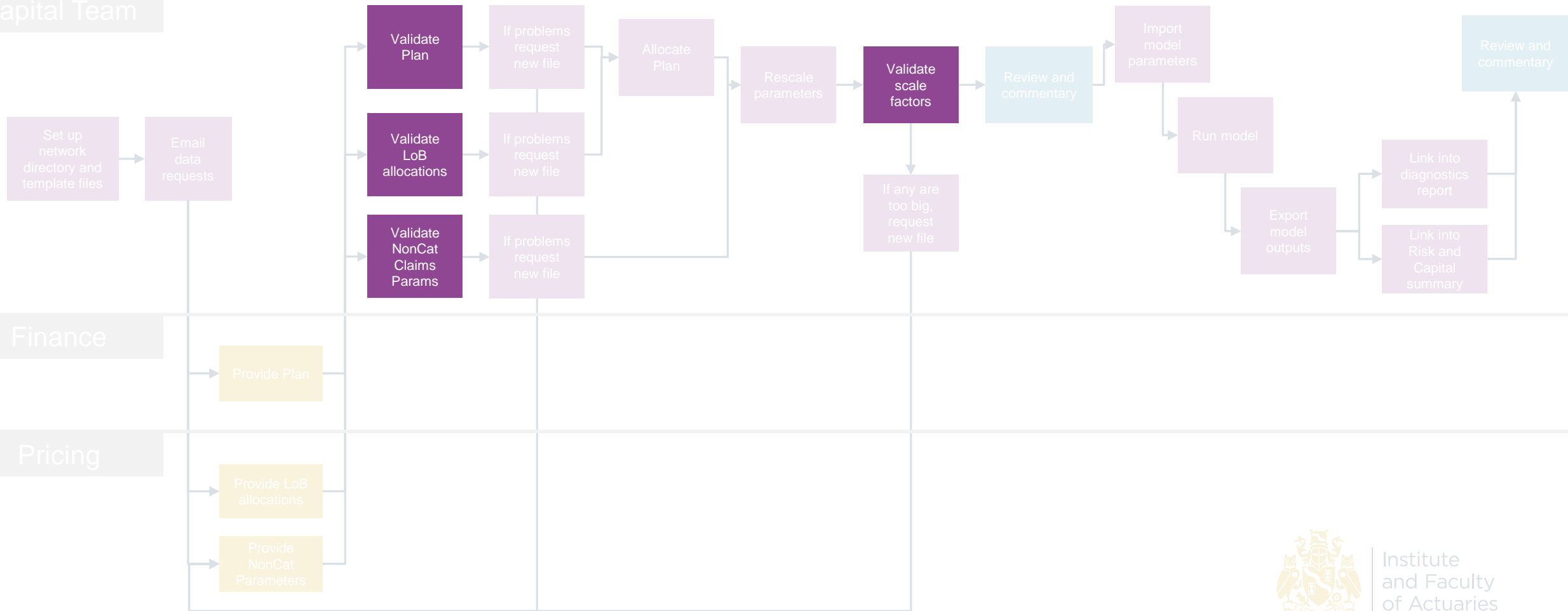
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Process flow automated



Auto-validation of data inputs, calibration and model diagnostics

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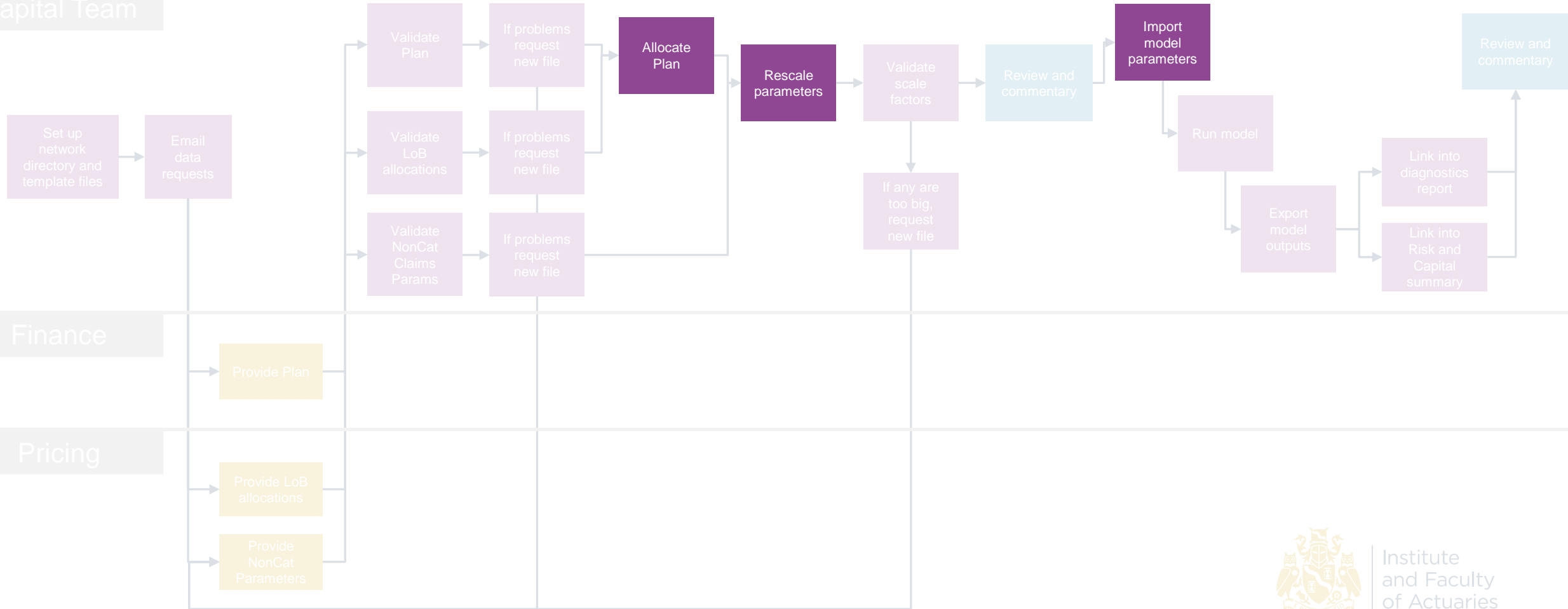


