



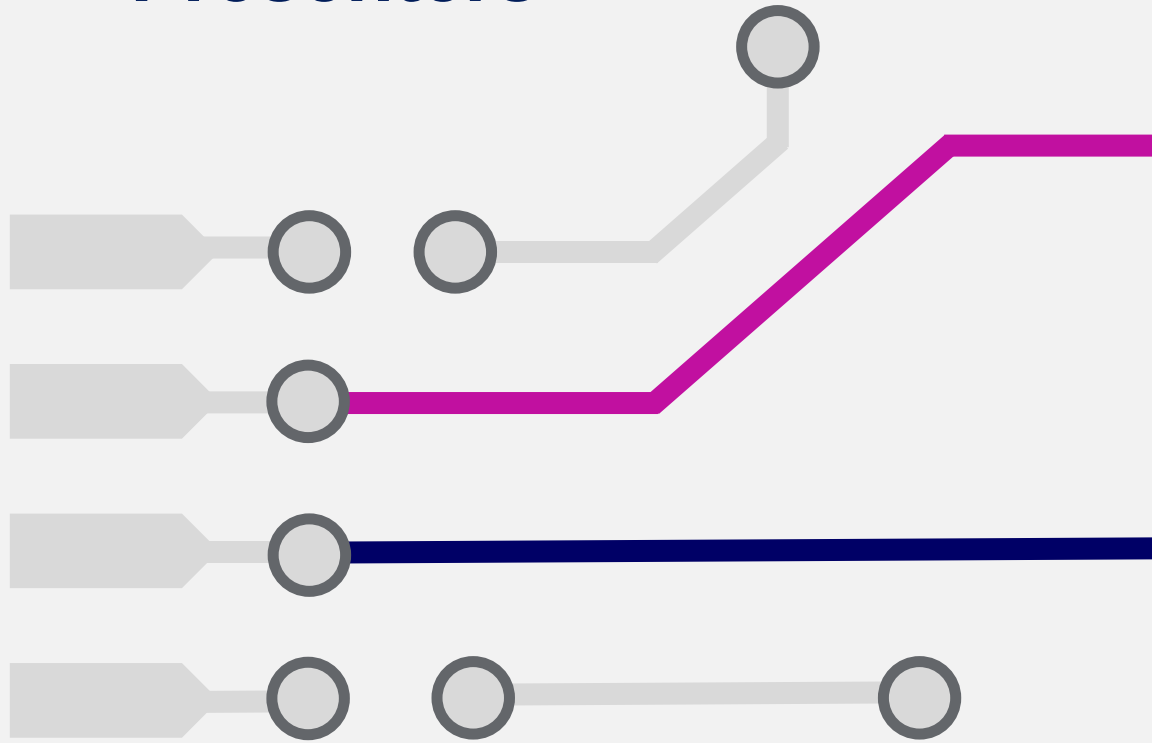
The robot reserving analyst

September 16, 2016

Jamie Mackay & James Marshall



Presenters



Jamie Mackay



Willis Towers Watson 

James Marshall



 **ZURICH**[®]



Agenda

An increasing focus on automation

The Willis Towers Watson reserving survey

A change in focus at Zurich

Jamie Mackay



Willis Towers Watson 

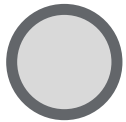
James Marshall



 ZURICH®



Polling question 1



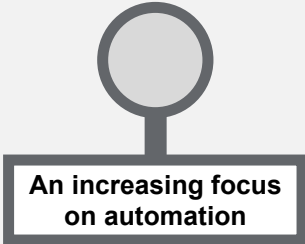
Do you / your reserving team currently use Robotic Process Automation as an integral part of your reserving process?

Select one:

- Yes
- No
- I don't know
- I don't even know what it means



Agenda



The Willis Towers Watson reserving survey



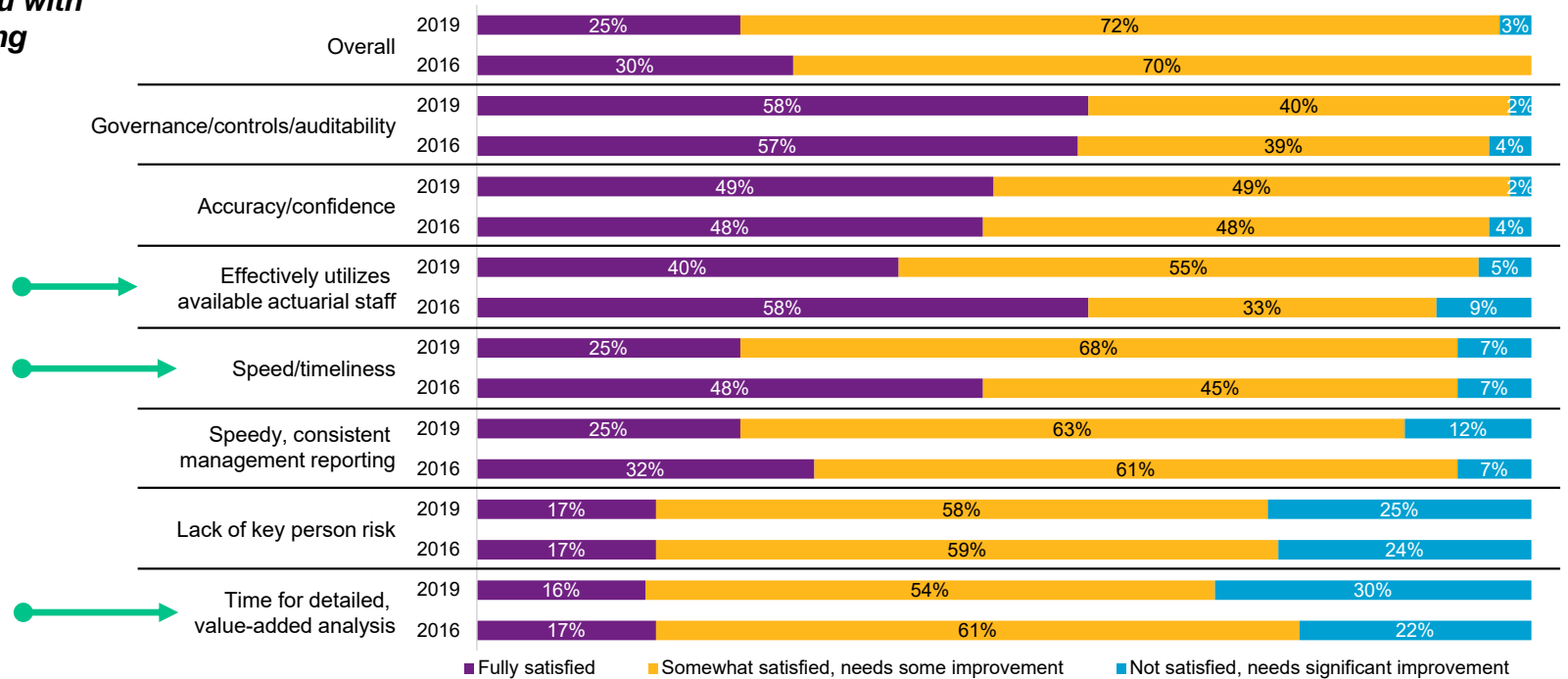
The Willis Tower Watson Reserving Survey

- Completed in 2019 (with prior surveys completed in 2016 and 2014)
- Completed by 57 Chief Actuaries / Chief Reserving Actuaries based in US, Canada and Bermuda

The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

Q *How satisfied are you with your current reserving process?*



Base: Total Respondents (2019 n = 57, 2016 n = 54)

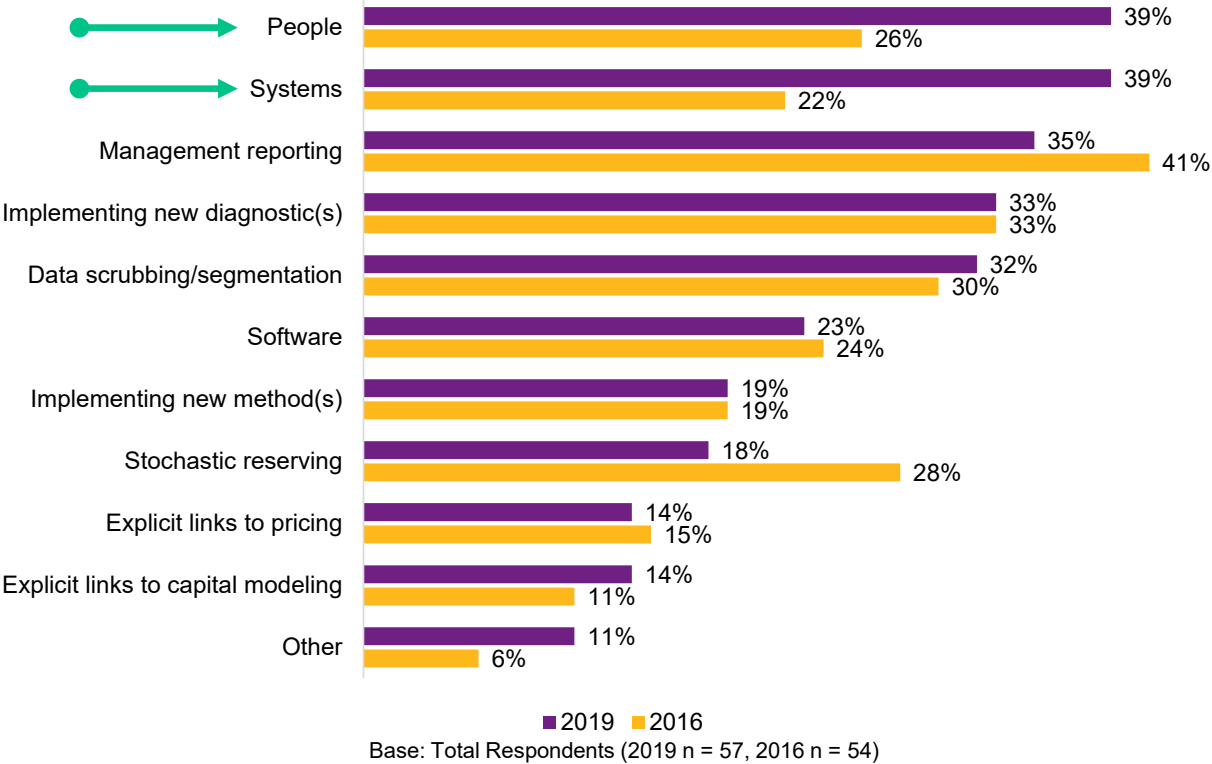
The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

The Willis Tower Watson Reserving Survey

Reserving departments are concentrating their investments on people and systems

Q **Over the next two years, which of the following areas are your top reserving priorities for investment?**



The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

Reserving departments are concentrating their investments
on people and systems

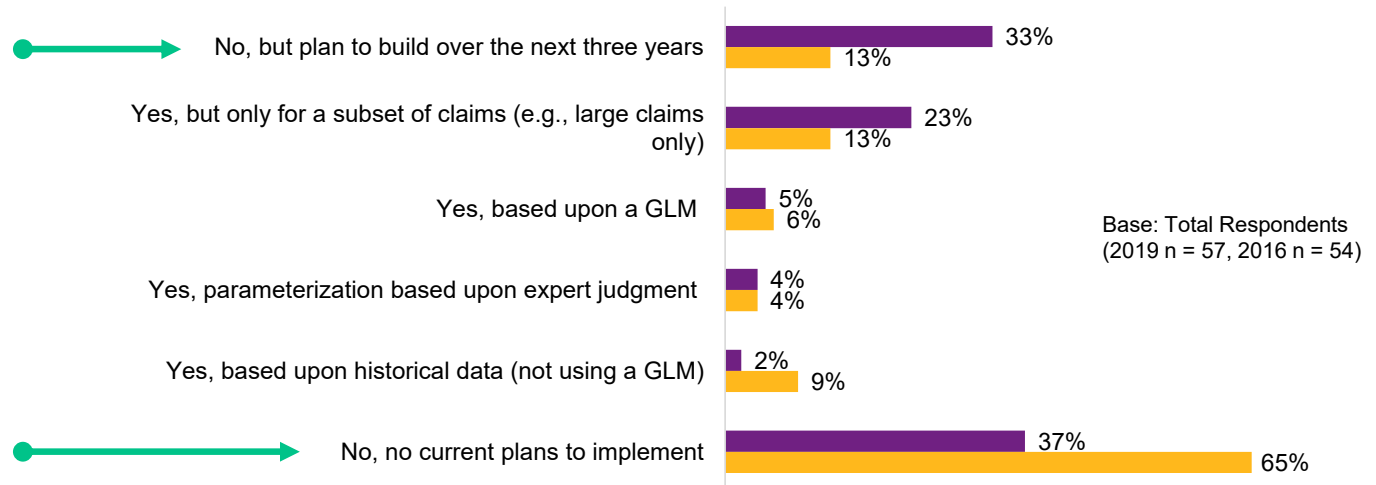
The Willis Tower Watson Reserving Survey

Interest in individual claims modeling has doubled since our last survey

Desire for more time and more analysis

Reserving departments are concentrating their investments on people and systems

Q **Do you utilize individual claims reserving methodologies?**



The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

Reserving departments are concentrating their investments
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Interest in individual claims modeling has doubled since our last survey

The Willis Tower Watson Reserving Survey

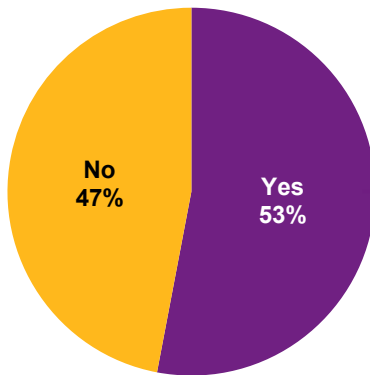
There's a desire to use more data

Desire for more time and more analysis

Reserving departments are concentrating their investments on people and systems

Interest in individual claims modeling has doubled since our last survey

Q *Is there data that would be useful to incorporate into your normal reserve analysis that is not currently utilized?*



Examples of additional data fields:

- Claim/Policy coverage details
 - Contract features
 - Available limits
- Data granularity
 - Segmentation (e.g., subclass or geography)
 - Drill down functionality
- Claim details
 - Loss/Injury type (e.g., indemnity vs. medical)
 - Soft claims information
- Claim counts
- Miscellaneous
 - External benchmarks
 - Large loss identifiers or other identifiers
 - Distribution channel
 - Exposure information (e.g., miles driven)

The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

Reserving departments are concentrating their investments
on people and systems

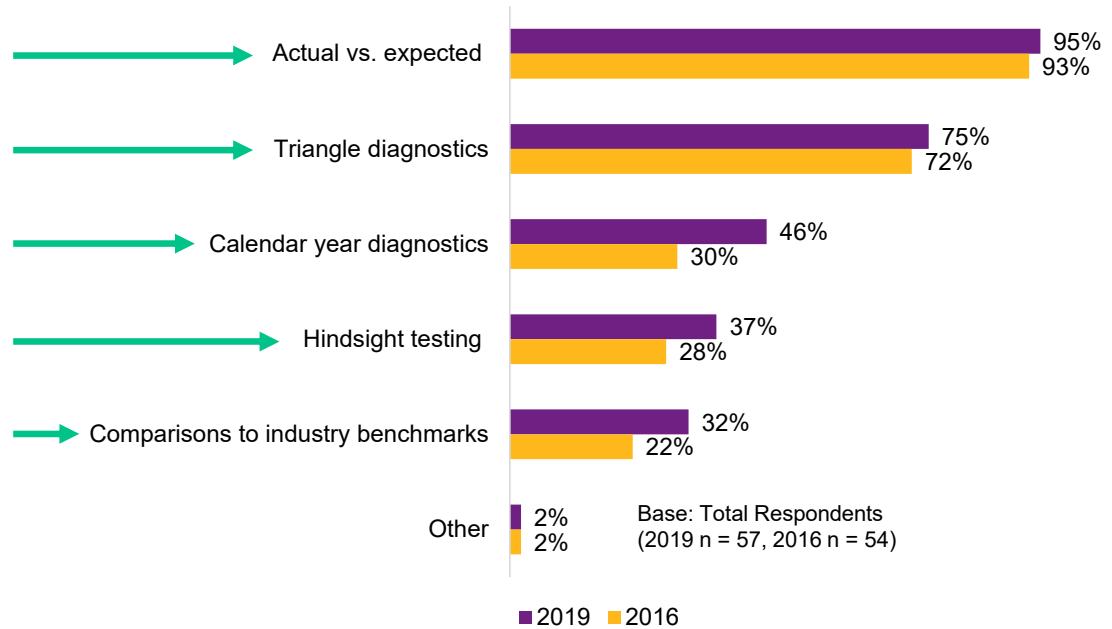
Interest in individual claims modeling has doubled since our last survey

There's a desire to use more data

The Willis Tower Watson Reserving Survey

An increasing use of diagnostics to support selections

Q **Which diagnostics do you calculate as part of your regular reserve analysis?**