Process flow automated



Data processing transformation and calibration

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Finance

Pricing

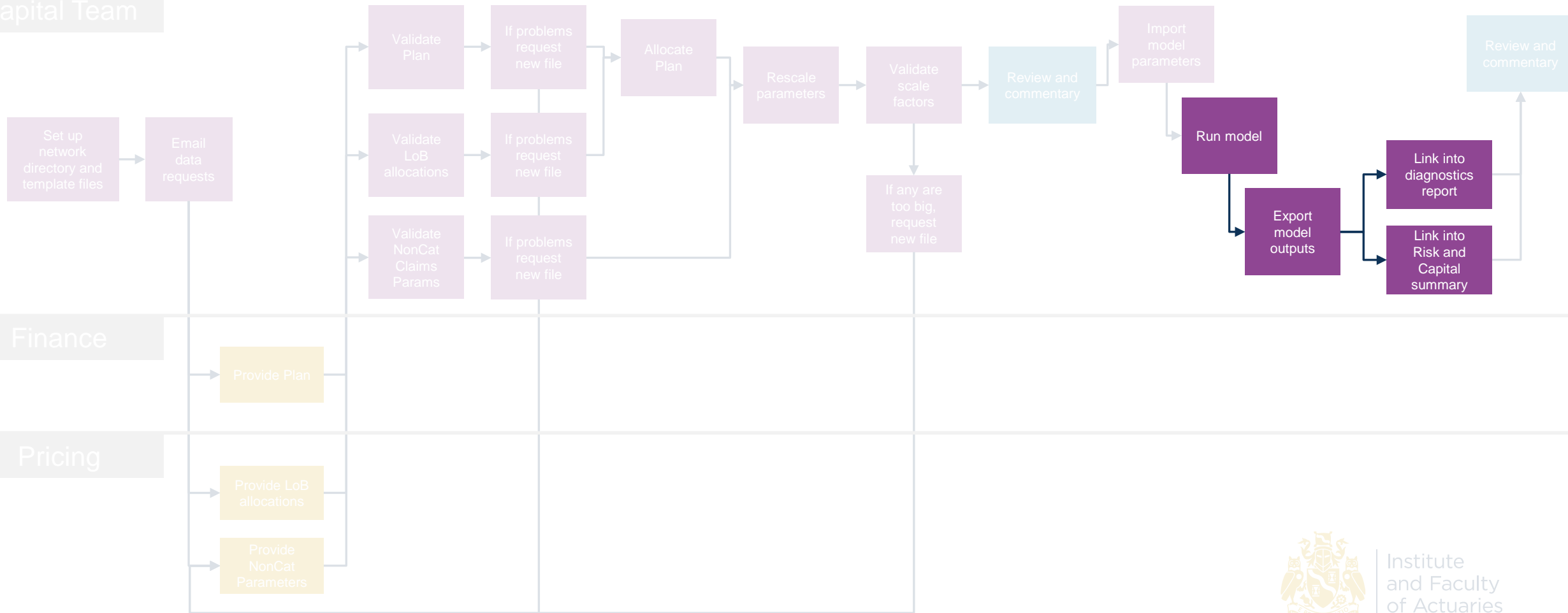


Process flow automated



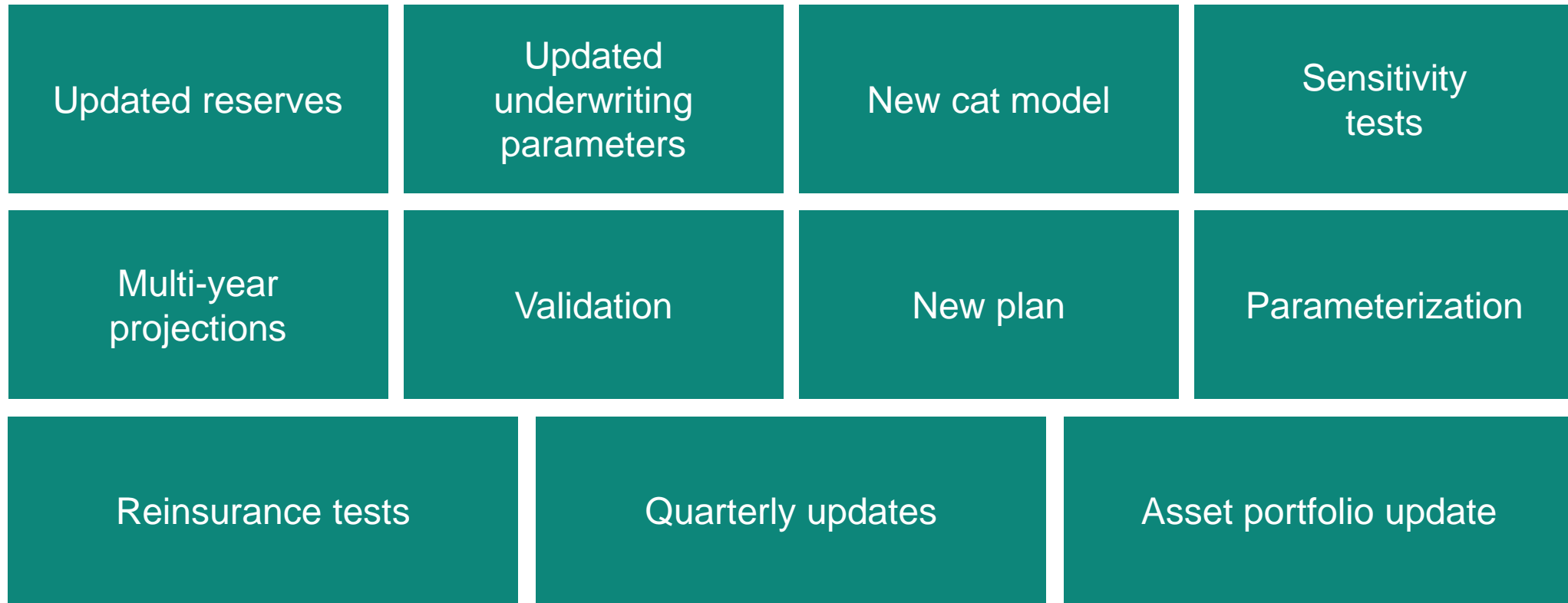
Run models and building of reports

Capital Team




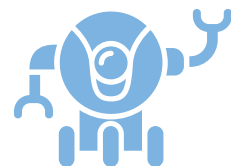



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Automation possibilities



Identifying the right processes for automation

				
Repetitive	Prone to Error	Rules Based	Digital Data	Time



Identifying the right processes for automation

Capital Modelling examples

Higher Priority

- Plan updates
- Reinsurance tests
- Cat exposure updates
- Sensitivity testing

Worth doing

- Quarterly updates
- Validation testing
- Parameterisation process

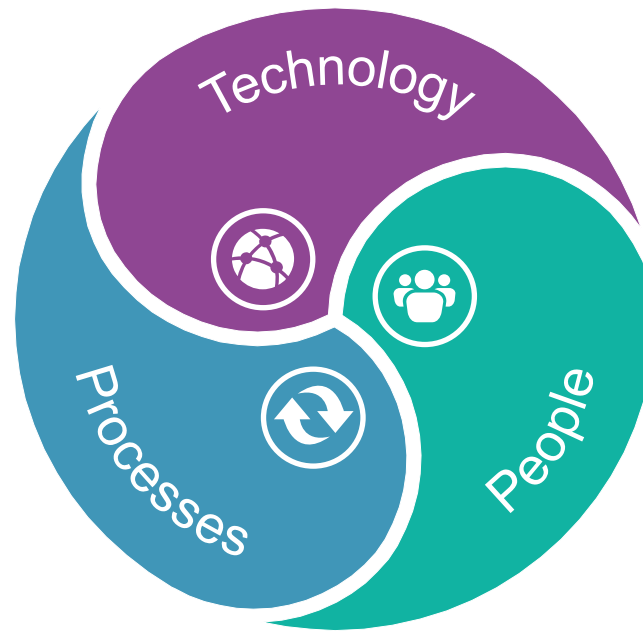
Low priority

- Reinsurance data entry
- Dependencies
- M&A



Approach

Considerations across Technology, Processes and People



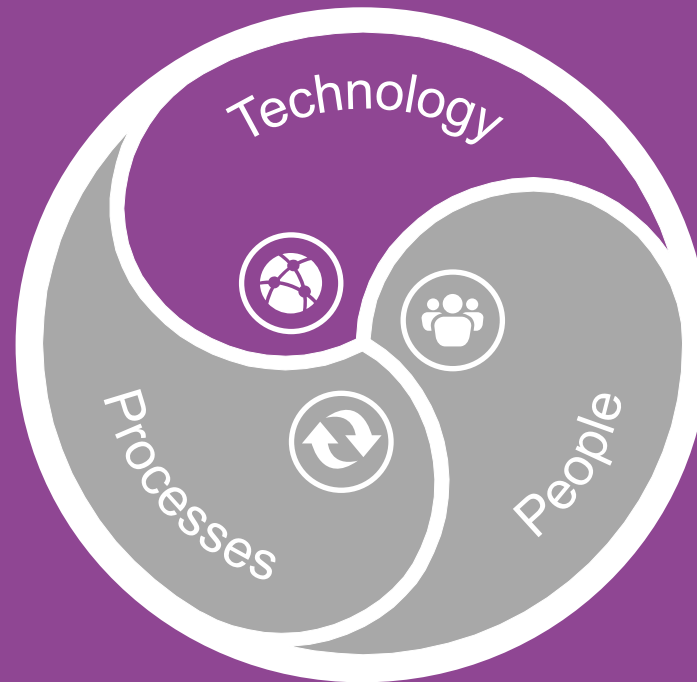
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Approach

Considerations across Technology, Processes and People

Technology should be properly paired with People and Processes

Technology should be scalable and maintainable



Ensure you have the right tool for the job

“Plug and play” approach



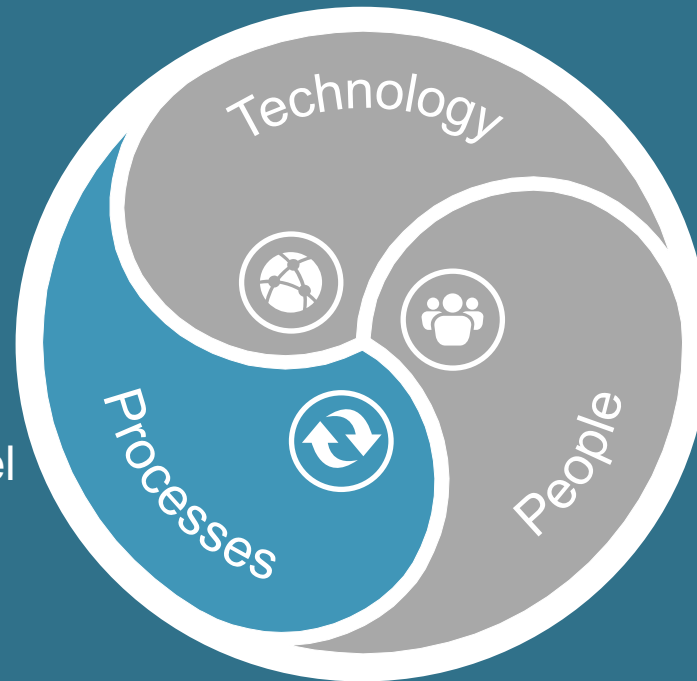
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Approach

Considerations across Technology, Processes and People

Processes should not be considered in isolation

Automated processes should enable your end-state target operating model



“Fix and Shift” vs. “Shift and Fix”

Consider what process to follow when things go wrong

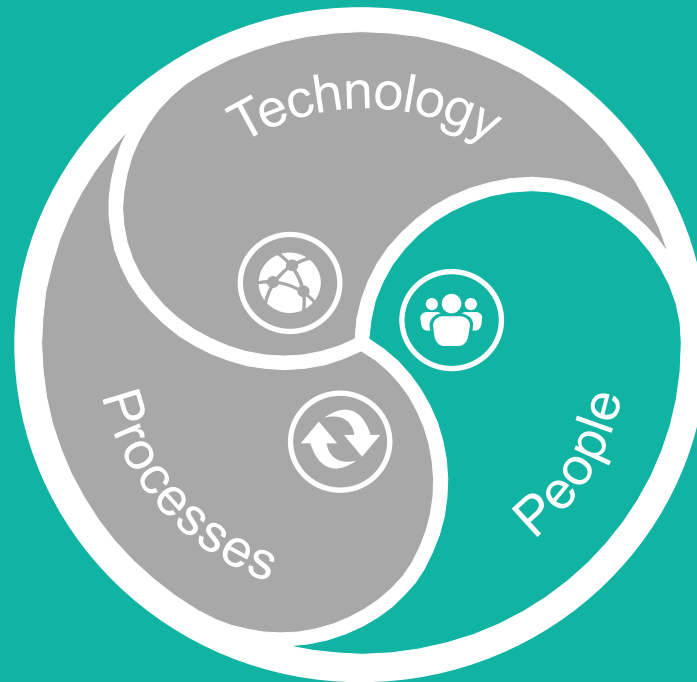


Approach

Considerations across Technology, Processes and People

Clear vision should be set
by leadership

Embrace a culture of change



Automation as a side hobby will fail

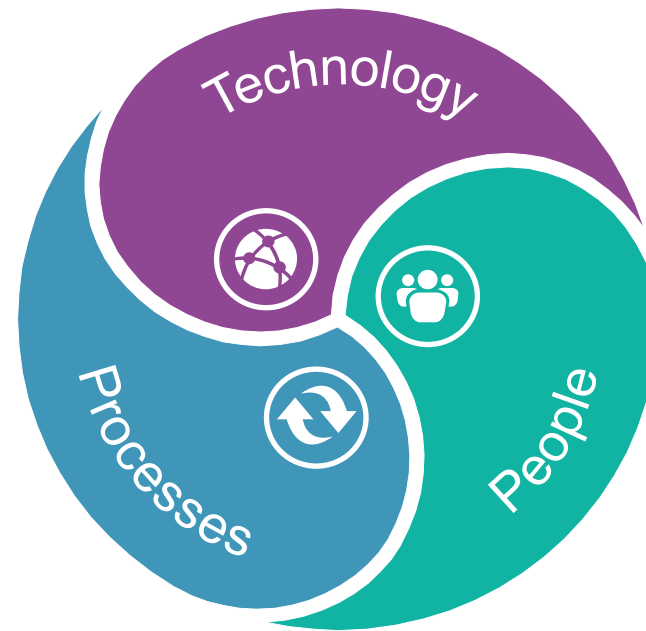
Be cognizant and transparent
about changing roles