Desire for more time and more analysis

Reserving departments are concentrating their investments on people and systems

Interest in individual claims modeling has doubled since our last survey

There's a desire to use more data

The Willis Tower Watson Reserving Survey

Desire for more time and more analysis

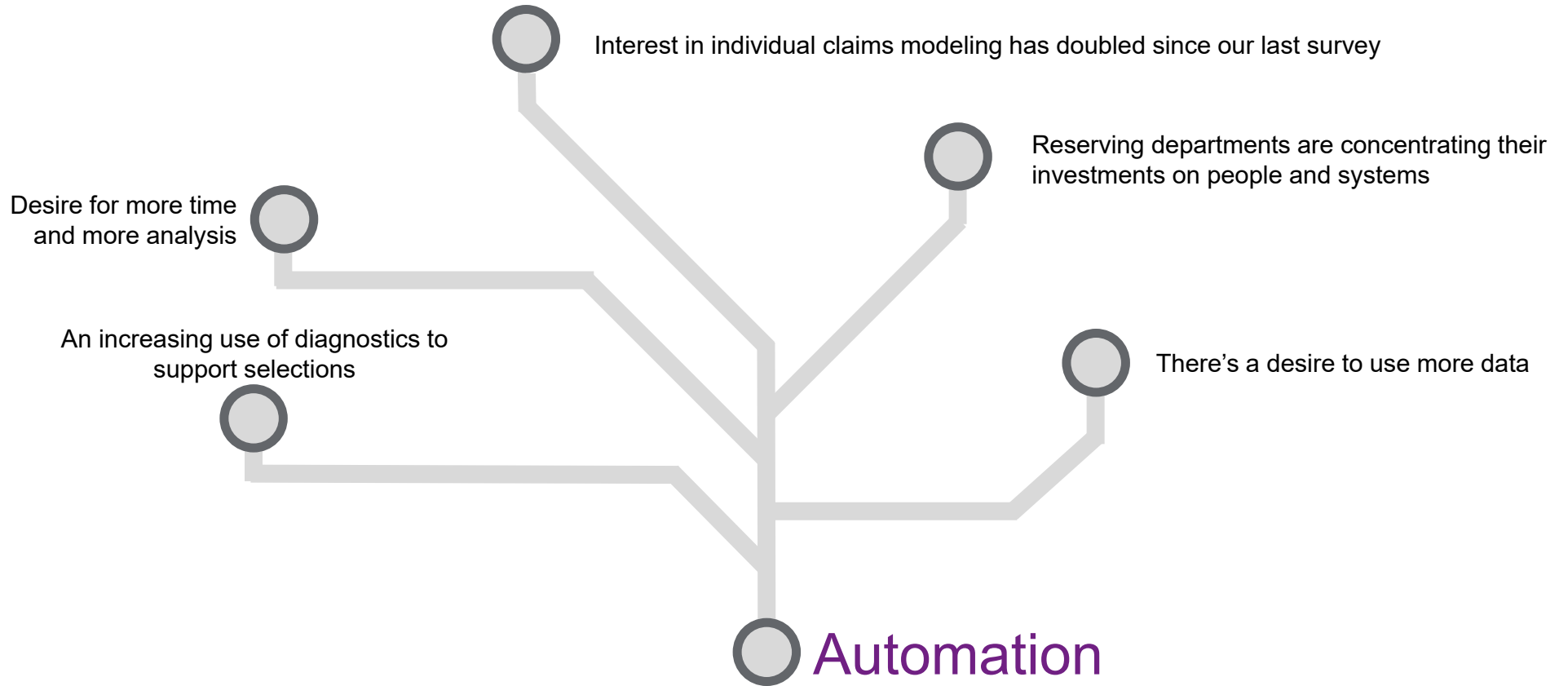
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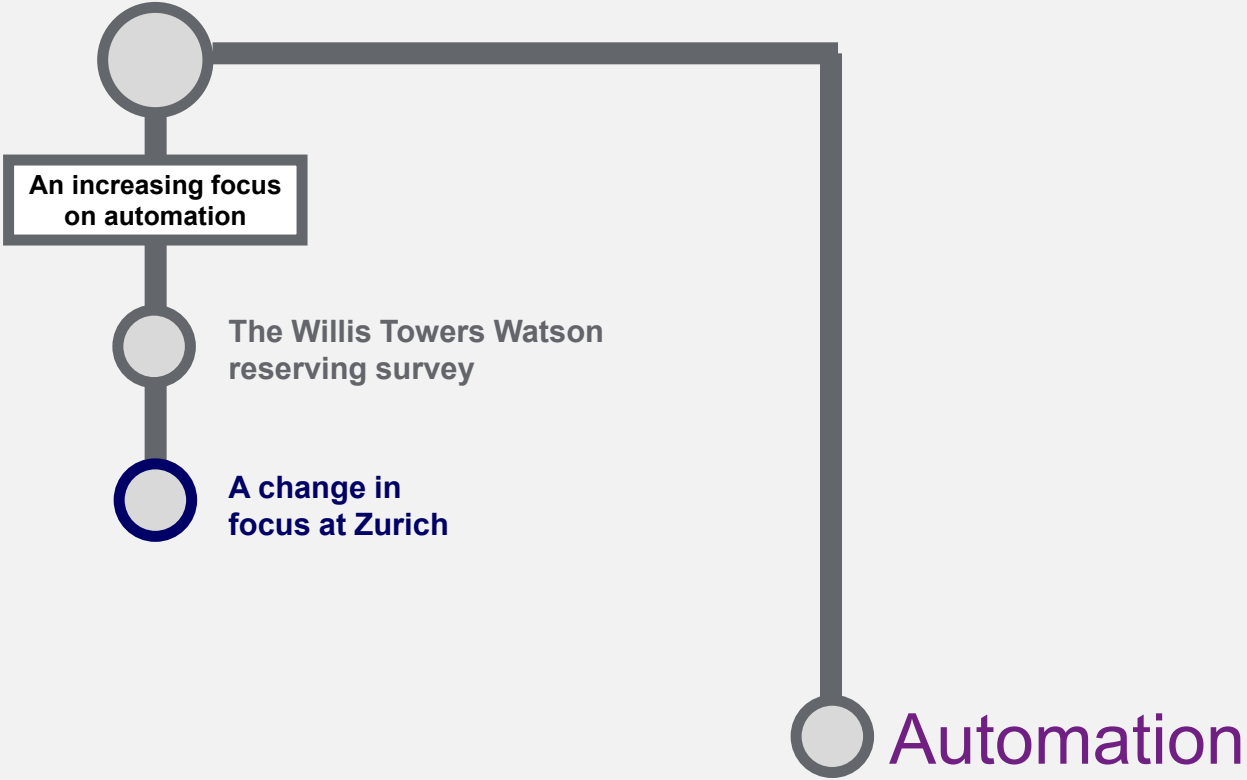
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An increasing use of diagnostics to support selections

The Willis Tower Watson Reserving Survey

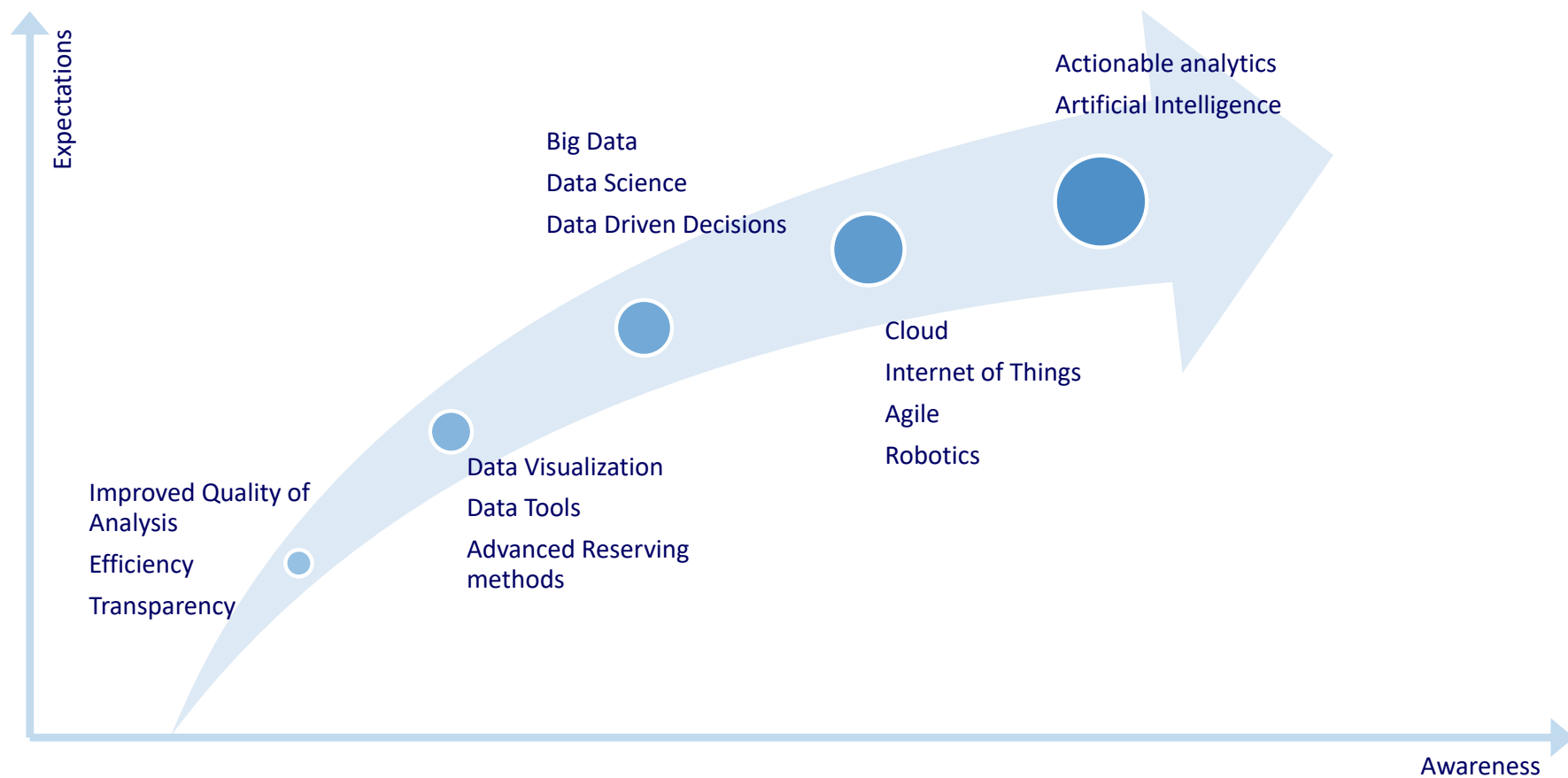


Agenda



Stakeholder Expectations are increasing.

Deep digitalization will lead to more demand for the automation of actuarial processes



Stakeholder Expectations

Our expectations are higher and so are the expectations of our stakeholders

Reserving Process Challenges

Reserving Team not able to update on progress on reserve studies – either number of reviews completed or aggregate projections until all reviews finalized

Manual typing of IBNR amounts into IT system

Manually create documentation with inconsistent formatting and exhibits between reviews

Quality of Insight:

- Ultimate changed because LDF changed
- LDF changed because 3 year average changed
- 3 year average changed because link ratio changed

What does CFO compare with:

USPS Tracking of parcel

Deposit check into checking account using phone

Health Apps on phone summarizing key metrics

Explanations of elections results and polling
Pitches from Data Analytics companies

Polling question 2



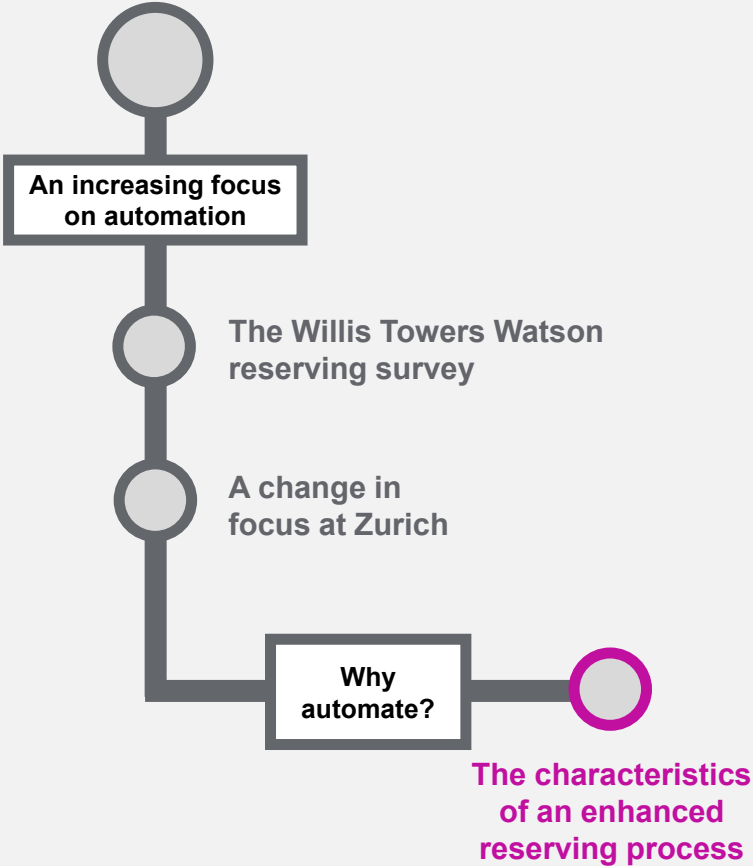
If you had to select a single development priority to enhance your current reserving process, would it be...

Select one:

- Faster turn-around / quicker close?
- Better diagnostic and graphical support to communicate trends and results?
- Using advanced methodologies?
- Stronger access and audit controls?



Agenda

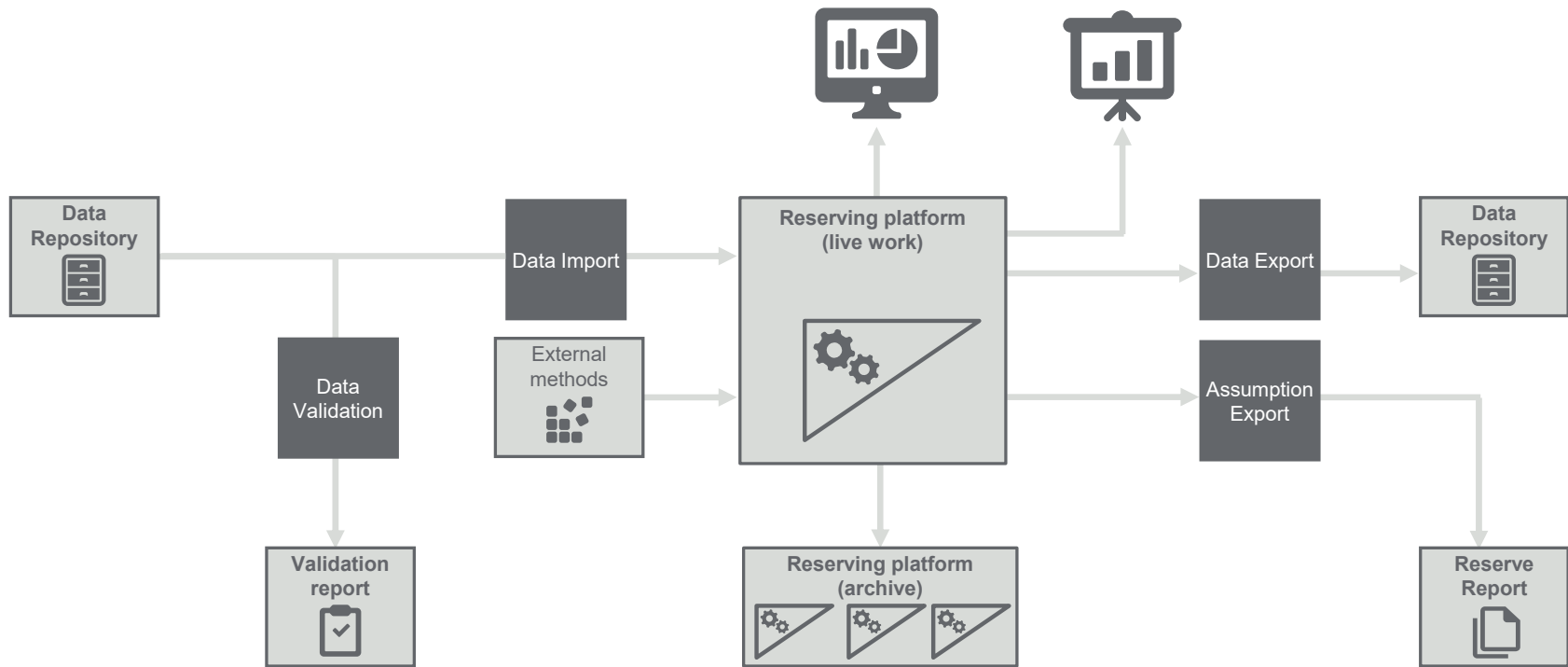


Enhancing your reserving process

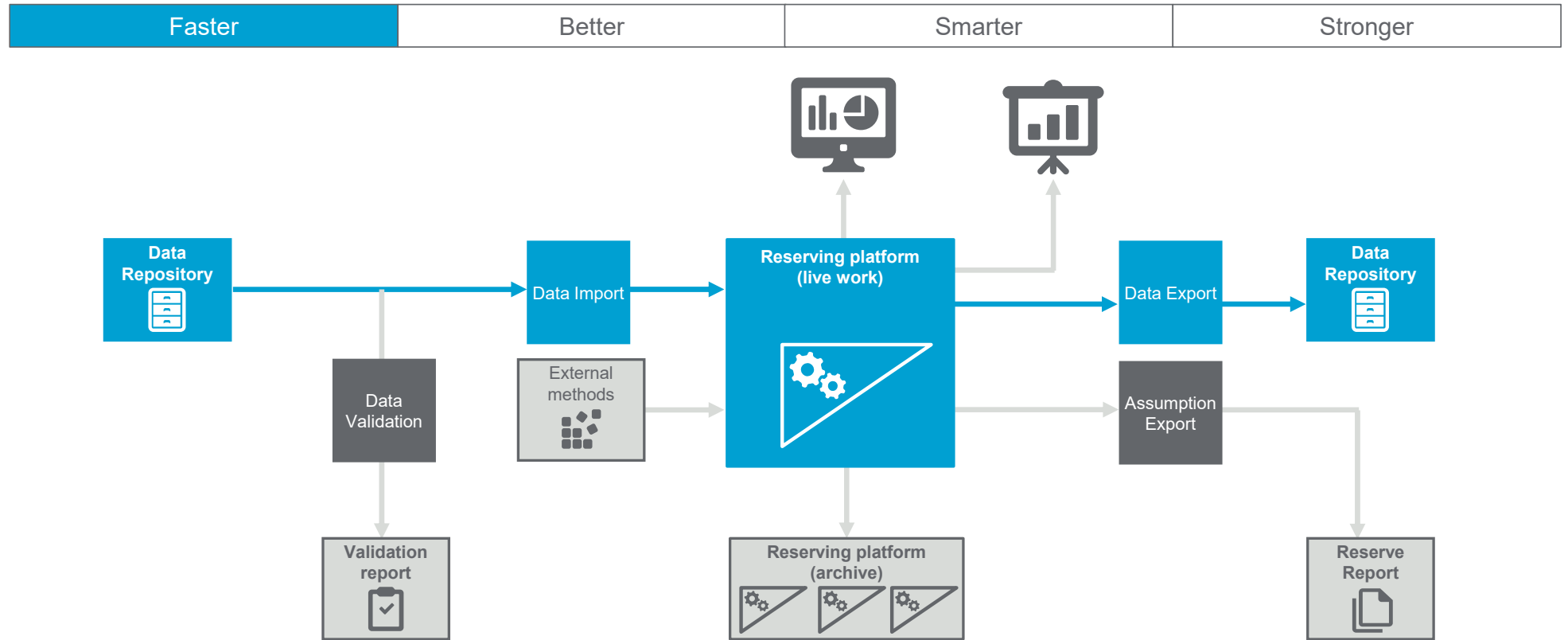
Faster	Better	Smarter	Stronger
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Enhancing your reserving process

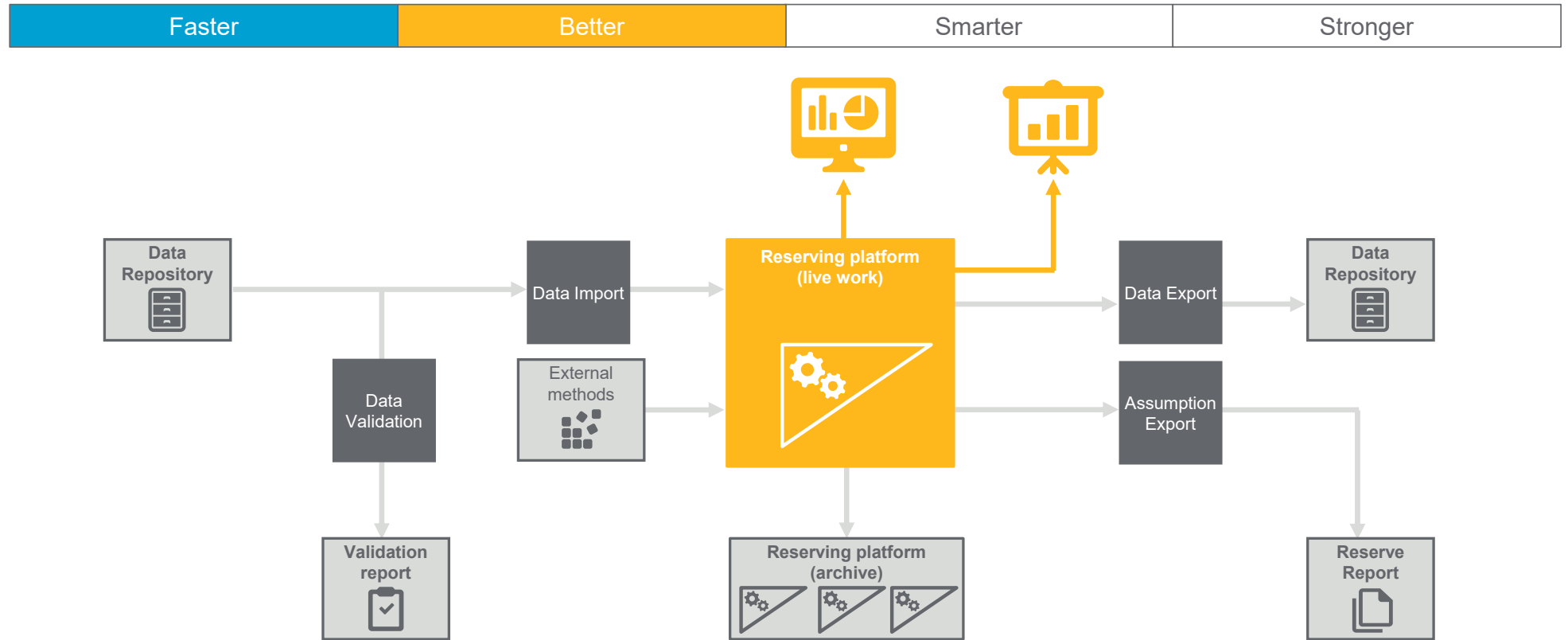
Faster	Better	Smarter	Stronger
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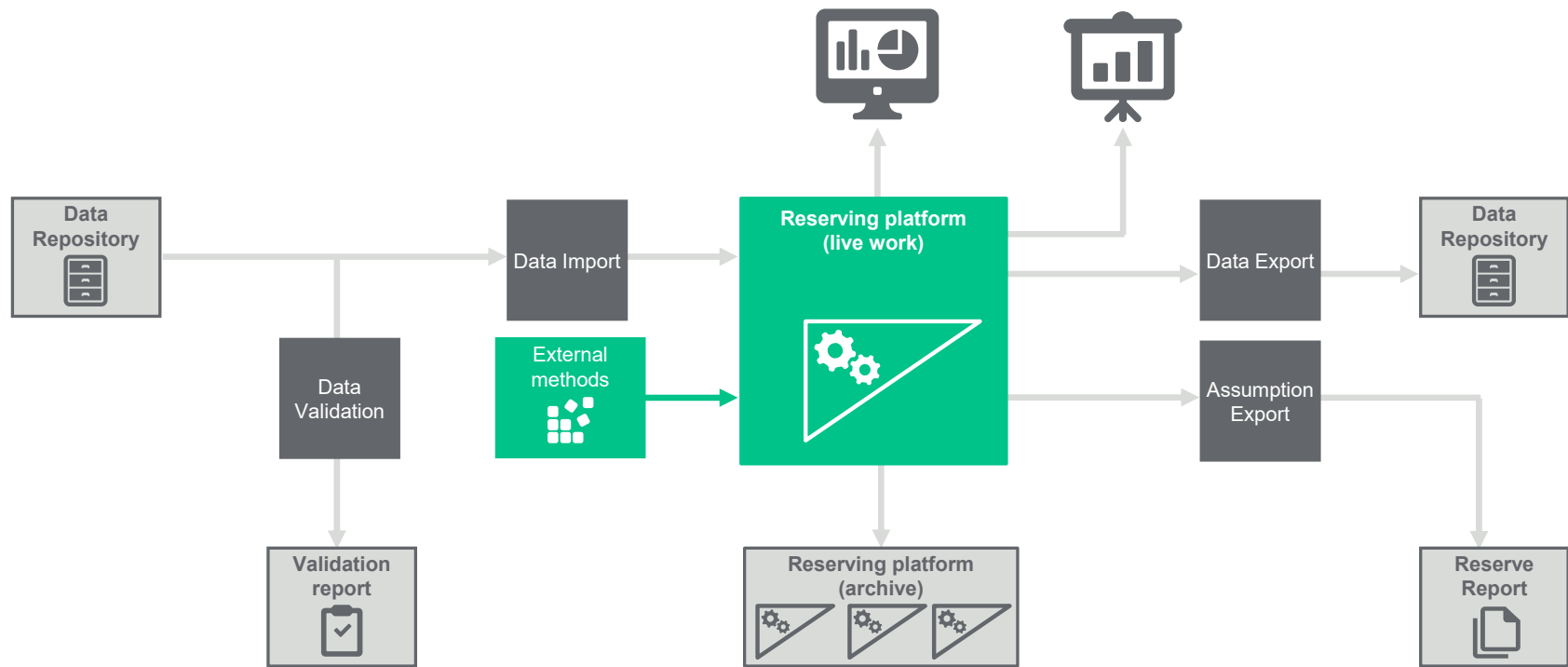
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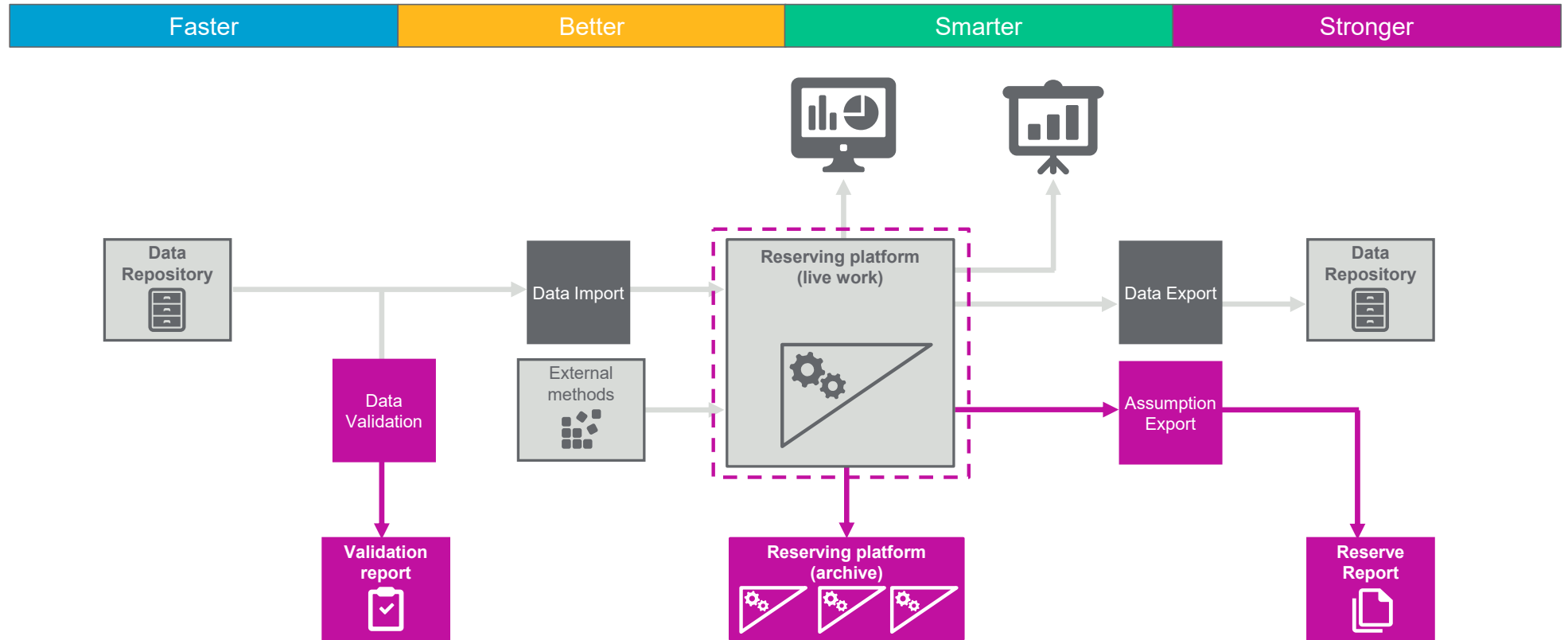
Enhancing your reserving process



Enhancing your reserving process



Enhancing your reserving process



Enhancing your reserving process

The benefits



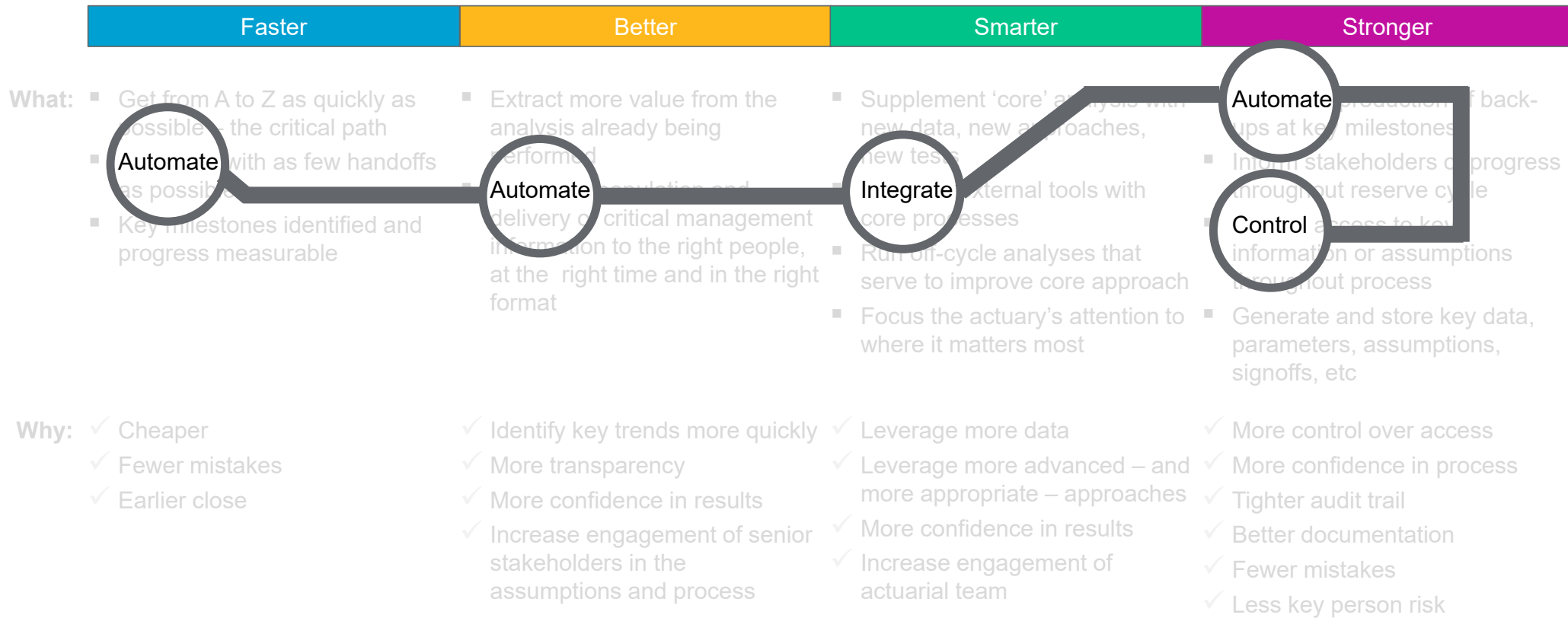
Enhancing your reserving process

The benefits

	Faster	Better	Smarter	Stronger
What:	<ul style="list-style-type: none"> ■ Get from A to Z as quickly as possible – the critical path ■ Automate with as few handoffs as possible ■ Key milestones identified and progress measurable 	<ul style="list-style-type: none"> ■ Extract more value from the analysis already being performed ■ Automate population and delivery of critical management information to the right people, at the right time and in the right format 	<ul style="list-style-type: none"> ■ Supplement ‘core’ analysis with new data, new approaches, new tests ■ Integrate external tools with core processes ■ Run off-cycle analyses that serve to improve core approach ■ Focus the actuary’s attention to where it matters most 	<ul style="list-style-type: none"> ■ Automate production of back-ups at key milestones ■ Inform stakeholders of progress throughout reserve cycle ■ Control access to key information or assumptions throughout process ■ Generate and store key data, parameters, assumptions, signoffs, etc
Why:	<ul style="list-style-type: none"> ✓ Cheaper ✓ Fewer mistakes ✓ Earlier close 	<ul style="list-style-type: none"> ✓ Identify key trends more quickly ✓ More transparency ✓ More confidence in results ✓ Increase engagement of senior stakeholders in the assumptions and process 	<ul style="list-style-type: none"> ✓ Leverage more data ✓ Leverage more advanced – and more appropriate – approaches ✓ More confidence in results ✓ Increase engagement of actuarial team 	<ul style="list-style-type: none"> ✓ More control over access ✓ More confidence in process ✓ Tighter audit trail ✓ Better documentation ✓ Fewer mistakes ✓ Less key person risk

Enhancing your reserving process

The enabler



Enhancing your reserving process

The order



- ✓ Cheaper
- ✓ Fewer mistakes
- ✓ Earlier close



- ✓ Identify key trends more quickly
- ✓ More transparency
- ✓ More confidence in results
- ✓ Increase engagement of senior stakeholders in the assumptions and process