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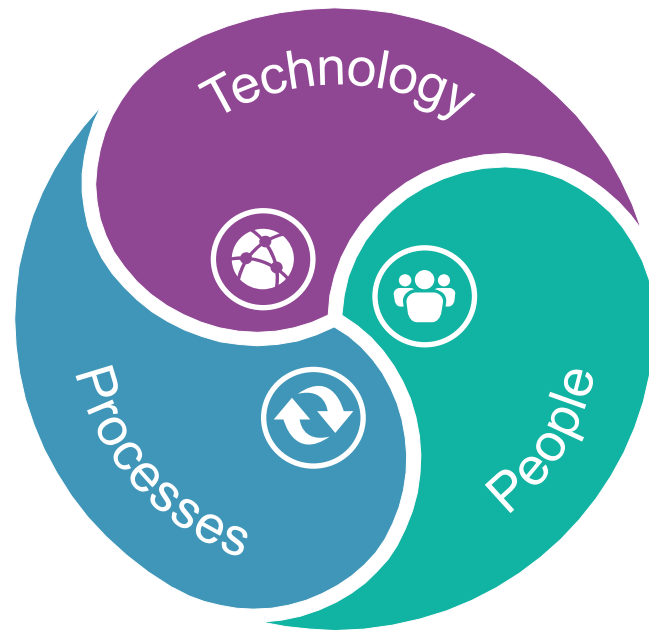
Approach

Implementation methodology



Approach

Implementation methodology



A phased implementation approach

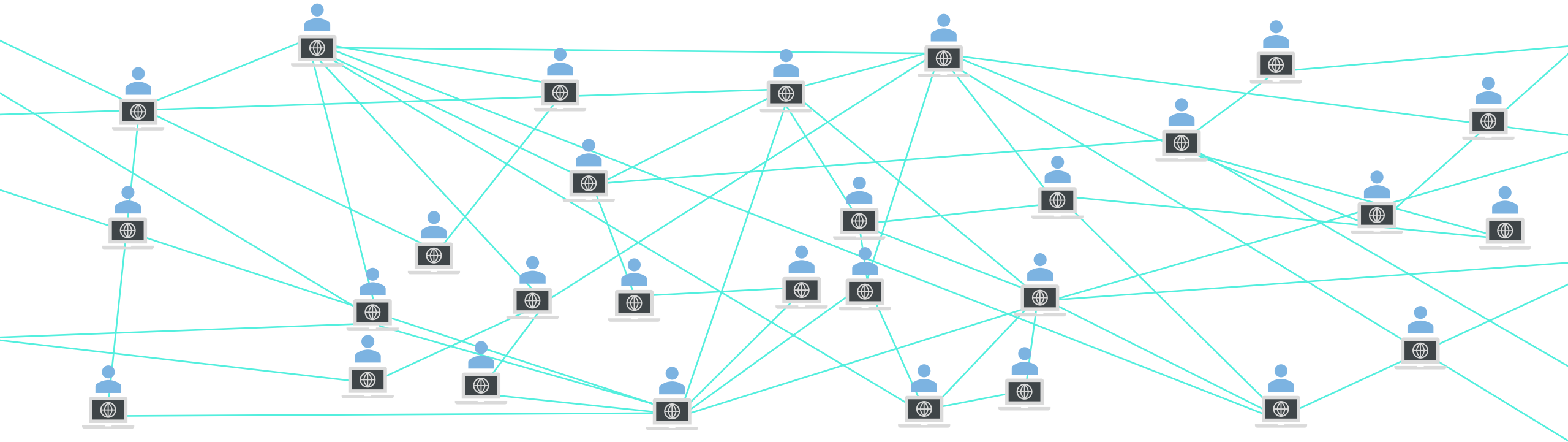
Maximize early delivery of benefits

Collaboration is key



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Adaptability



Things change...new data systems, modelling gets better, you will want to continually improve

Processes need to be adaptable – things will likely change every year



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Business user applications

Reinsurance testing

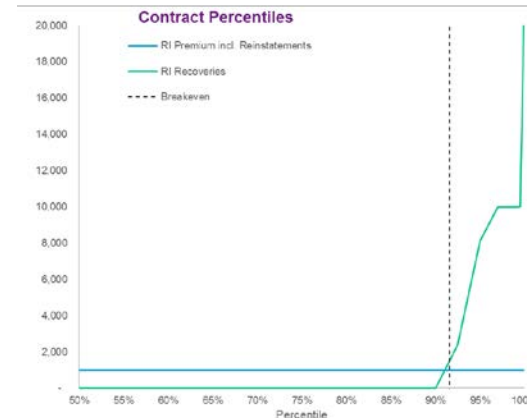
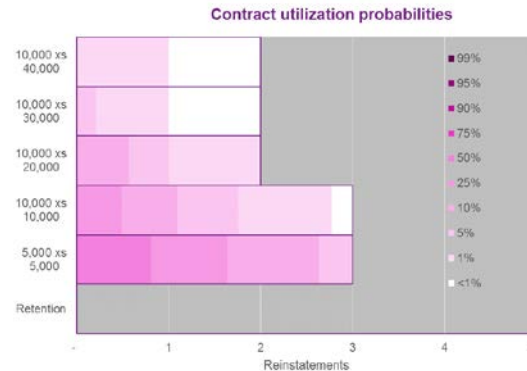


Gross models pre-run and static

Template for RI programs

In-built contract pricing + input quotes

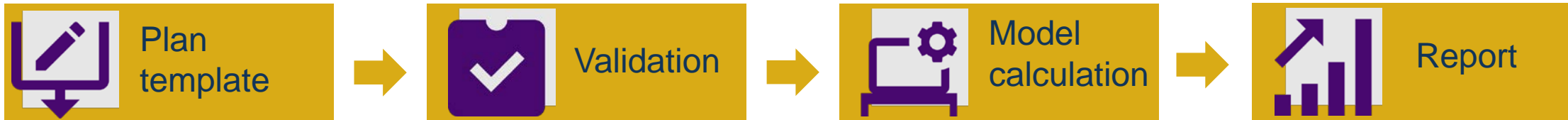
Fully automated, no expert review by as standard but may request review for important runs



Contract	Expected Profit	Blended EVA
Gross	63,941	-87,989
Prop 1 - 5xs5	-1,110	-910
Prop 2 - 10xs10	-740	-535
Prop 3 - 10xs20	-346	-240
Prop 4 - 10xs30	-174	-129
Prop 5 - 10xs40	-116	-85
Eng+Cons 1 - 5xs5	-285	-215
Eng+Cons 2 - 5xs10	-136	-90
Eng+Cons 3 - 5xs15	-95	-62
Eng+Cons 4 - 10xs20	-135	-91
GL+WC 1 - 2.5xs2.5	-2,527	1,407
GL+WC 2 - 2.5xs5	-1,484	1,305
GL+WC 3 - 2.5xs7.5	-1,159	1,220
Prof Liab 1 - 2.5xs2.5	-322	-54
Prof Liab 2 - 2.5xs5	-189	-12
Prof Liab 3 - 2.5xs7.5	-148	9
Auto 1 - 5xs5	-1,041	392
Auto 2 - 10xs10	-724	775
Auto 3 - 10xs20	-285	558
Auto 4 - 10xs30	-153	405
Auto 5 - 10xs40	-95	330
Marine Liab 1 - 1xs1	-64	15
Marine Liab 2 - 3xs2	-54	51
Marine Liab 3 - 5xs5	-16	31
Marine QS	-301	-187
Cat 1 - 20xs50	-1,671	-328
Cat 2 - 30xs70	-1,933	-76
Cat 3 - 100xs100	-2,161	739
Cat 4 - 100xs200	-2,007	3,332
Cat 5 - 100xs300	-1,071	4,083
Total RI	-23,578	9,411
Net	40,363	-78,578

Business user applications

Business plan testing



Scope is limited – no human review, so can't give too much freedom without model assumptions breaking down.

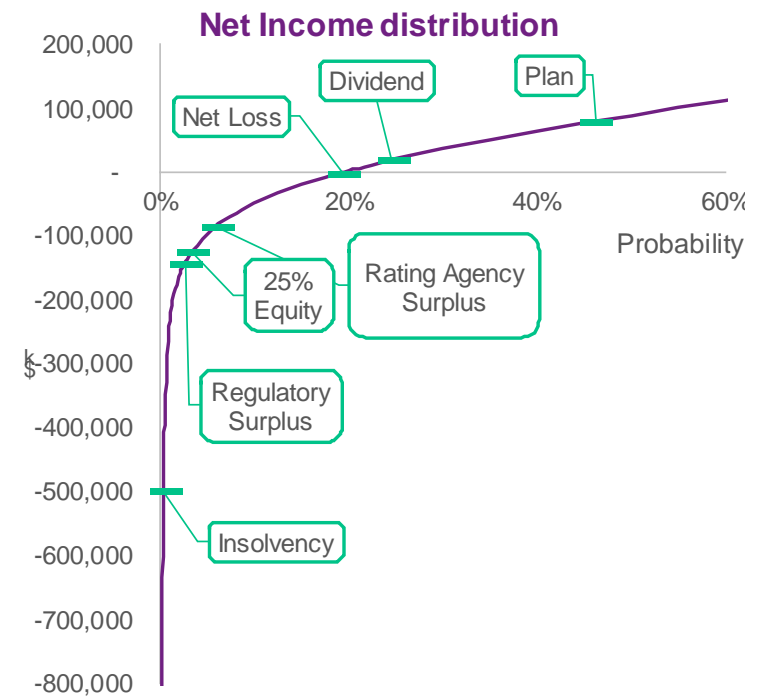
Parameters are rescaled. Limits on how far can stretch things.

What happens to reinsurance? Enter in program, auto-repricing. Or just scale net outputs.