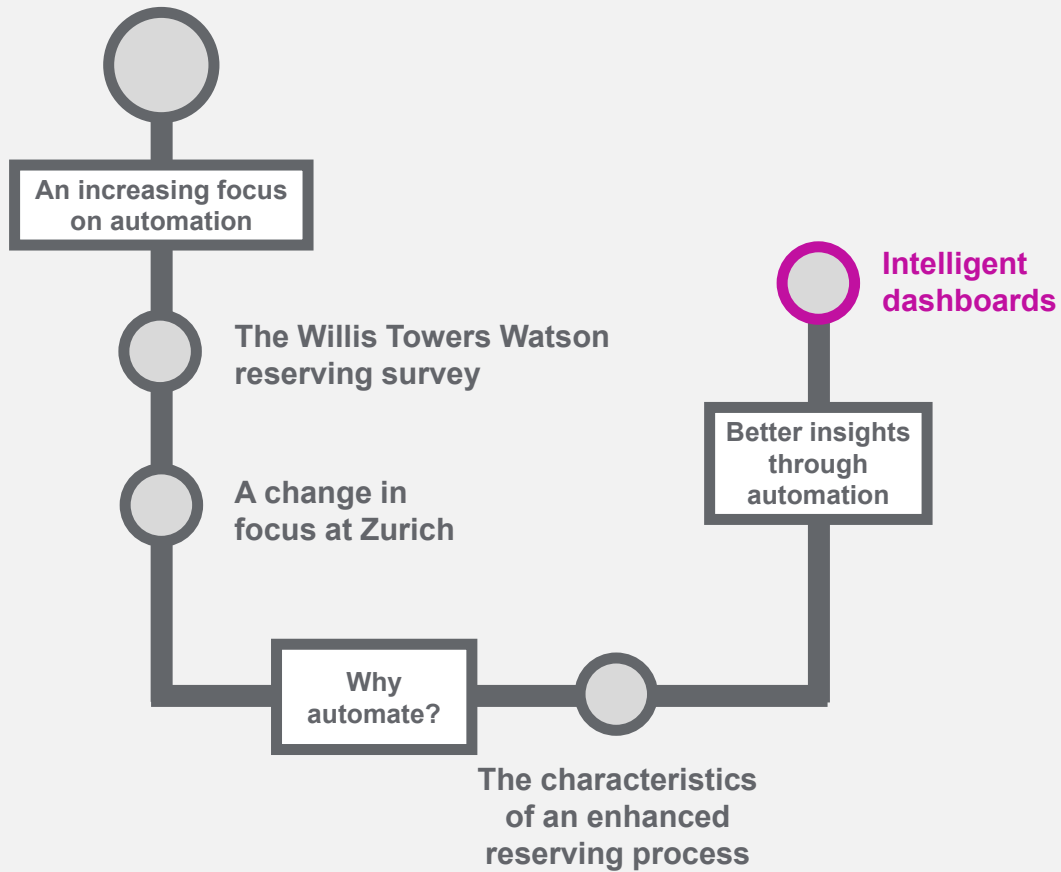


- ✓ Leverage more data
- ✓ Leverage more advanced – and more appropriate – approaches
- ✓ More confidence in results
- ✓ Increase engagement of actuarial team



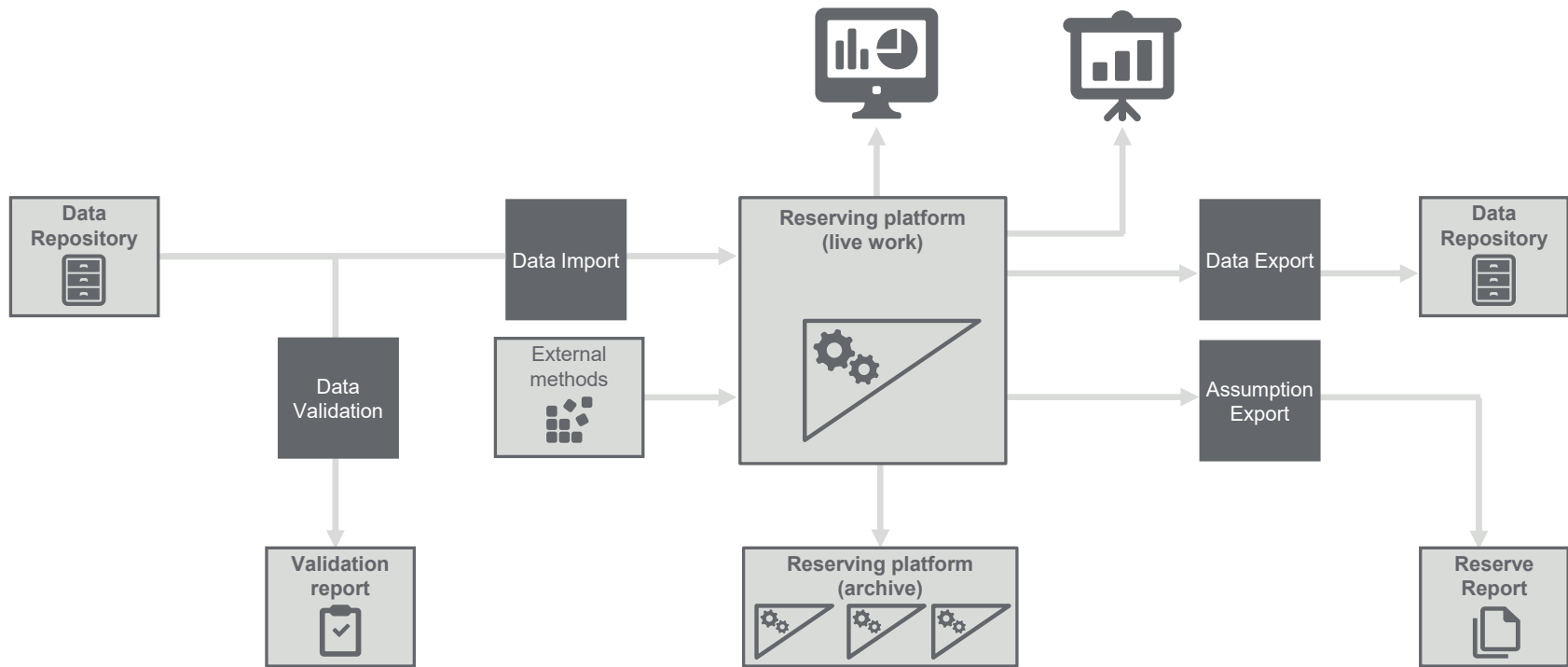
- ✓ More control over access
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Agenda

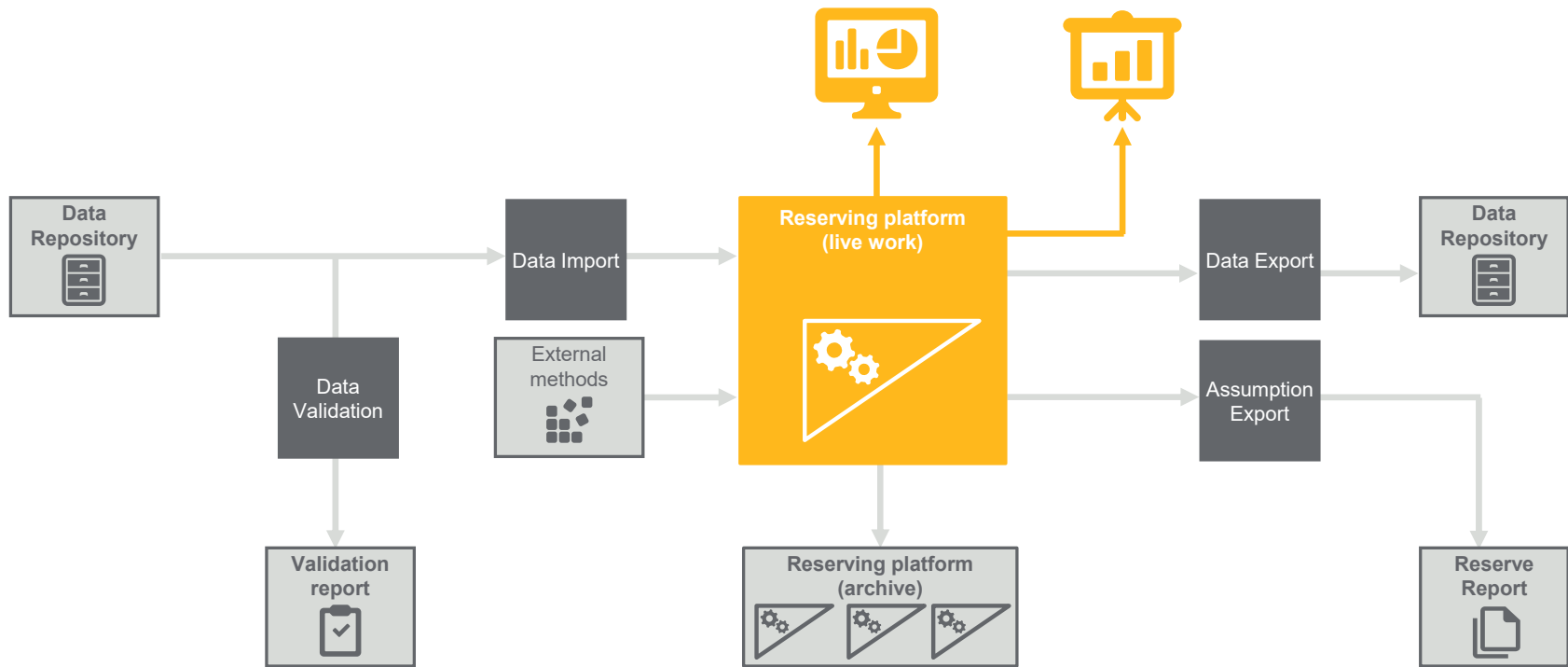


Intelligent insights

Faster	Better	Smarter	Stronger
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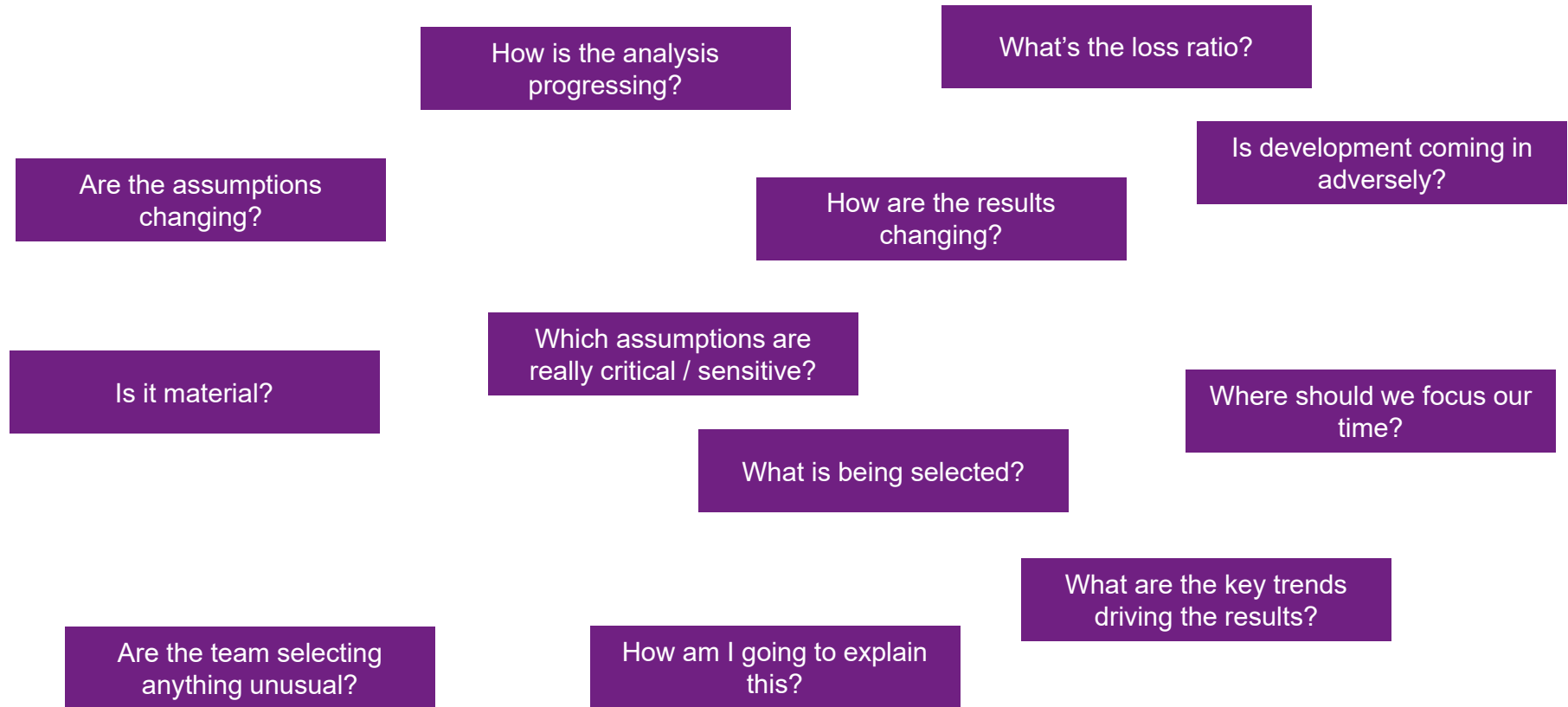


Intelligent insights



Intelligent insights

The questions



Intelligent insights

The questions

Task	Doing?	Delivery Date	Owner	Consulting Review	Lead Actuary Review	Doing?	Delivery	Frequency & Severity		UT Sat Sub Ratio & OCCE Ratio		Pure Premium		Methods		AvsE: Reported Loss					
								Count	Loss	Count	Loss	Count	Loss	Count	Loss	Count	Loss	Count	Loss		
Exact Client Summaries	Yes	10/1/2019	Christine Jubb	Russell	Jim	Yes	CO	134,303	5	134,308	134,308	0	5	\$445,716	\$26	\$445,742	\$445,739	(\$2)	\$24	\$445,014	(\$75)
Exact Average Bill	Yes	10/1/2019	Christine Jubb	Russell	Jim	Yes	CO	4,949	0	4,949	4,949	0	0	18,430	0	18,430	18,430	(1)	(1)	18,430	0
Read prospect Roll Forward	Yes	10/1/2019	Christine Jubb	Russell	Jim	Yes	CO	4,955	0	4,955	4,955	0	0	19,847	0	19,847	19,852	5	5	19,852	0
...

Accident	Earned Vehicle	Closed Counts	Open Counts	Inclosed Counts	Selected UR Counts	IBNR Counts	Unclosed Counts	Paid Loss	Case Reserve	Incurred Loss	Selected UR Loss	IBNR Reserve	Prior UR Loss	Movement since Prior	Loss
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
134,303	5	134,308	134,308	0	5	\$445,716	\$26	\$445,742	\$445,739	(\$2)	\$24	\$445,014	(\$75)		
4,949	0	4,949	4,949	0	0	18,430	0	18,430	18,430	(1)	(1)	18,430	0		
4,955	0	4,955	4,955	0	0	19,847	0	19,847	19,852	5	5	19,852	0		
4,610	2	4,612	4,612	0	0	17,826	0	17,826	17,826	0	0	17,826	0		
4,782	4	4,786	4,786	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,899	2	4,901	4,901	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,949	3	4,952	4,952	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,463	1	4,470	4,470	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,401	4	4,405	4,405	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,278	8	4,286	4,286	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
4,261	17	4,278	4,278	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
3,825	9	3,834	3,834	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
3,860	16	3,876	3,876	0	0	18,430	0	18,430	18,430	0	0	18,430	0		
...		

Year	Total	2020 Q1	1,142	979	990
2019	\$65,034	\$64,824			
2020	\$64,824				

Line	Paid	Case	WTR Loss & ALAE Summary	IBNR
	Inced	Unres		
SP	369,797,920	31,911,764	401,679,680	457,853,321
CL	387,254,609	6,153,728	393,568,337	313,142,432
PD	427,094,026	11,195,319	438,289,346	456,819,523
CP	114,467,305	1,400,558	115,867,863	117,024,811
UP	2,145,581	45,608	2,191,189	2,227,493
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...

Intelligent insights

The questions

Too much information!

Too disorganized!

Too much effort!

Too late!



Intelligent insights

The right time

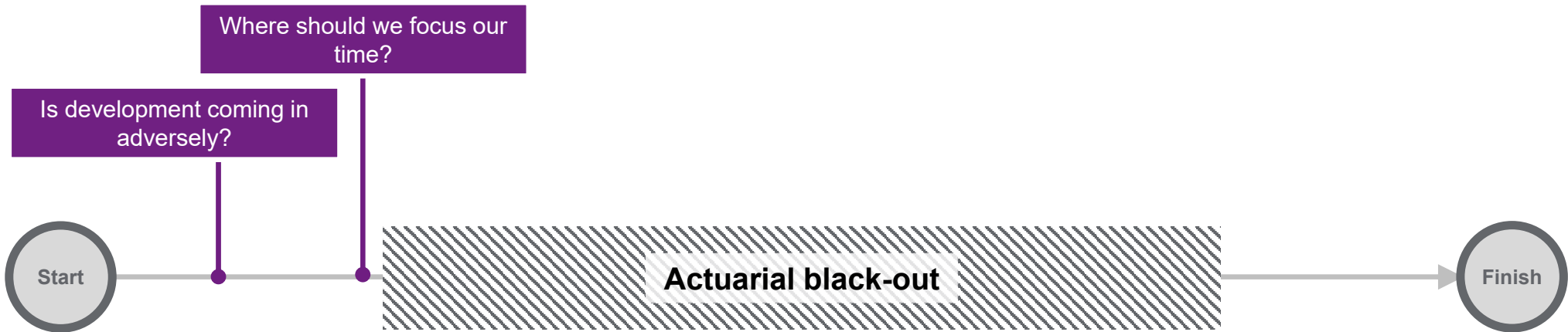
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Is it material?	What is being selected?	How am I going to explain this?	Where should we focus our time?
Are the team selecting anything unusual?	Which assumptions are really critical / sensitive?	What are the key trends driving the results?	What's the loss ratio?



Intelligent insights

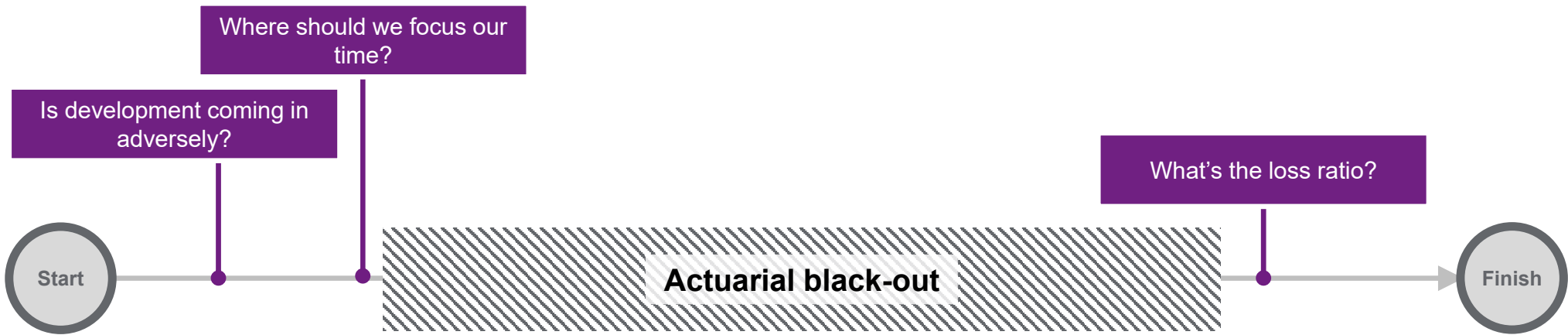
The right time

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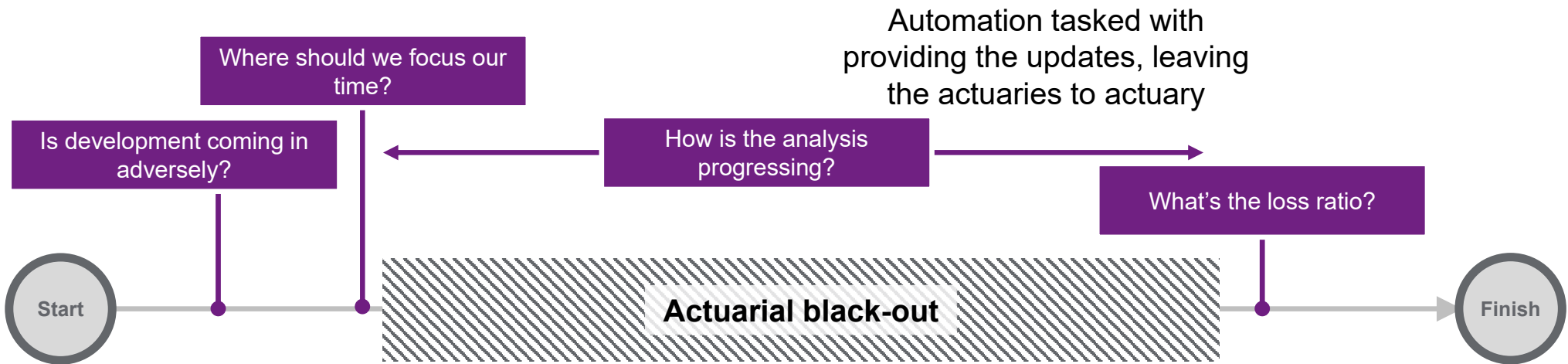
Intelligent insights

The right time



Intelligent insights

The right time



Intelligent insights

Anticipating the next question

Is development coming in adversely?

How is the analysis progressing?

Are the assumptions changing?

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Intelligent insights

Anticipating the next question

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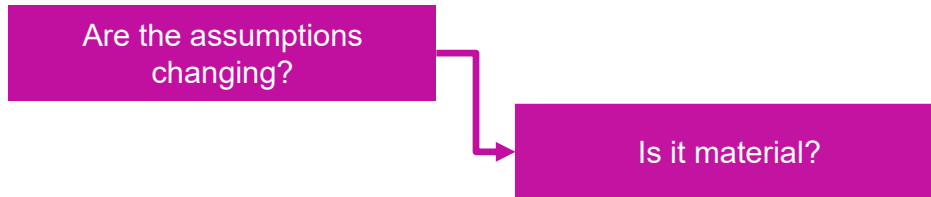
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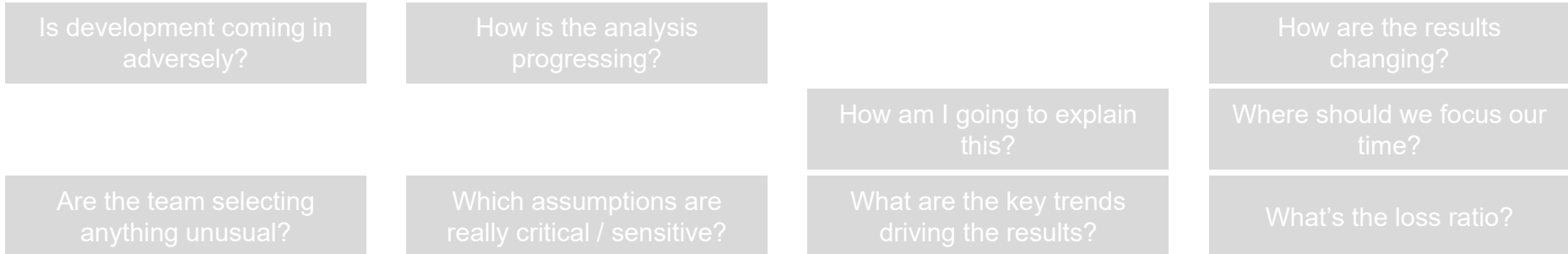
Intelligent insights

Anticipating the next question



Intelligent insights

Anticipating the next question



Intelligent insights

Anticipating the next question

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Intelligent insights

Anticipating the next question

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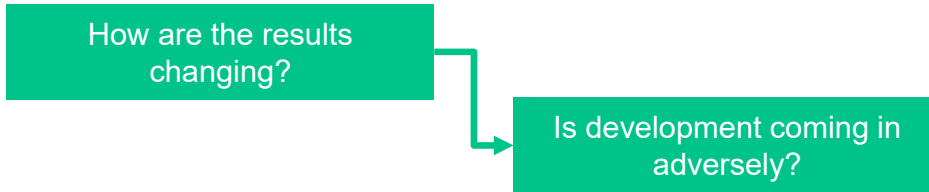
What are the key trends driving the results?

What's the loss ratio?

How are the results changing?

Intelligent insights

Anticipating the next question



Intelligent insights

Anticipating the next question



Intelligent insights

Understanding the audience

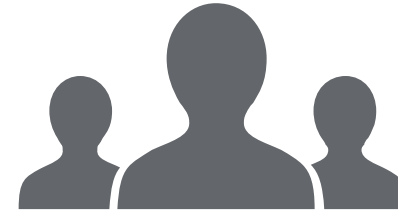
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Analysts team



Chief Reserving Actuary



Management

Intelligent insights

Understanding the audience

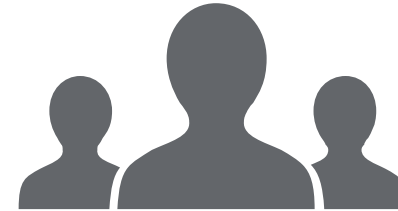
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Analysts team



Chief Reserving Actuary



Management

Intelligent insights

Understanding the audience

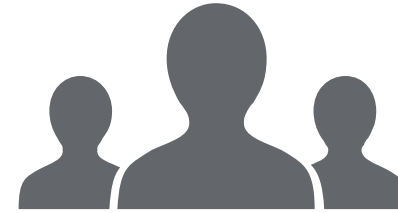
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Analysts team



Chief Reserving Actuary



Management

Intelligent insights

Understanding the audience

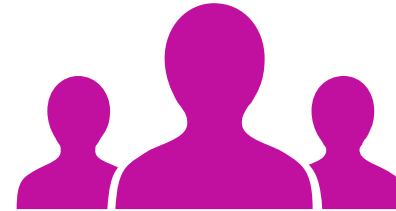
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Analysts team