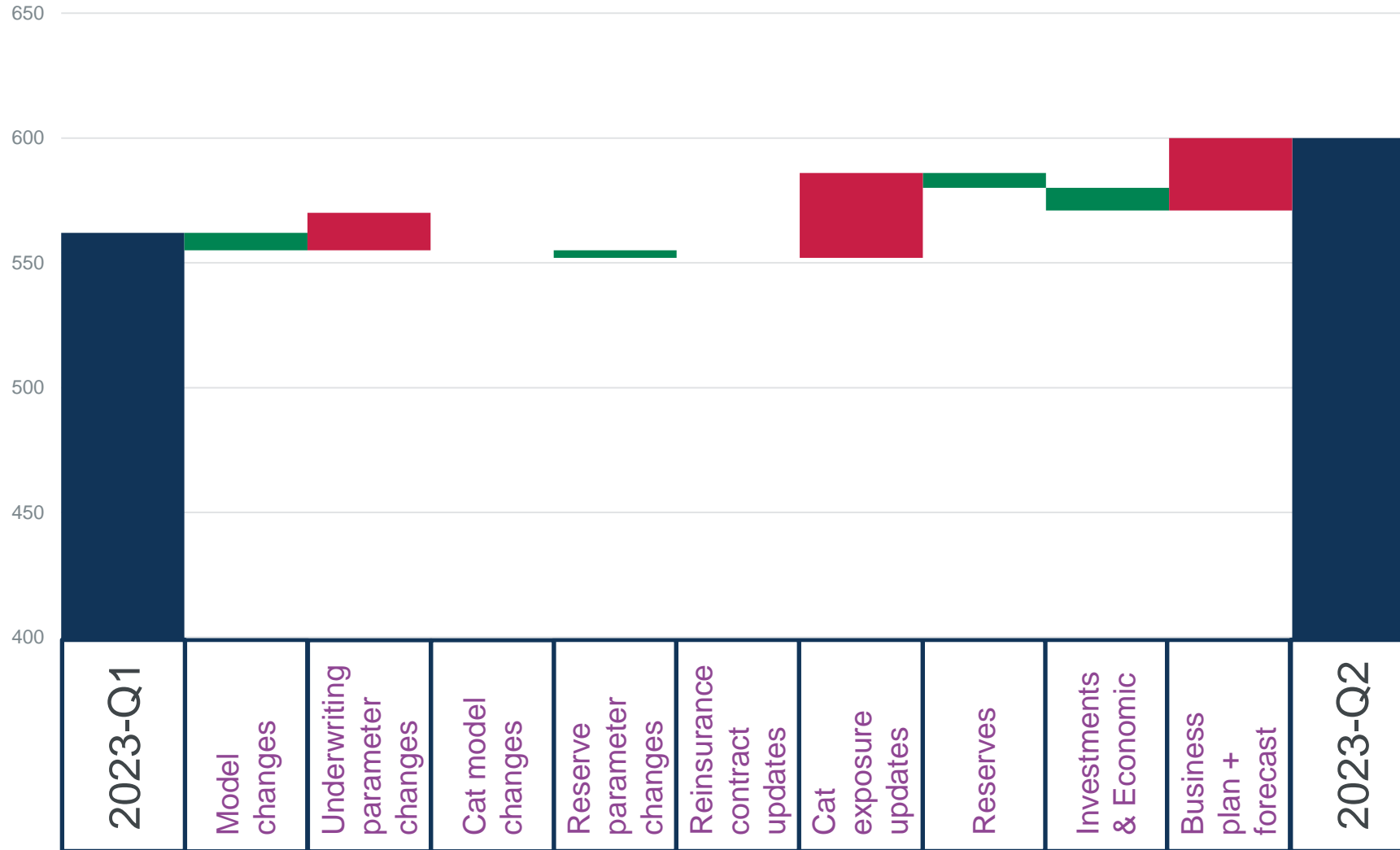
What basis – exclude reserve risk? Current reserves aren't affected, but next year's underwriting will be the year after's reserves.

Probability of:

Net Income below plan	46%
Being unable to cover the dividend	25%
Net loss	19%
Falling below Rating Agency capital requirement	6%
Losing 25% of shareholders' equity	3%
Falling below Regulatory Capital Requirement	3%
Complete insolvency	0.4%

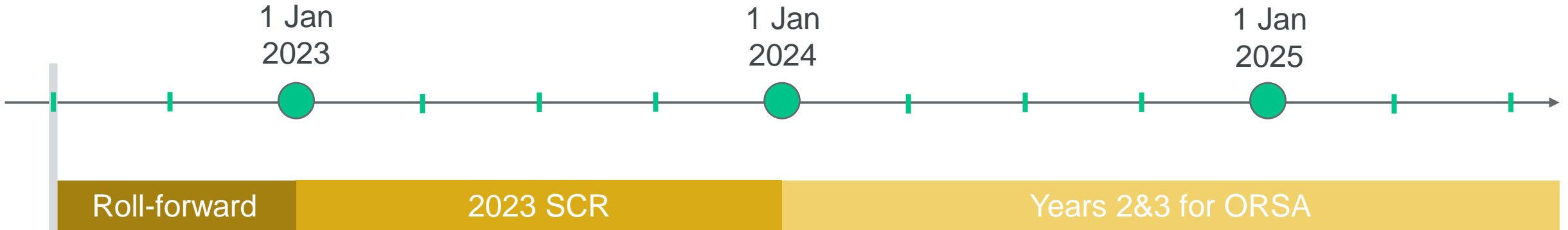


Quarterly updates



Projection period

Annual calendar year projections



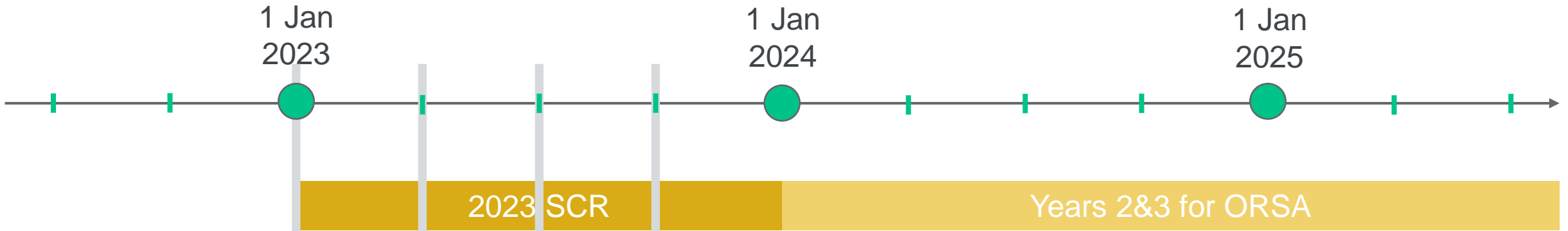
Calibration based on data as at 1 July with roll-forward to model projection period as-at 1 January



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Projection period

Annual calendar year projections



Quarterly updates of reserves, premium volumes, rates...

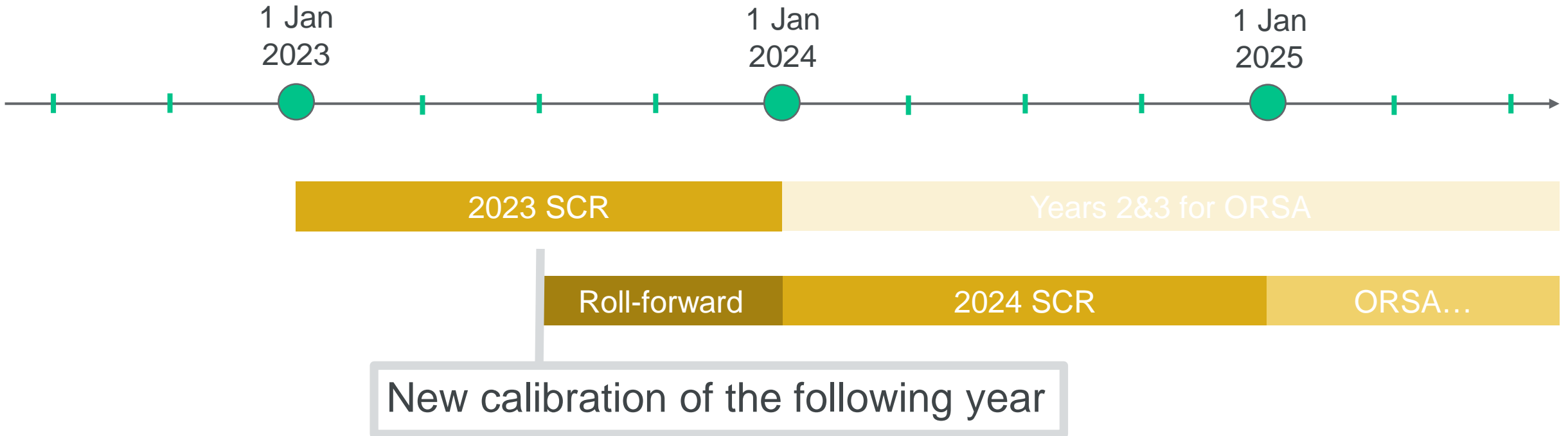
⇒ *Continuous monitoring of capital adequacy*



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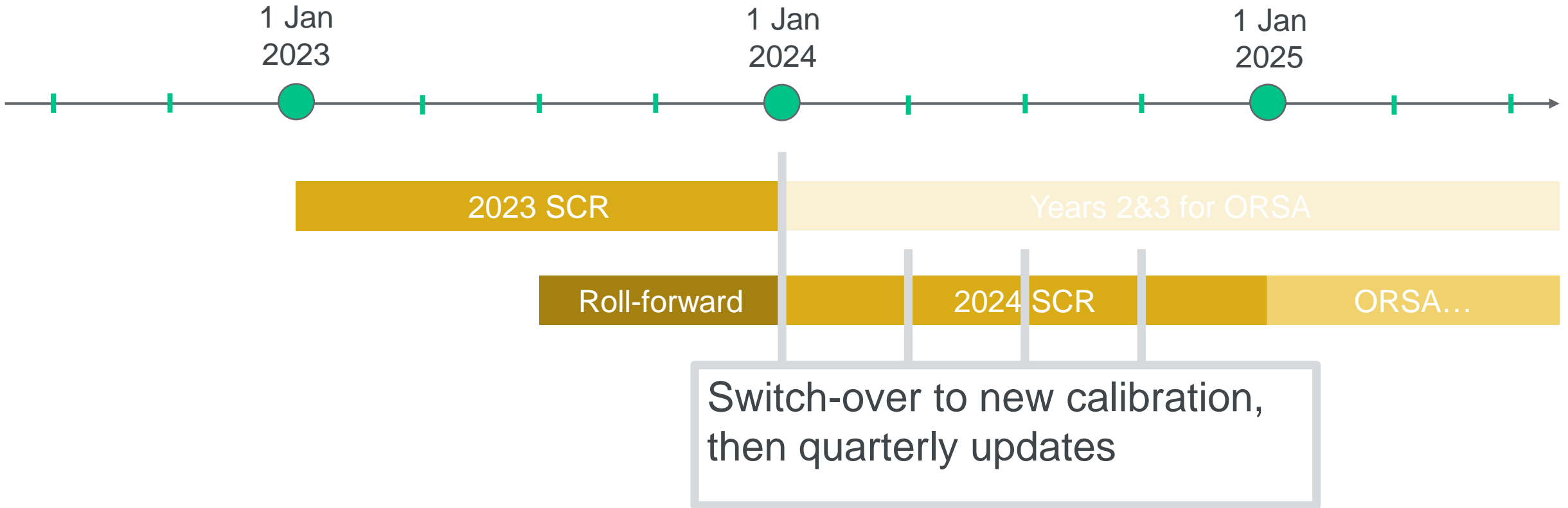
Projection period