Chief Reserving Actuary



Management

Intelligent insights

Understanding the audience

Technical,
Ground up
Selection driven



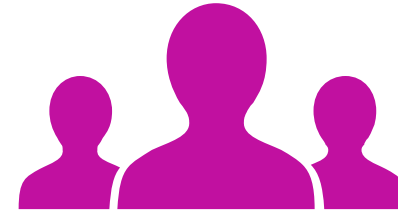
Analysts team



Non technical
Top down
Business driven



Chief Reserving
Actuary

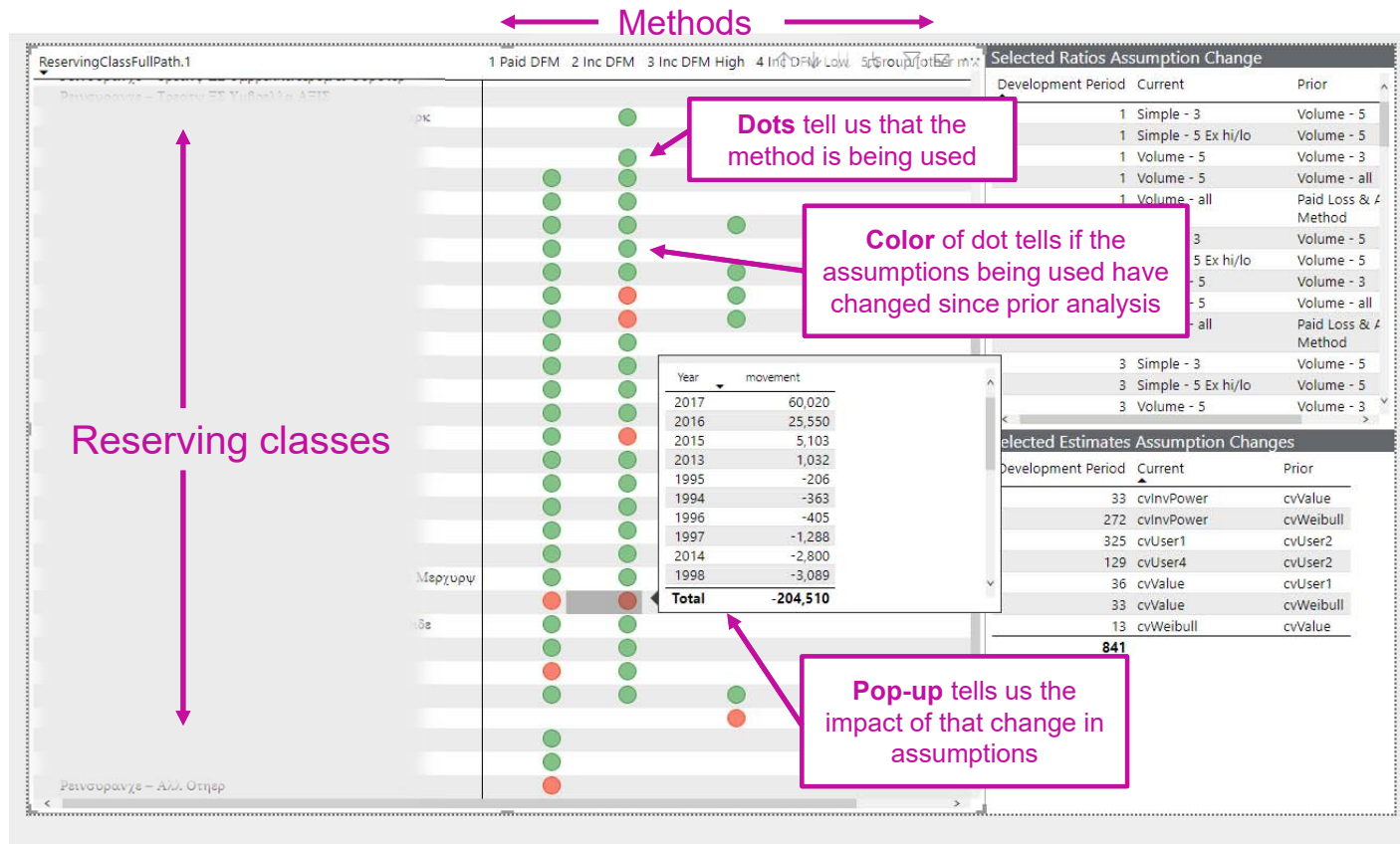


Management

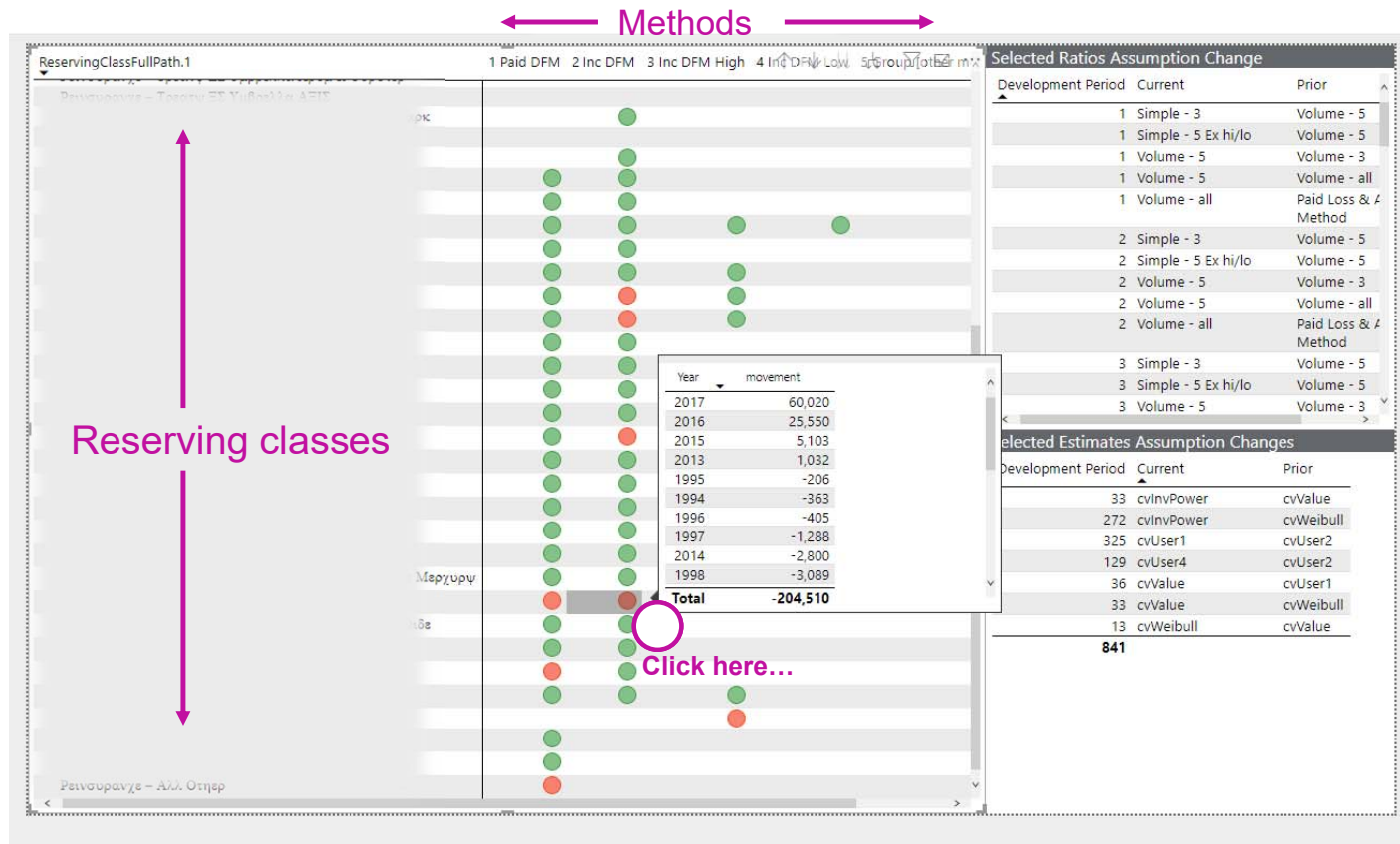
Intelligent Dashboards



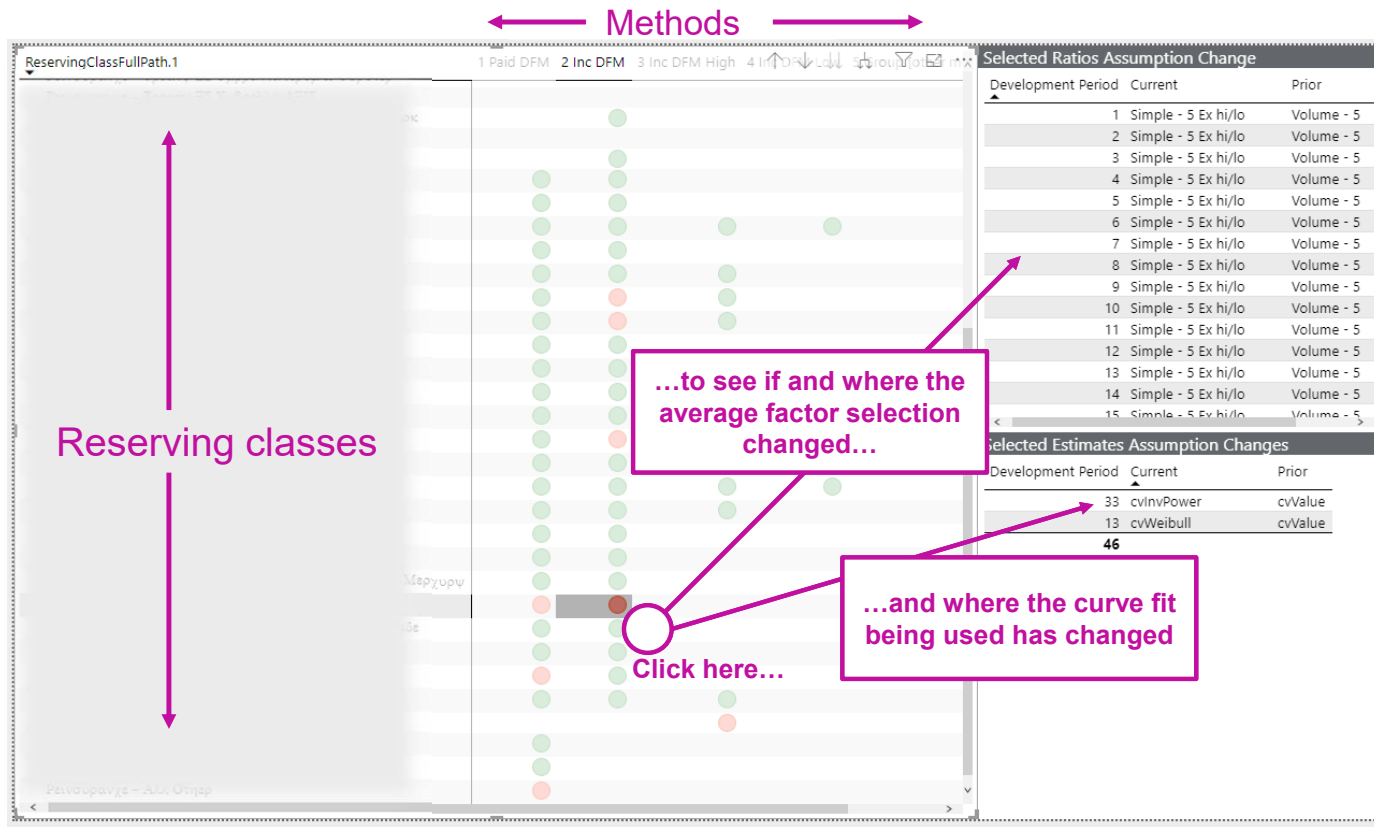
Intelligent Dashboards



Intelligent Dashboards

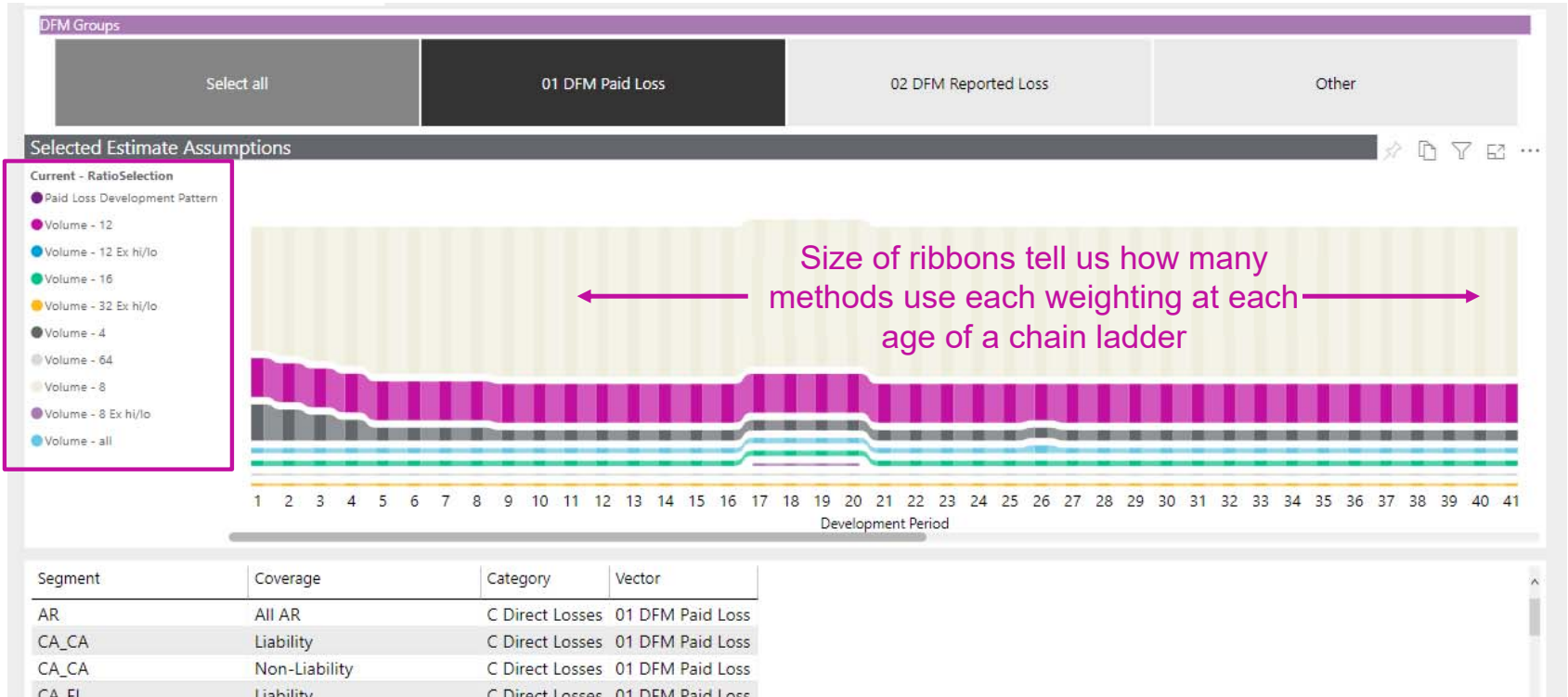


Intelligent Dashboards

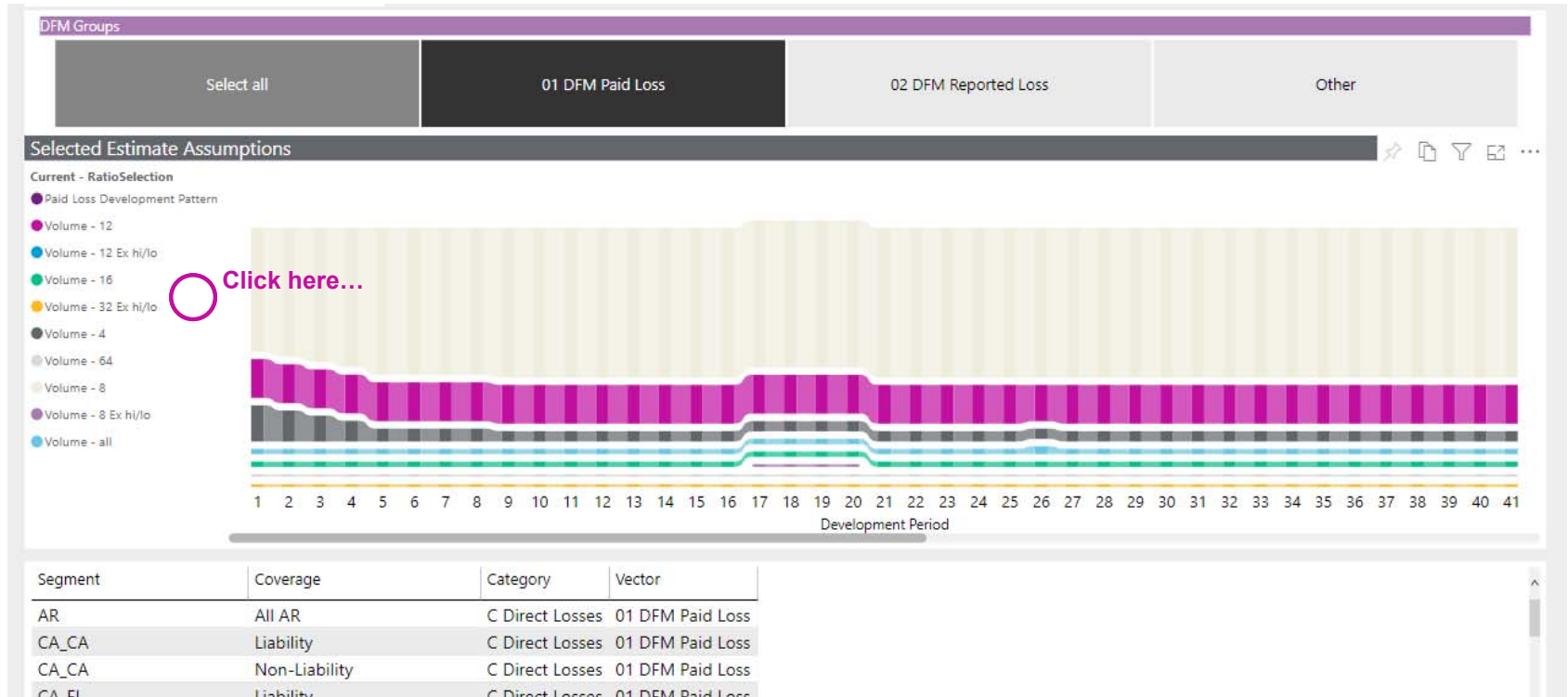


Intelligent Dashboards

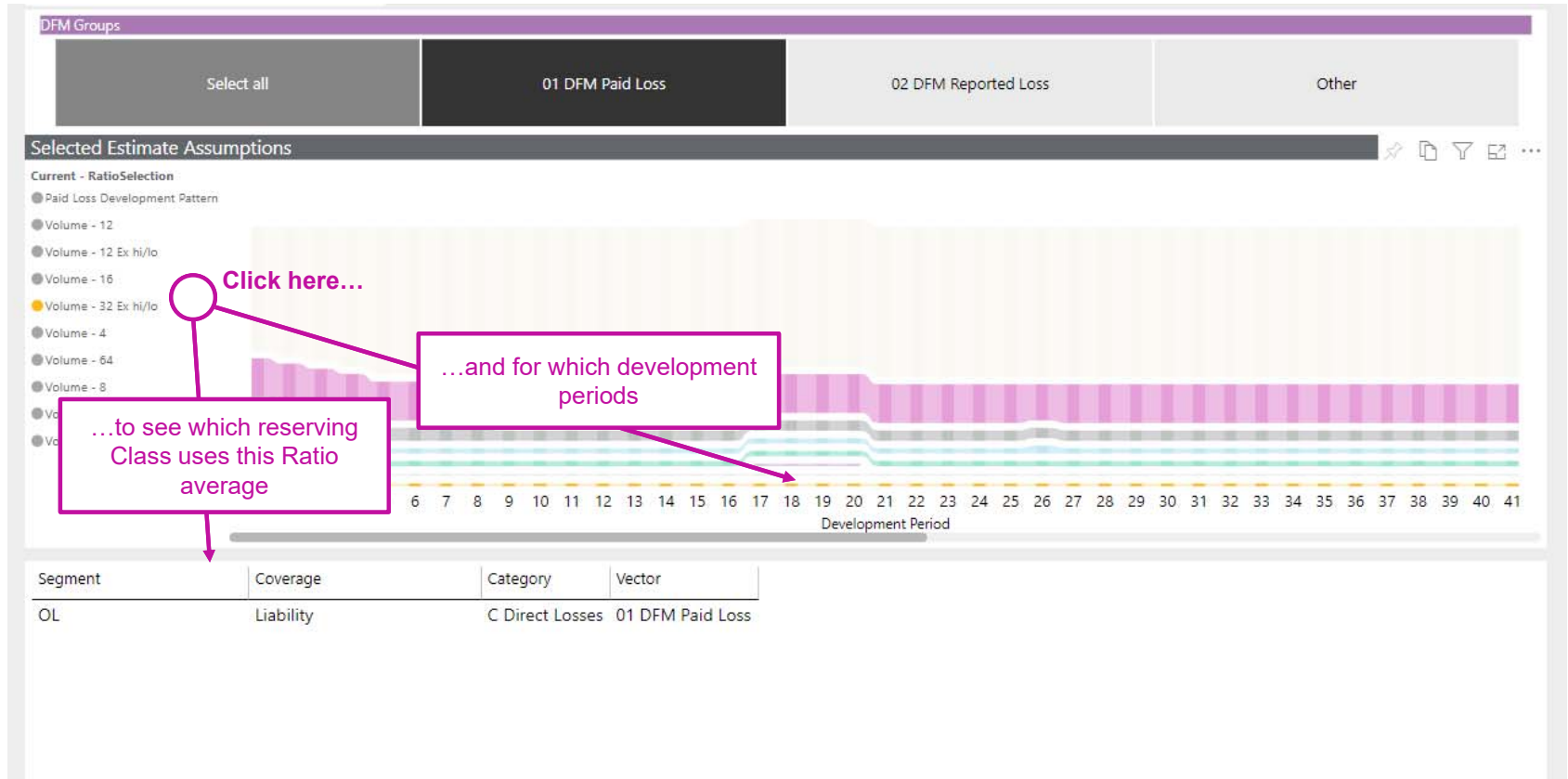
Average factor selection →



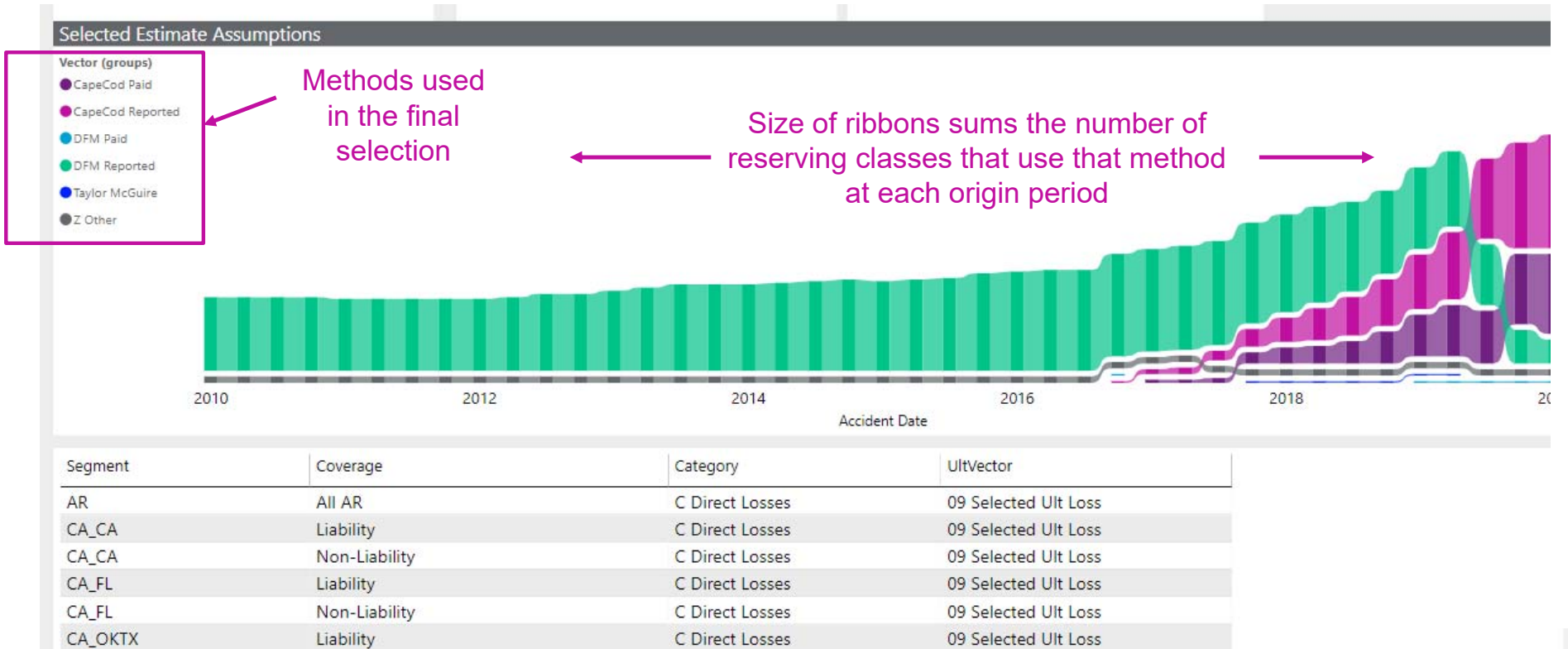
Intelligent Dashboards



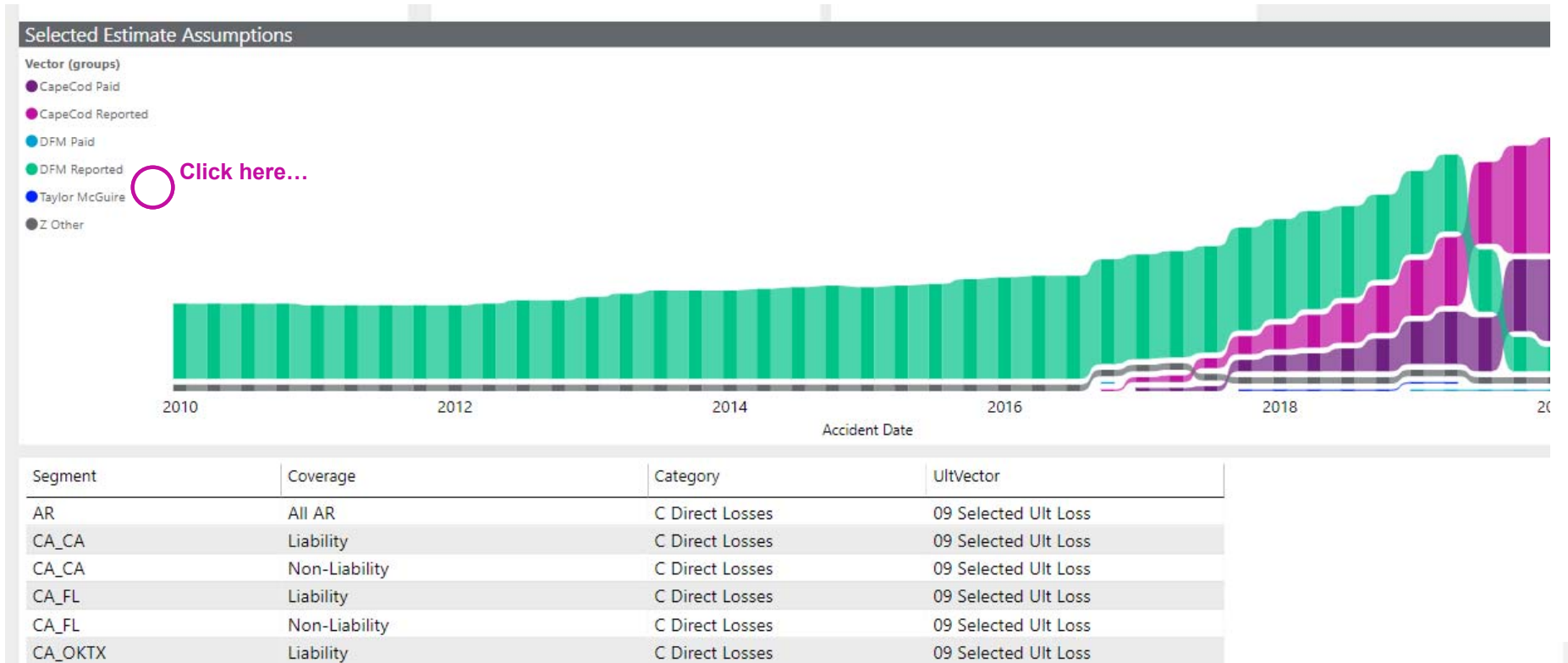
Intelligent Dashboards



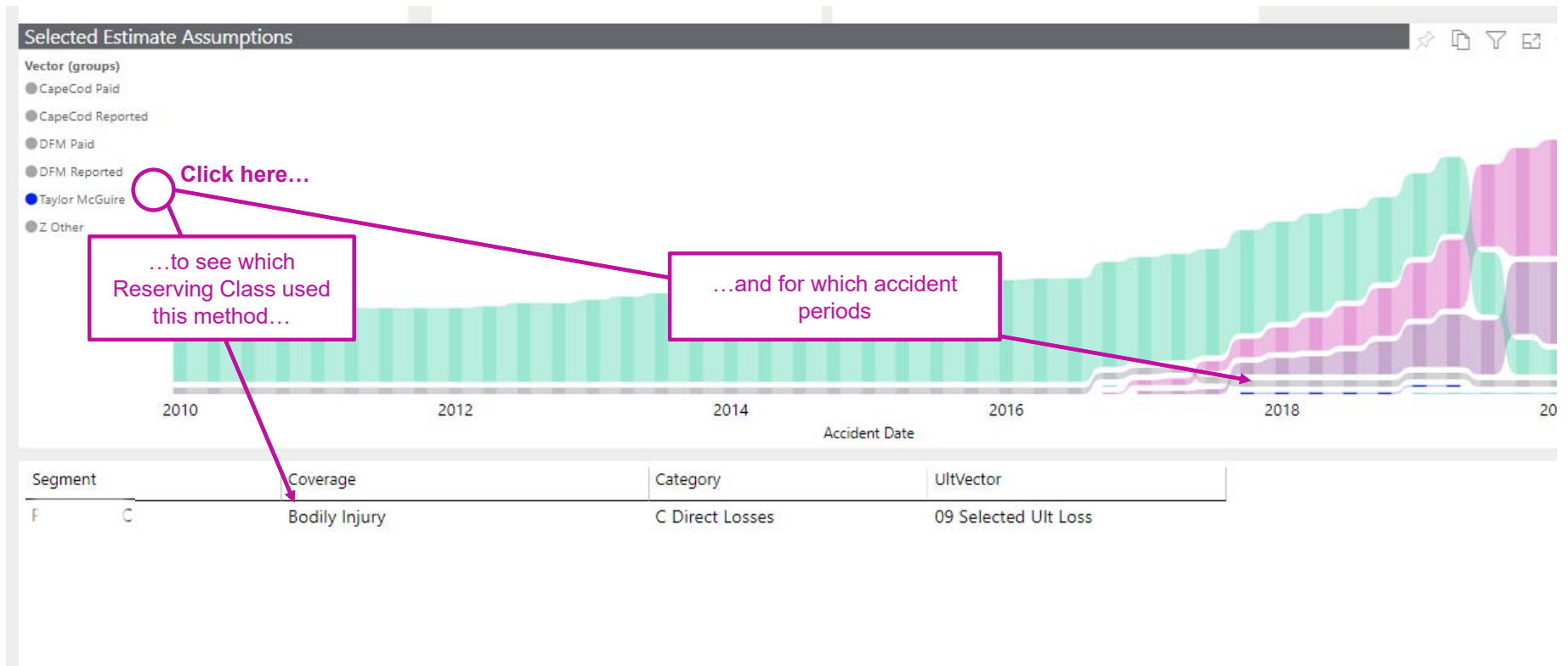
Intelligent Dashboards



Intelligent Dashboards



Intelligent Dashboards



Intelligent insights

Automation is critical in

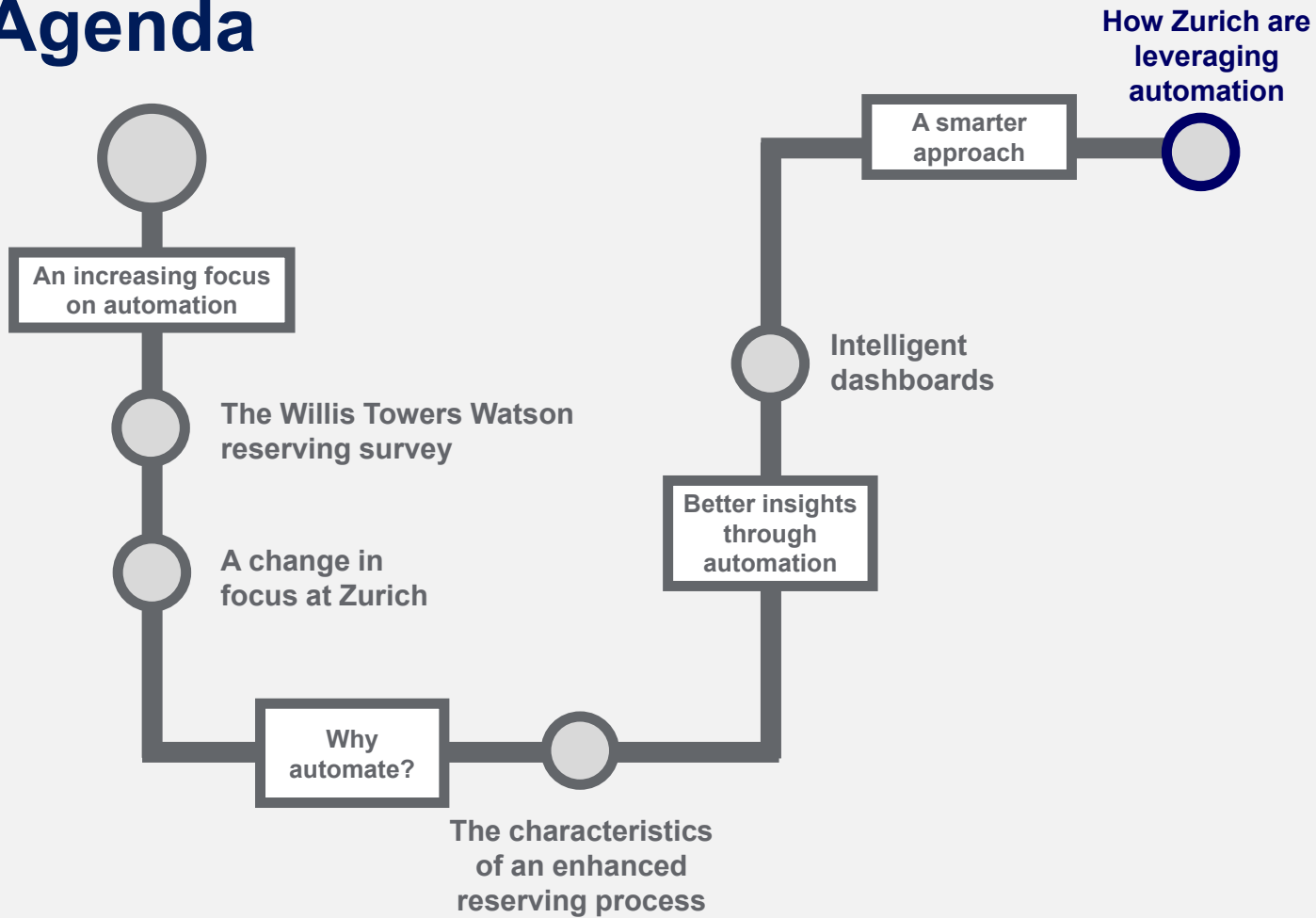
delivering the **right information** to the **right people** at the **right time** in the **right medium**



New skills are required:



Agenda



How to make process faster, better and smarter?



	Faster	Better	Smarter	Stronger
Electronic Signatures	Faster			
Automated Memo Generation	Faster	Better		Stronger
Frequent Diagnostic review using Data Visualization Tools	Faster	Better	Smarter	
Automated Feed to IT system	Faster			Stronger
External Models	Faster	Better	Smarter	Stronger

How to make process faster, better and smarter?



	Faster	Better	Smarter	Stronger
--	--------	--------	---------	----------

Electronic Signatures

Faster

- Record time of signature
- Automatically save copy of signed copy
- Save paper
- Easier to organize and store
- Searchable

Automated Memo Generation

Faster	Better		Stronger
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Frequent Diagnostic review using Data Visualization Tools

Faster	Better	Smarter	
--------	--------	---------	--

Automated Feed to IT system

Faster			Stronger
--------	--	--	----------

External Models

Faster	Better	Smarter	Stronger
--------	--------	---------	----------

How to make process faster, better and smarter?



	Faster	Better	Smarter	Stronger
Electronic Signatures	Faster			
Automated Memo Generation	Faster	Better		Stronger

- Consistent order and exhibits
- Automatic updating of values after changes
- Leverage natural language processing
- Save time on standard content so analyst can focus on describing insights

Frequent Diagnostic review using Data Visualization Tools	Faster	Better	Smarter	
Automated Feed to IT system	Faster			Stronger
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How to make process faster, better and smarter?



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External Models	Faster	Better	Smarter	Stronger

- Focus analysis in reserve studies
- More time to prepare for reserves studies – engage stakeholders earlier
- Early indications to leadership on potential changes
- Overview and drill down capabilities

How to make process faster, better and smarter?



	Faster	Better	Smarter	Stronger
Electronic Signatures	Faster			
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- Save time
- Reduce risk of errors
- Time stamp of upload
- Monitor progress

External Models	Faster	Better	Smarter	Stronger
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How to make process faster, better and smarter?

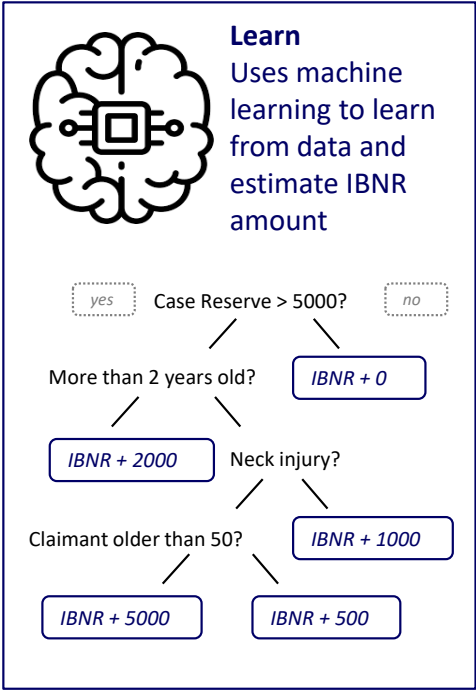


	Faster	Better	Smarter	Stronger
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Frequent Diagnostic review using Data Visualization Tools	Faster	Better	Smarter	
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External Models	Faster	Better	Smarter	Stronger

External Models – Making Process Smarter

Cognitive Computing – Systems which mimic the functioning of the human brain such as the ability to learn, understand, reason, and interact.

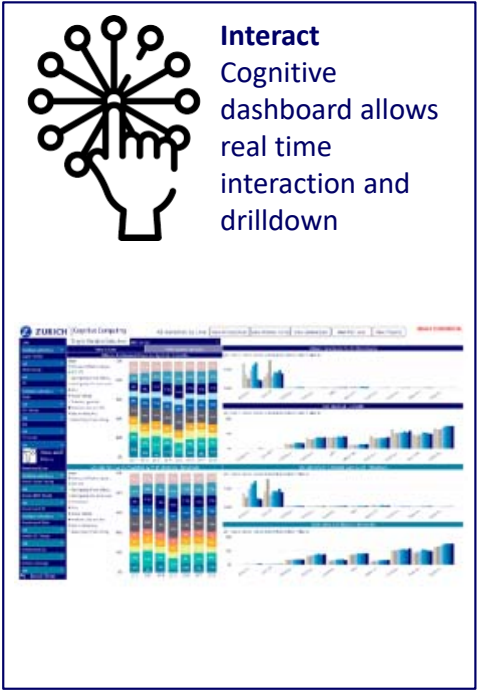
Cognitive Reserving – Leveraging cognitive computing to make the actuarial reserving analysis more efficient and more insightful.



Reason
Cognitive models detects anomalies for further investigation

	Actual	Expected
Incremental Incurred:	67,810	59,960
Claims Closure:	2090	1860
Severe Claim Counts:	130	100
Newly Reported Counts:	910	620

Insights Generation:
Based on cognitive Actual vs. Expected, there has been higher than average claim closure and newly reported claims



External Models – Making Process Smarter



Insights

- Able to react and understand changes in mix.
- Identify key loss drivers, which feedback into Claims and Underwriting.

Allocations

- Allocating IBNR more effectively results in availability of detailed accurate loss data at sub-analysis levels, leading to more granular understanding of portfolio without time consuming side analysis.

Augmentation

- Use model to enhance selections within a traditional model

External Models – Making Process Smarter



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- Able to react and understand changes in mix.
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Allocations

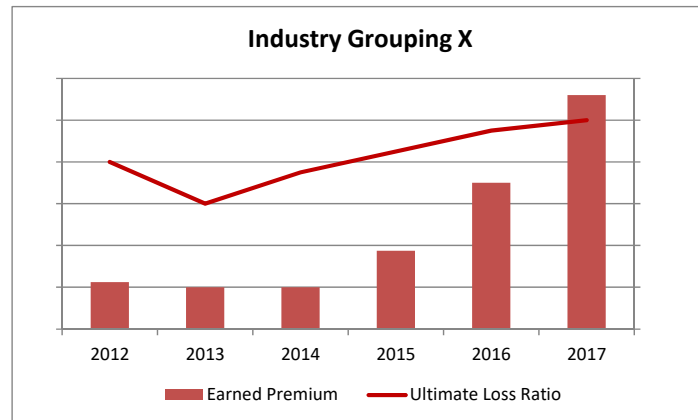
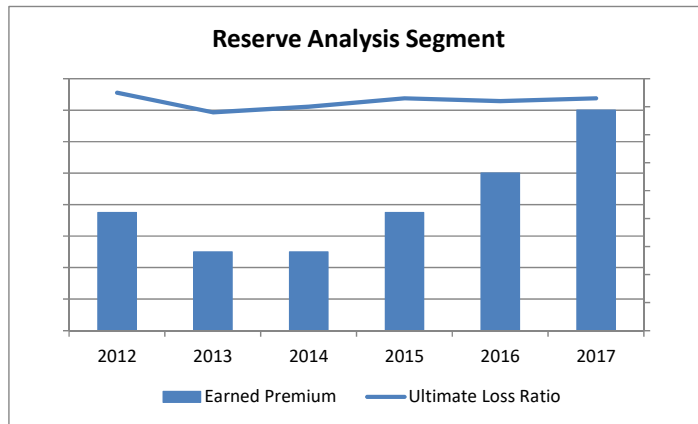
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Model Insight Example

Reserving Analysis Segment 1

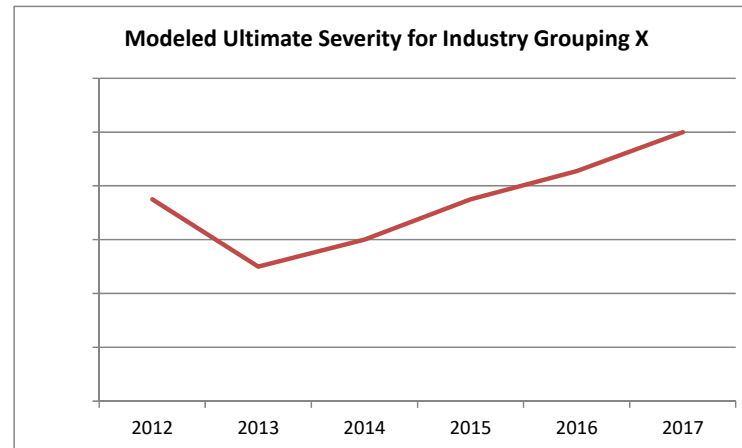
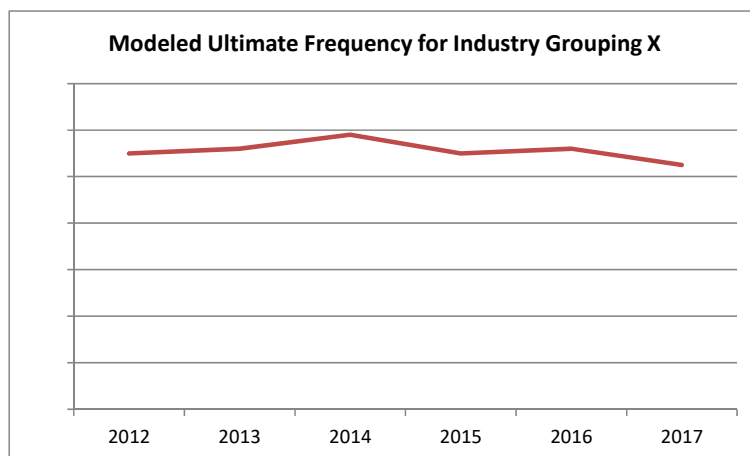


- Premium in aggregate has increased significantly.
- Analysis is carried out at the total segment level.