Annual calendar year projections



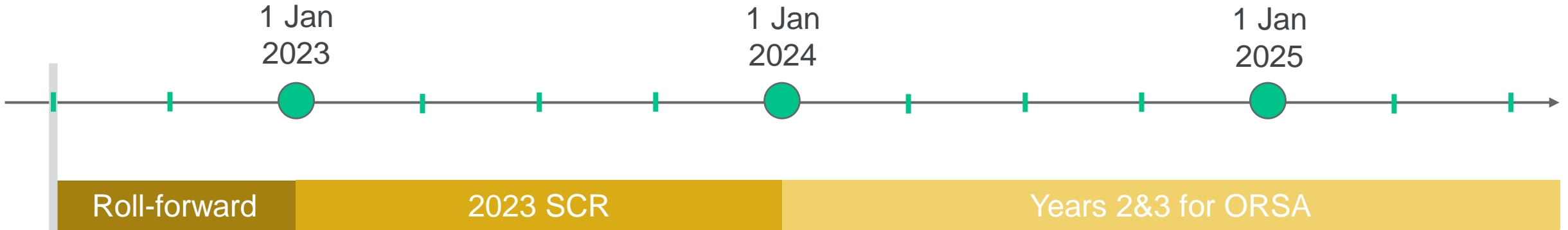
Projection period

Annual calendar year projections



Projection period

Annual calendar year projections



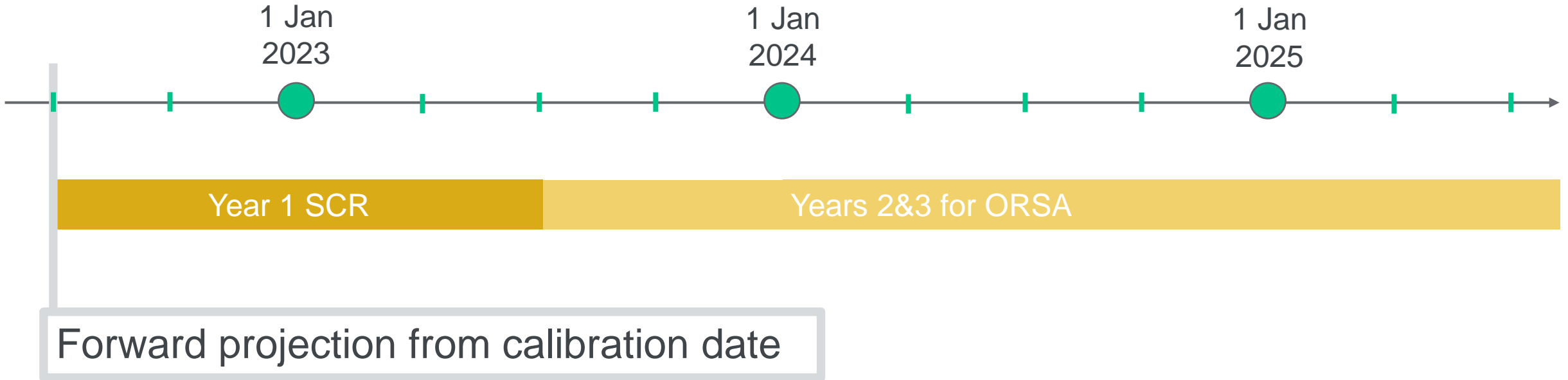
Calibration based on data as at 1 July with roll-forward to model projection period as-at 1 January



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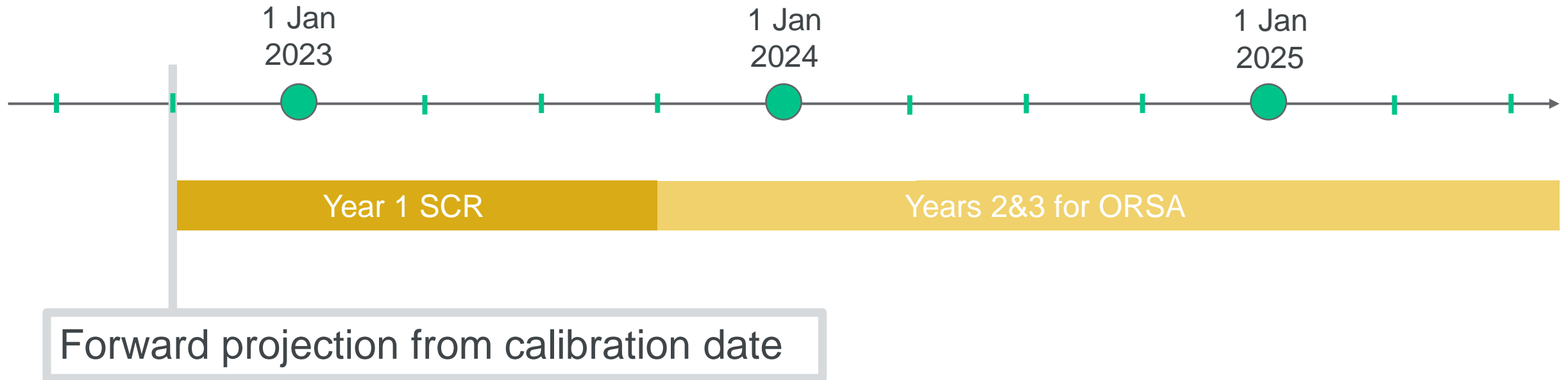
Projection period