- Cognitive Reserving Model enables a review of the ultimate loss at a lower level.
- Premium was always available but prior to cognitive model, IBNR at lower levels not based on claim characteristics.
- Model implies deteriorating Ultimate Loss Ratio for industry grouping X.
 - Continued growth of industry grouping X could lead to deterioration in loss ratio

Model Insight Example

Reserving Analysis Segment 1



- Increasing severity is driving the deteriorating loss ratio.
 - Ultimate severity is projected to increase.
 - This more than offsets improvement in the frequency.
- Model allows further segmentation to investigate the drivers of the increase in frequency.

Example – not derived from any company sources

External Models – Making Process Smarter



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Allocations

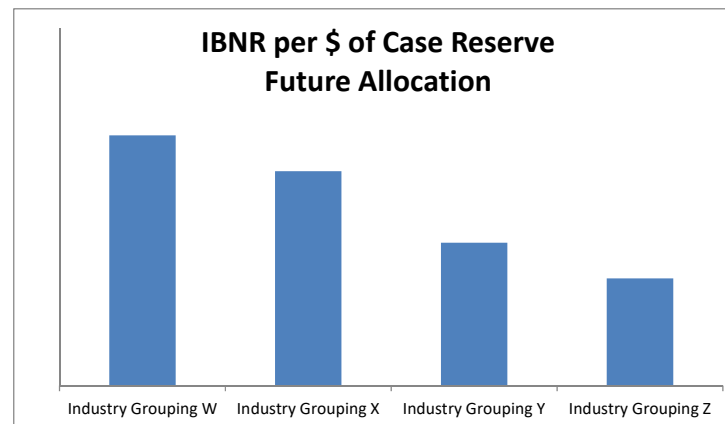
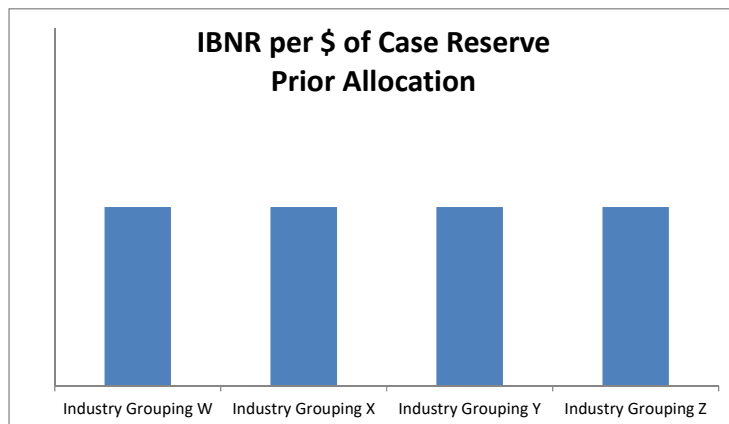
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Cognitive Computing - Allocations

Example



- Allocation of IBNER in proportion to case reserves could over/under state at lower levels.
- Claim level detail can be used to better allocate case reserves based on expected development based on claim characteristics.

Case Study – Policy Level Allocation

 Cognitive allocation estimates a more accurate ultimate loss ratio two years before allocation based on net case reserve

■ Reported LR ■ Previous Method ULR ■ Cognitive ULR

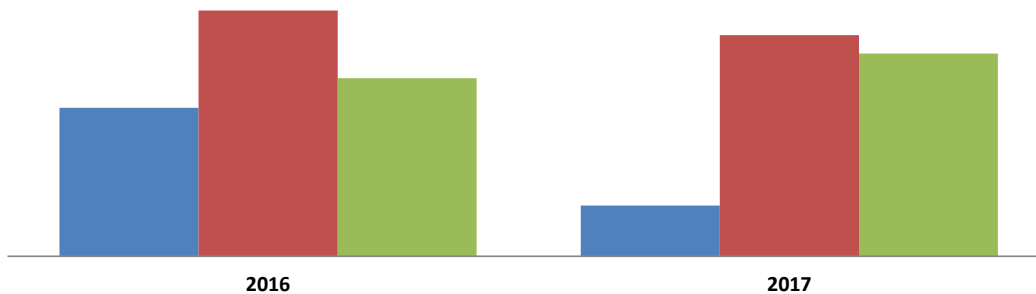
At December 31, 2017



In this example, Cognitive allocation estimates a much higher loss ratio than the allocation based on case reserve for accident year 2016 and 2017 at year end 2017.

This is because the current reported loss and case reserve are low, but the model predicts the loss will develop significantly.

At September 30, 2019



Two years later, more losses are reported and the case reserve method caught up with the cognitive estimates.

The cognitive allocation is quicker to estimate a more accurate loss ratio and has more stability.

Example – not derived from any company sources

External Models – Making Process Smarter

Insights

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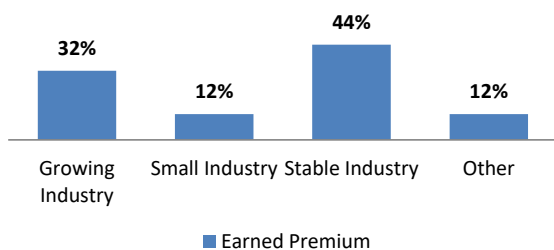
AI Augmentation - Cognitive Models Generate Insights



Cognitive models analyze result by industry with a button click

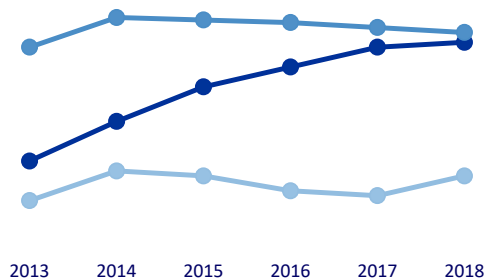
1 Look at premium volume...

- Growing and Stable are the largest books



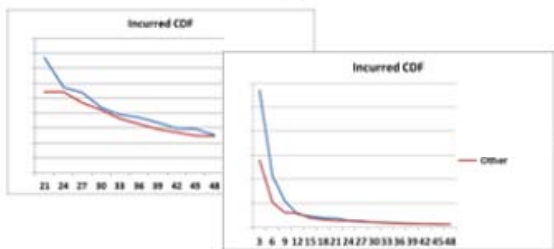
2 Examine premium growth patterns...

- "Growing" is growing consistently



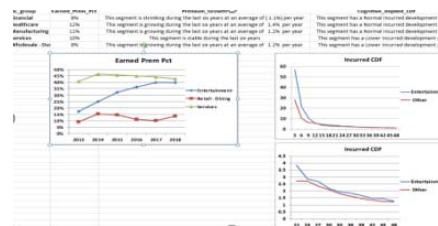
3 Investigate loss development patterns...

- "Growing" is growing and has higher than average incurred development pattern



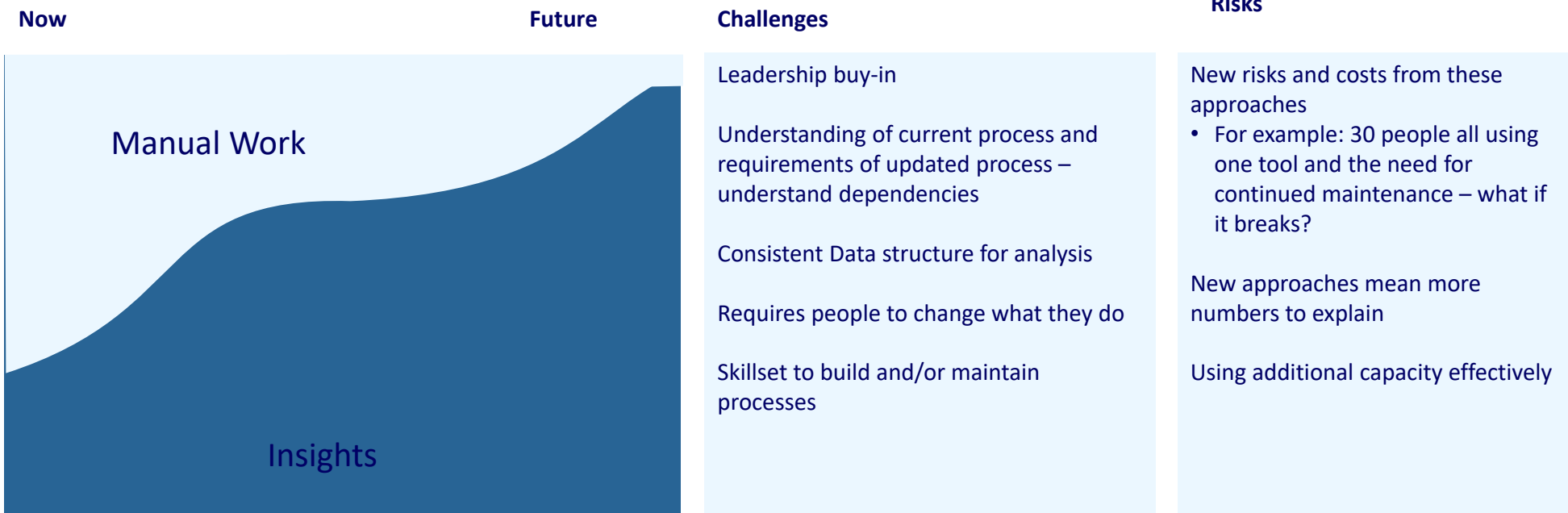
4 Generate report and call for action...

- Report signals potential mix shift and urges analyst to take action with further reviews



Getting Started on the journey

Communication with team and stakeholders is key to successful implementation



Improved interactions with stakeholders

- faster recognition of changes
- opportunity for insights and investigations
- more relevance for the reserving function

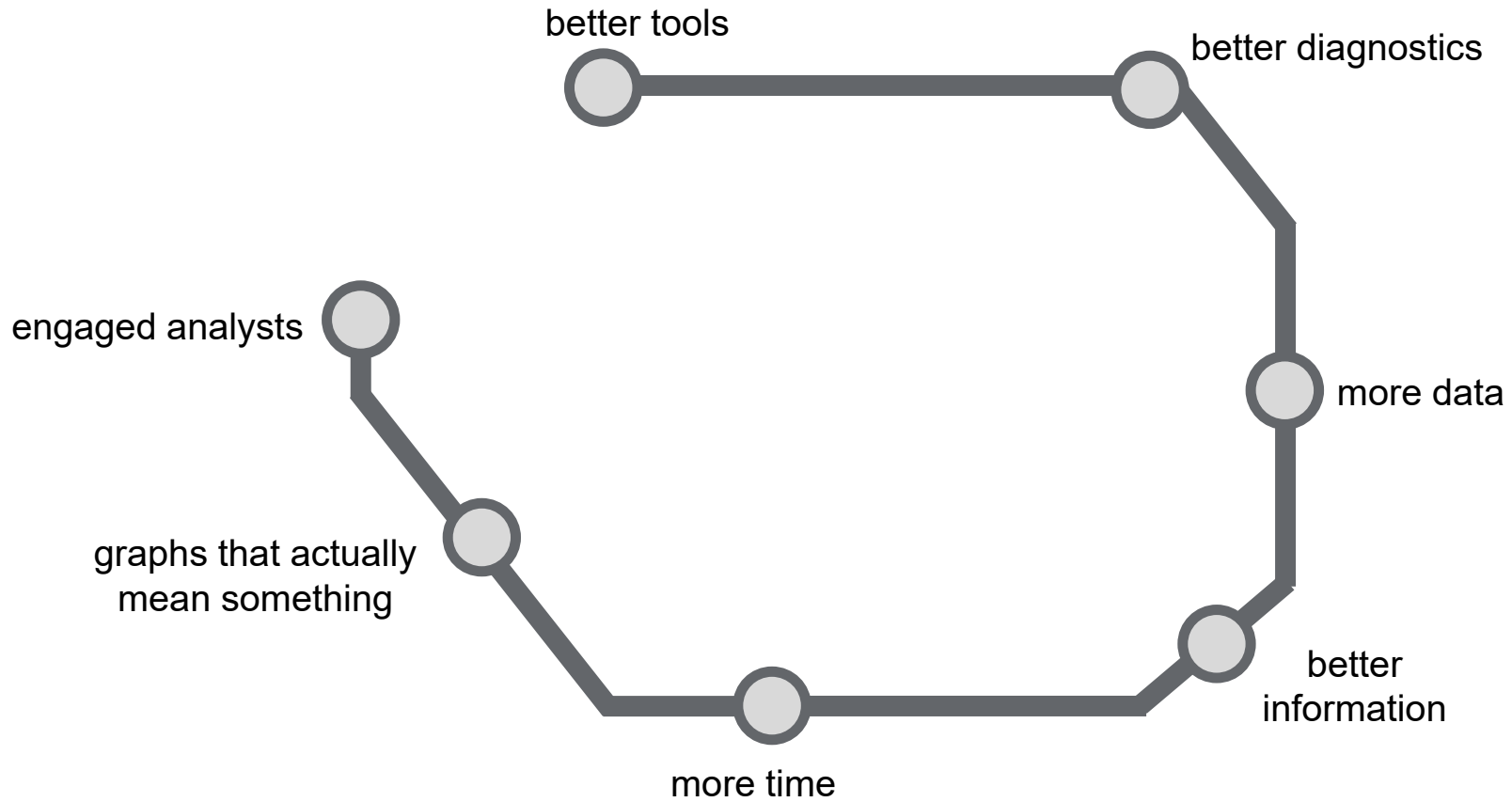
The opportunity in automation

Starting small

- *What if I could have this data upload completed overnight?*
- *What if I could have the reconciliation run automatically?*
- *What if I could run this entire analysis with alternative assumptions?*
- *What if I had a report that told me what I should be looking at first?*
- *What if I had a visual that broke down how my reserves changed over the last month?*
- *What if I had a diagnostic that was able to highlight the main drivers of my results?*
- *What if I could see instantaneously what the status of the analysis is?*
- *What if I didn't have to update this report?*
- *What if I could easily see who changed what and why?*
- *What if I had another 50 additional analysts that didn't need sleep and didn't cost me any money - what would I get them to do?*

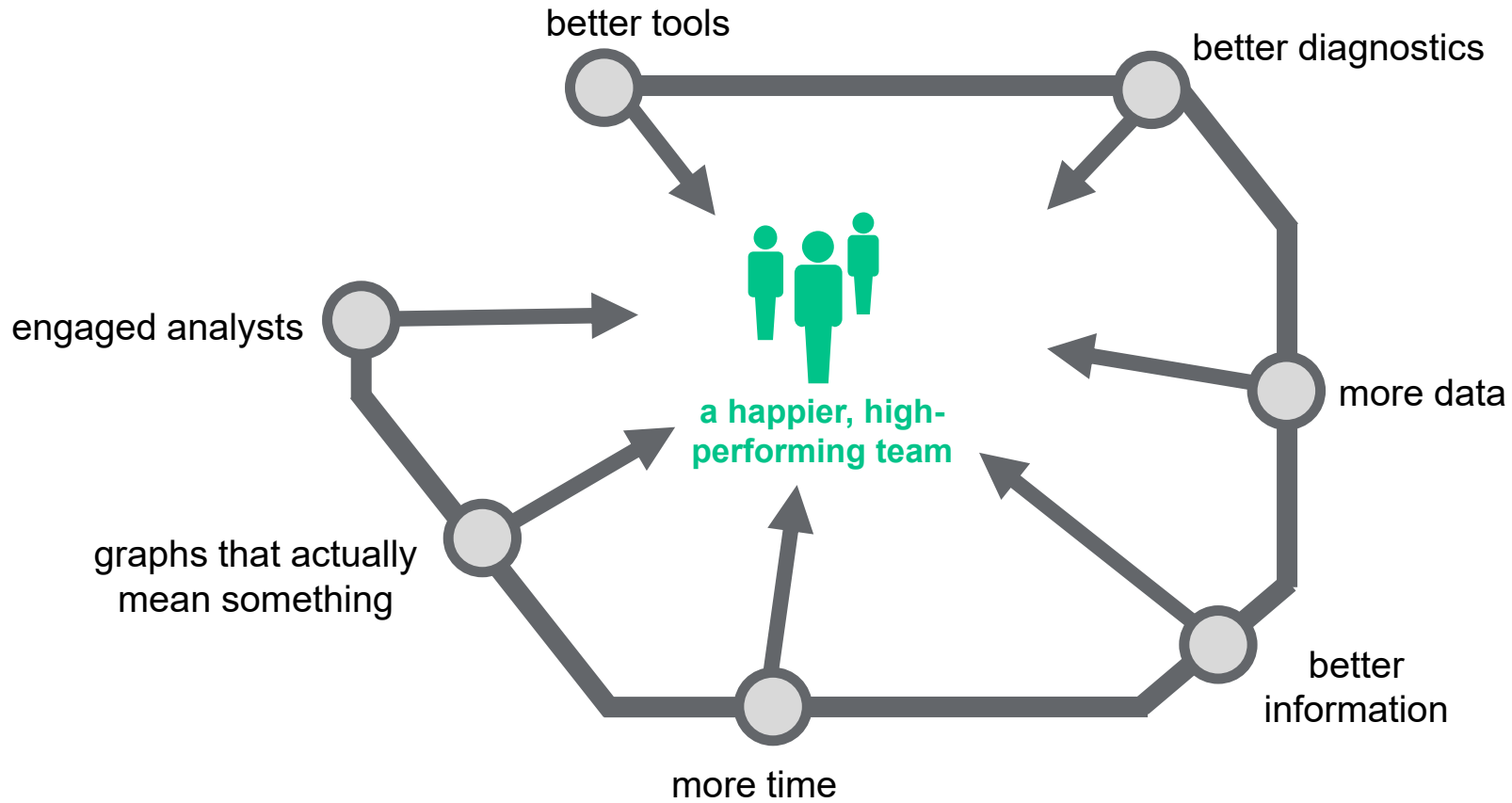
The opportunity in automation

What if I had...



The opportunity in automation

What if I had...



Q&A