Rolling annual projections



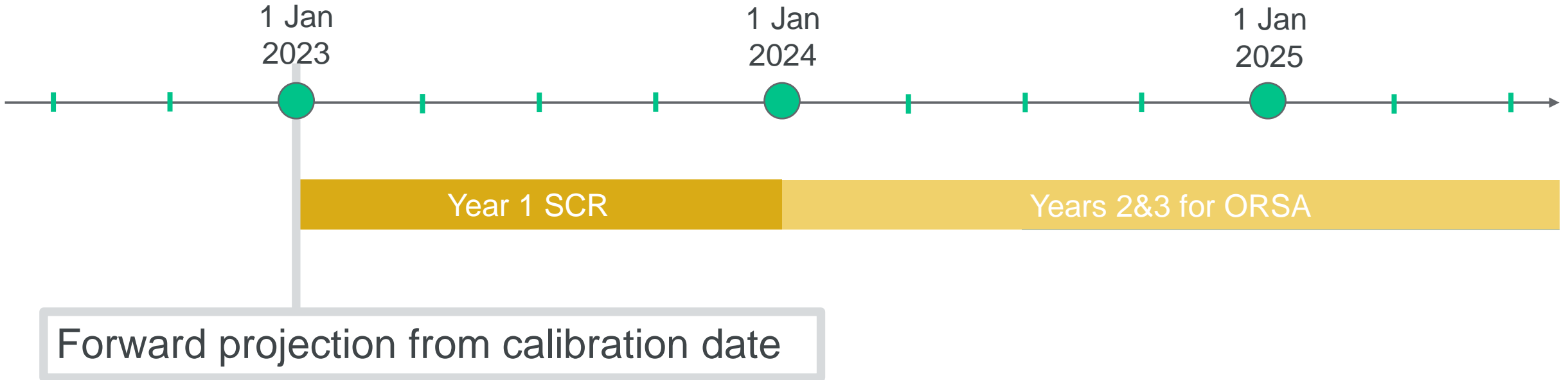
Projection period

Rolling annual projections



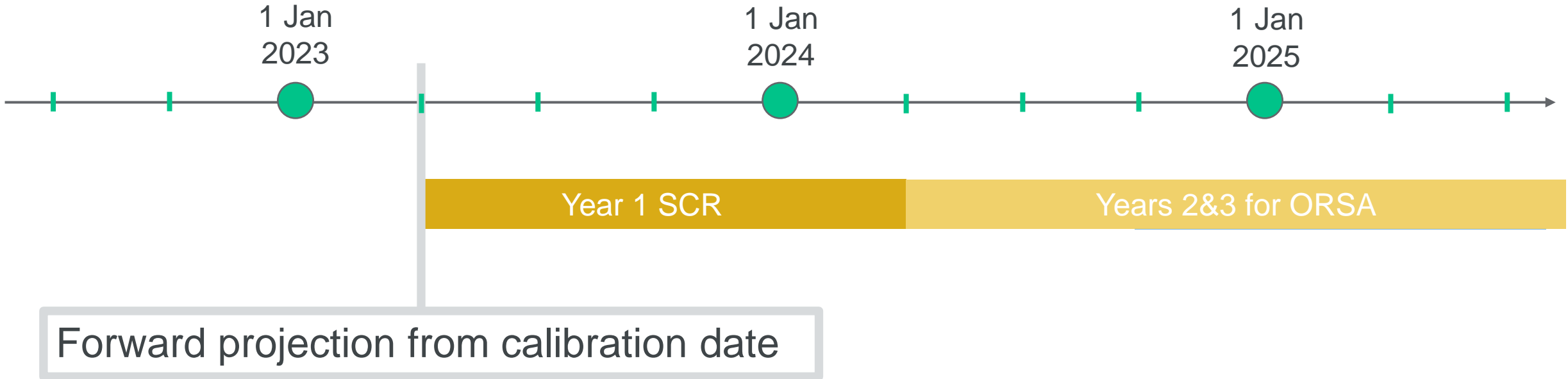
Projection period

Rolling annual projections



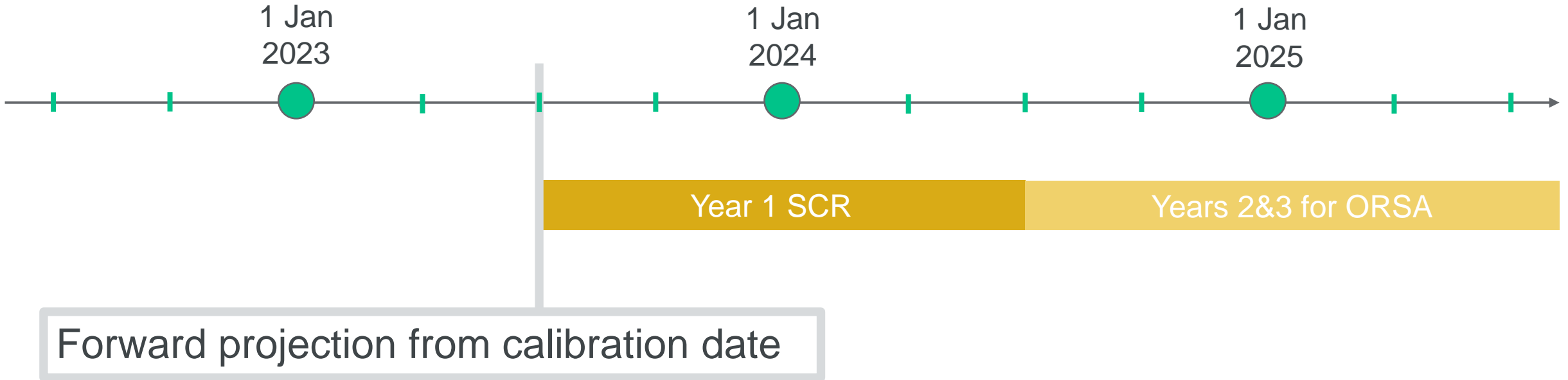
Projection period

Rolling annual projections



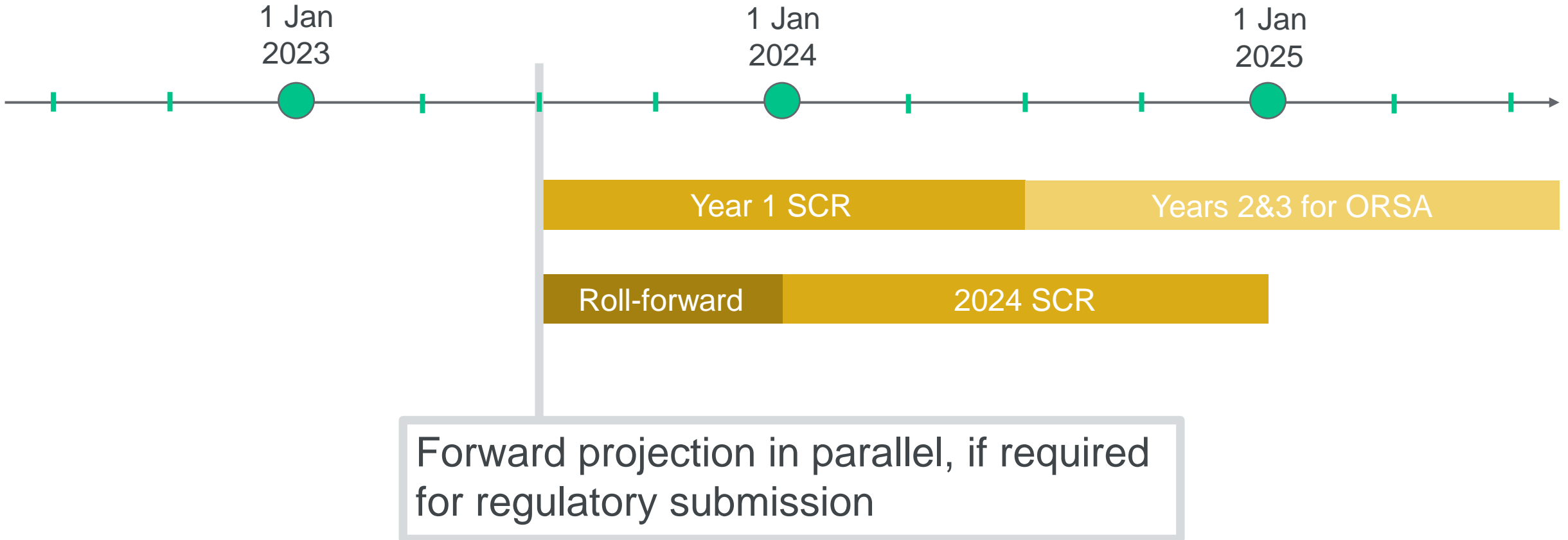
Projection period

Rolling annual projections



Projection period

Rolling annual projections



Projection period

Rolling annual projections



Rolling annual projection
Not only calendar year to calendar year

No roll-forward
Always as-at the current quarter



Regular updates

Continuous processes

Data Updates

The current state of the business and future plans. Updated as available from other functions to keep the model up to date.

Parameterisation

Updating assumptions
Less frequent than data updates.
Triggered by both scheduled reviews and automated warning criteria.

Model Changes

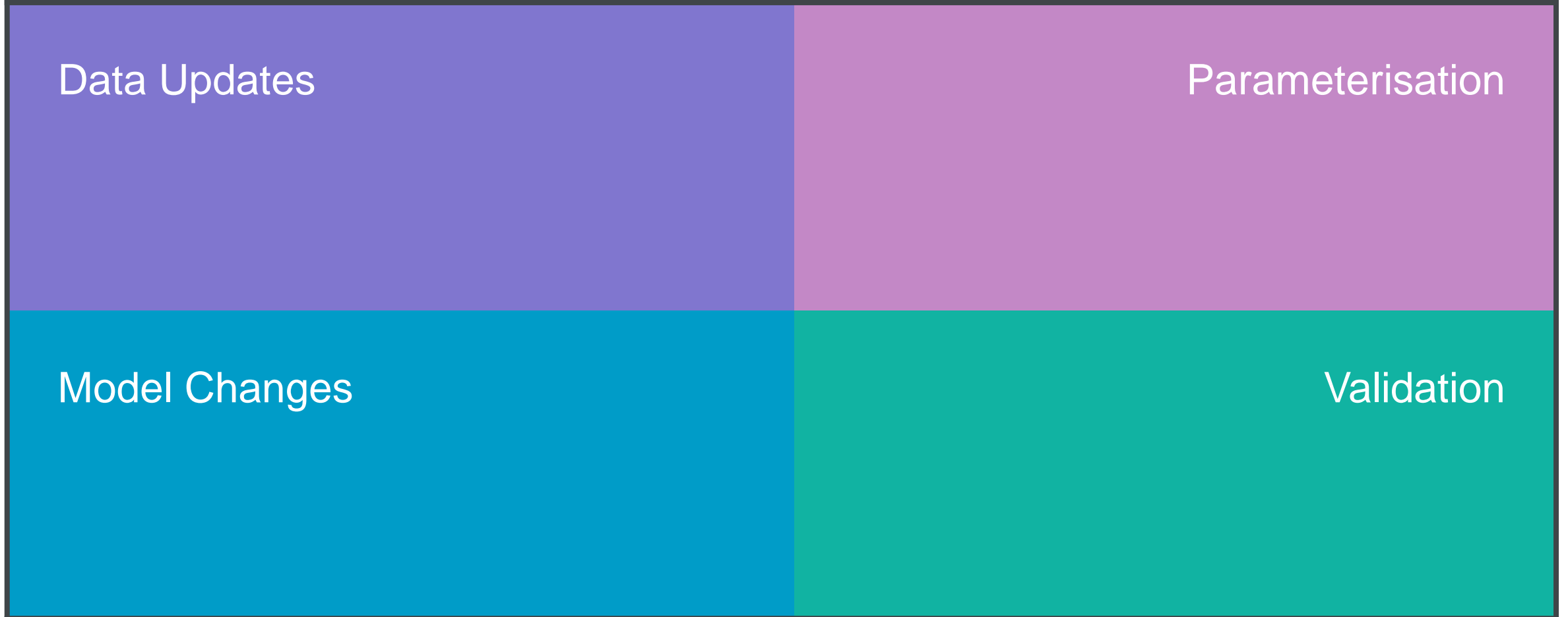
Changes to modelling approach or methodology. The least frequent kind of update and expected to cause some disruption to other processes.

Validation

Continuous monitoring of the model to ensure appropriateness. Assumptions tested at appropriate frequency for materiality.

Regular updates

Continuous processes



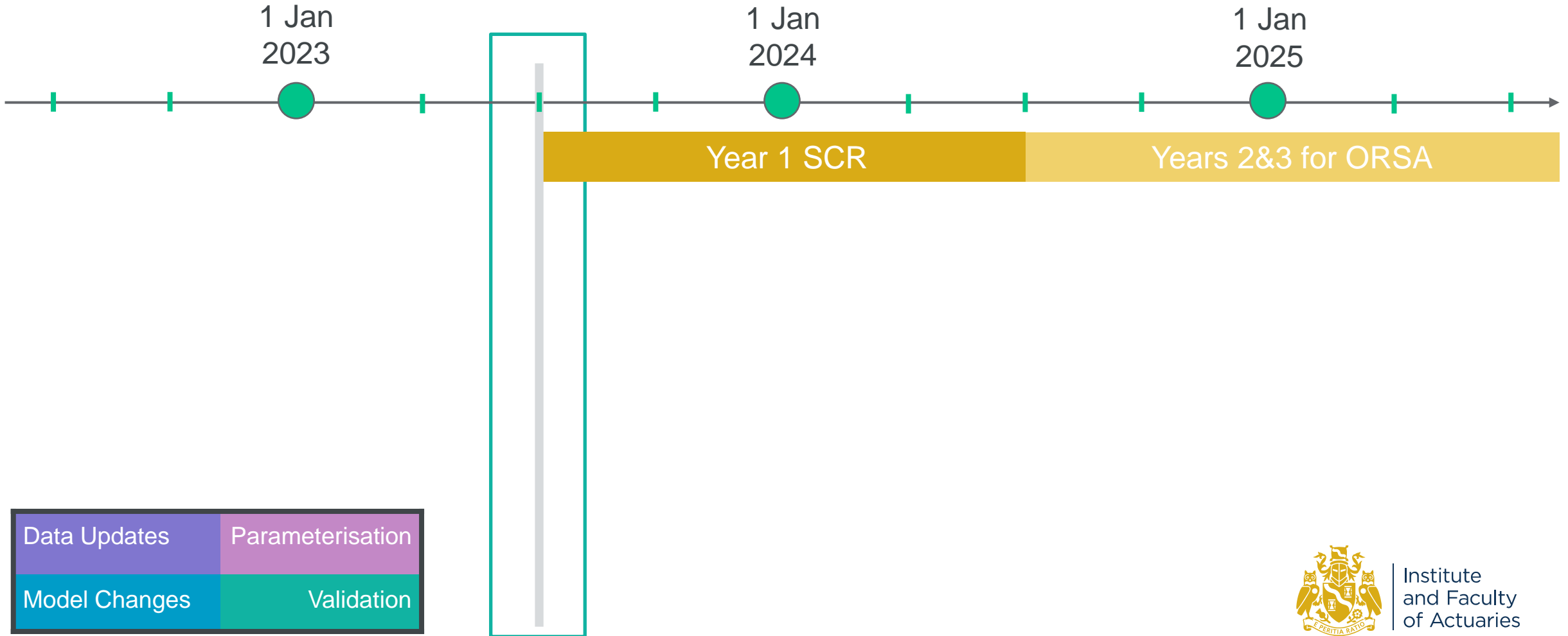
Regular updates

Continuous processes

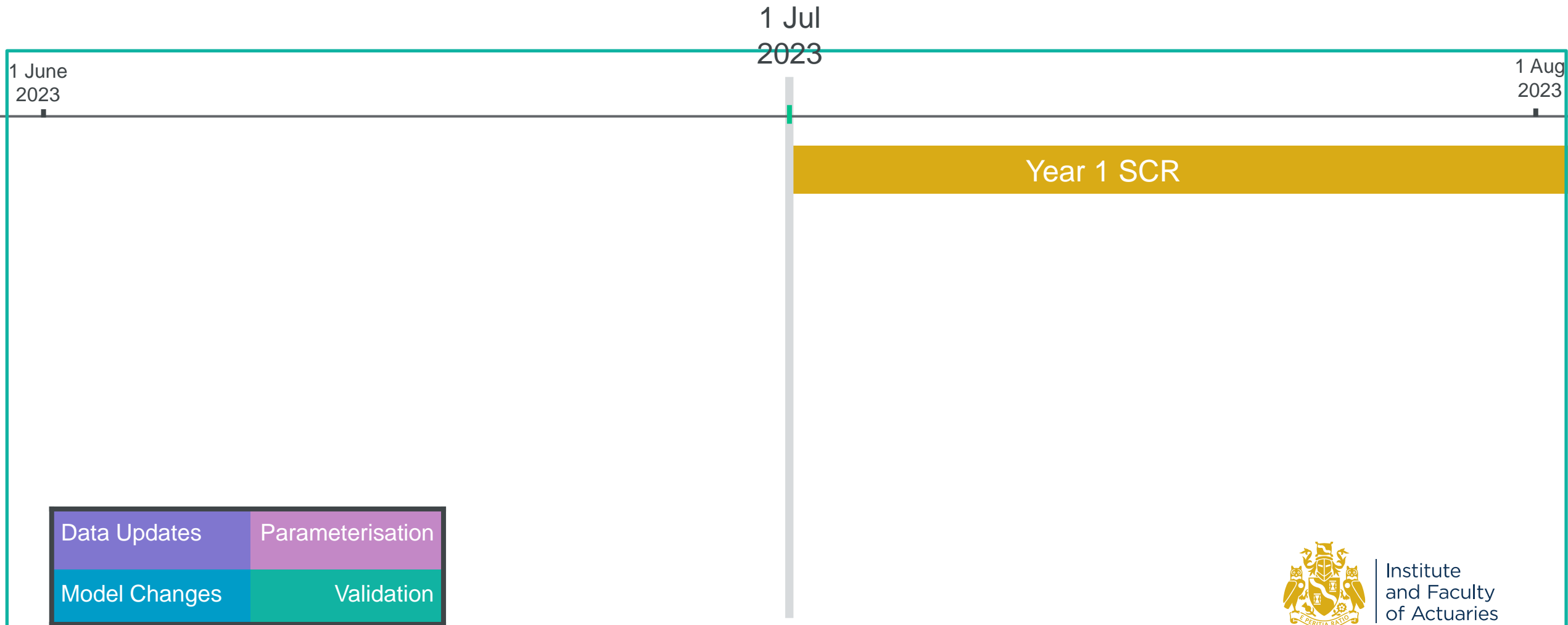
Data Updates	Parameterisation
Model Changes	Validation



Quarterly updates

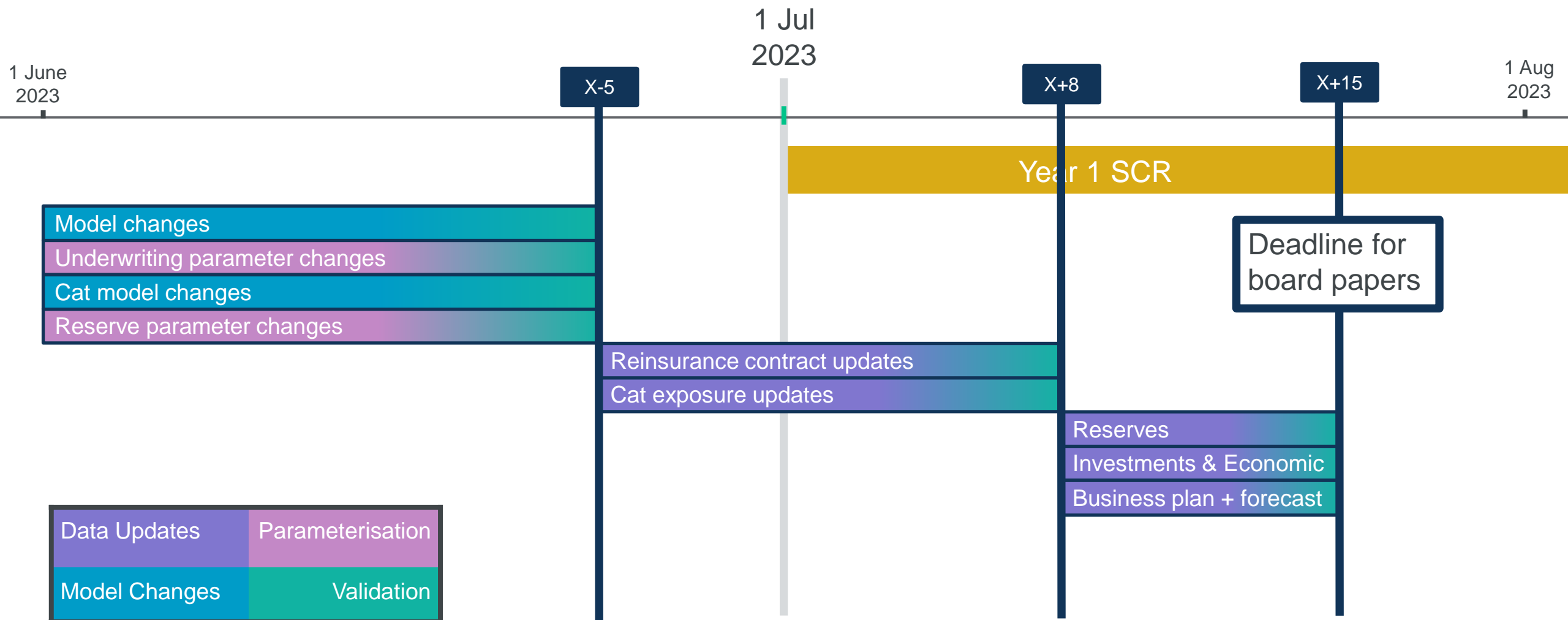


Quarterly updates

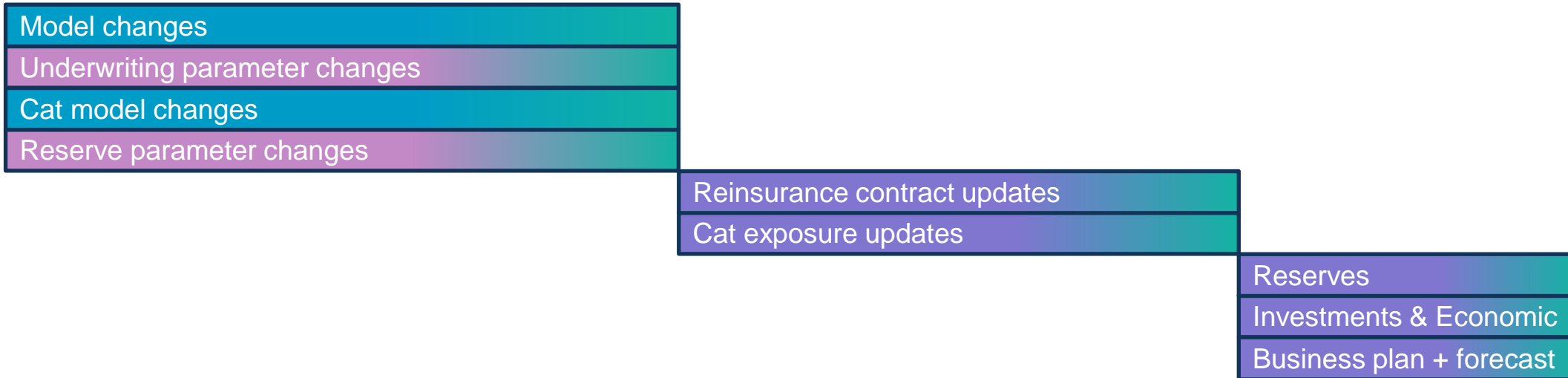


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Quarterly updates



Quarterly updates



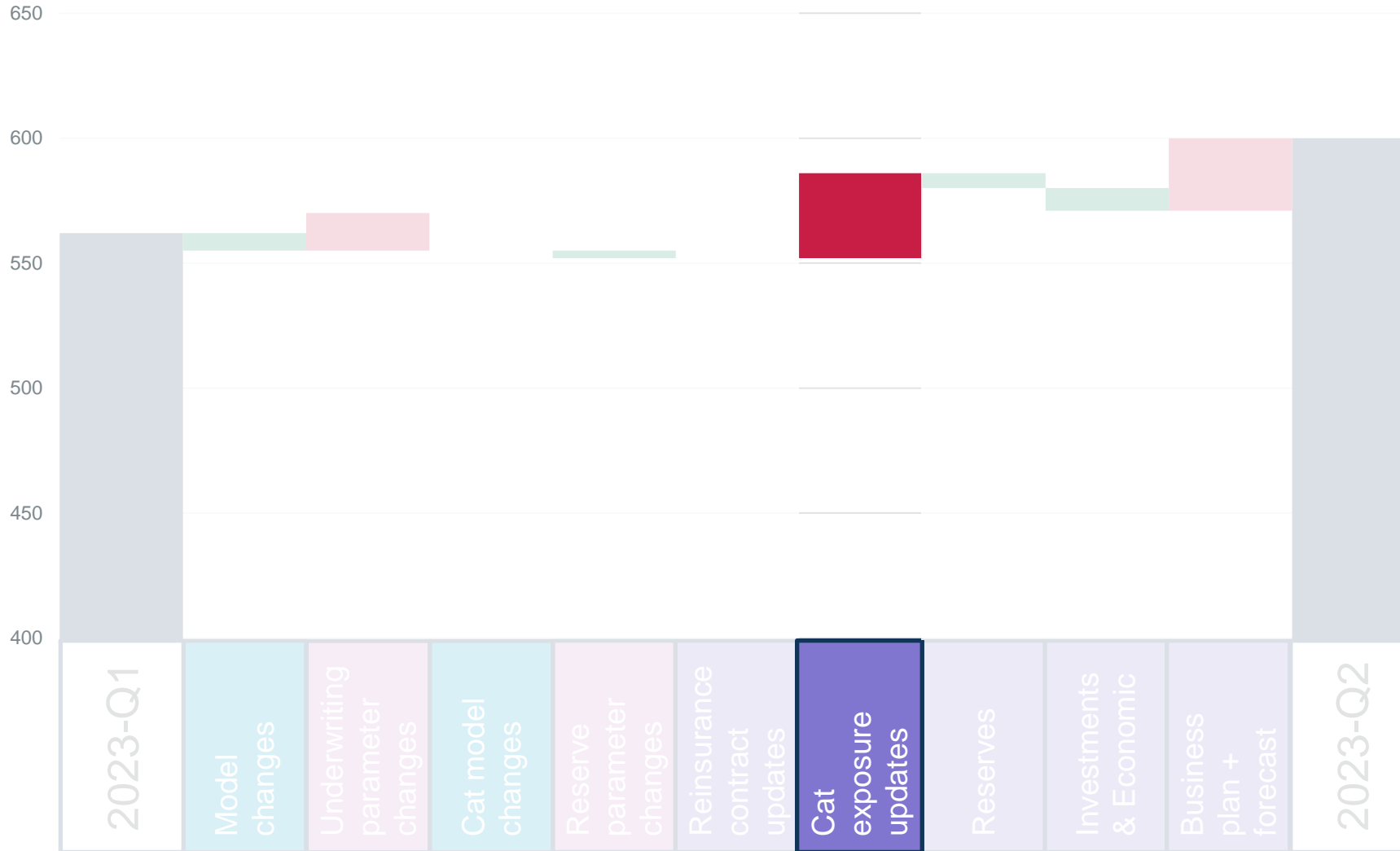
Quarterly updates

Model changes	Underwriting parameter changes	Cat model changes	Reserve parameter changes	Reinsurance contract updates	Cat exposure updates	Reserves	Investments & Economic	Business plan + forecast
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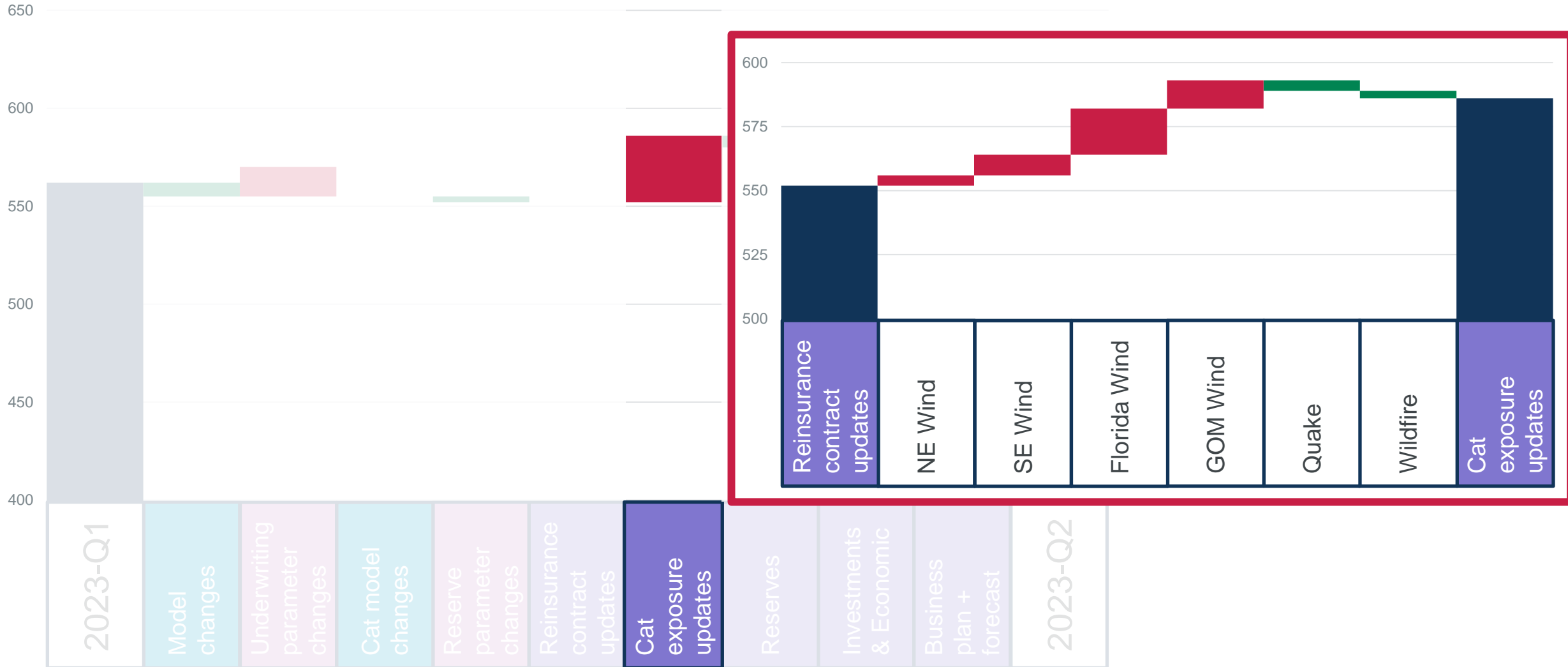
Quarterly updates



Quarterly updates



Quarterly updates



Regular updates

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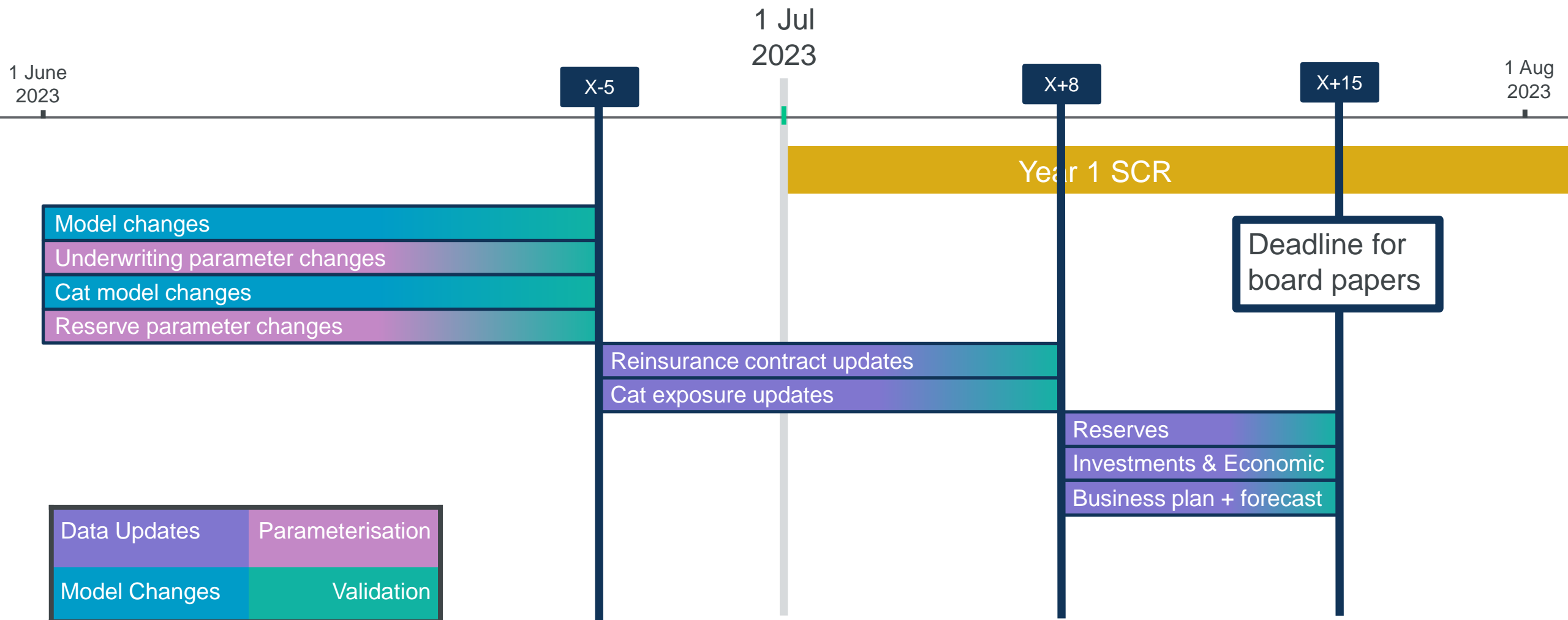
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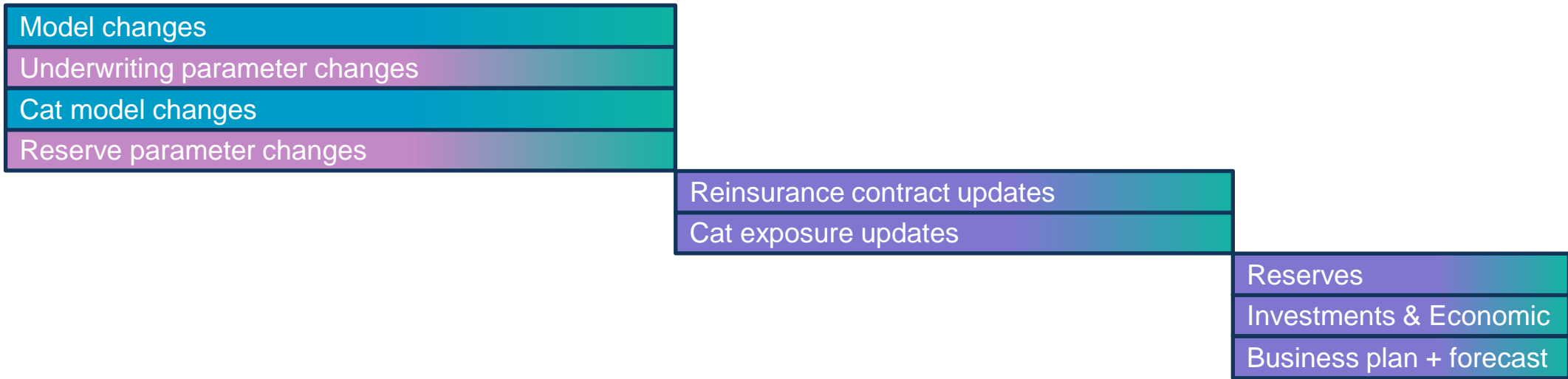
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Quarterly updates





Continuous updates

Model changes
Underwriting parameter changes
Cat model changes
Reserve parameter changes
Reinsurance contract updates
Cat exposure updates
Reserves
Investments & Economic
Business plan + forecast

Continuous updates

Model changes	Regular quarterly cycle
Underwriting parameter changes	Regular quarterly cycle
Cat model changes	Regular quarterly cycle
Reserve parameter changes	Regular quarterly cycle
Reinsurance contract updates	Ad hoc – whenever new contracts are bound
Cat exposure updates	Daily
Reserves	Quarterly + exceptional updates
Investments & Economic	Daily
Business plan + forecast	Quarterly + exceptional updates

Recap

Automation enables you to do more, faster with less human effort.

Mechanical steps can be automated, human input for judgement and review.

Best processes for automation are those that are: repetitive, error prone, rules based, use digital data and are time constrained.

The approach to automation should consider technology, processes and people

Your process needs to be adaptable – things will change every year

Business applications can be automated, reducing reliance on capital team for turn-around

Automation can enable a full quarterly update process...

...which can be extended to continual updates and immediate assessment of your position in times of volatility

Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.



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Thank you



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