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Institute
and Faculty
of Actuaries

D4 – Risk MI
Embedding within the business

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Contents

- What is Risk MI?
- Target audience
- Embedding
- A case study
- Some top MI issues
- Possible solutions
- Useful tips and tricks

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What is Risk MI?

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- Risk Management Information:

Information provided to management which is used to manage the business efficiently and effectively.

Systems are typically set up to provide this information which are used to analyse and facilitate strategic and operational activities.

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Target audience

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- Key users include:
    - Senior management / Board
    - Underwriters
    - Actuarial
    - Regulators
    - Auditors
- Generally users will not be as familiar with concepts
- But what are their needs?

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Target audience

- Approached a number of senior management within Arch with the following questions:

1. What do you look for in MI produced by the actuarial team?
2. Of the current MI, where would you like to see improvements?
3. What MI do you tend to use regularly?

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A1.
- Crisp exhibits, ideally one-pagers with the ability to drill into detail when required
- Consistency of reports at committee meetings
- Accessible
- Trustworthy (i.e. correct)

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A2.
- Additional types of reports, including increased flexibility of the output generated
- Further detail on LOB drill downs
- Less focus on low category risks
- More controls in place

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3. What MI do you tend to use regularly?

A3.
- Actual vs plan comparisons (claims and premiums)
- Large claim and premium movements in quarter
- Triangles

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Embedding

- Useful information
- All in one place
- Presented, so that
  - Easy to follow
    - One pagers
    - Consistent use of colour
    - Maximise use of space
  - Automatically highlighting key points
    - Conditional formatting
- Recognisable
  - Regular presentations
    - Board, Reserve Committee, Risk Committee, Management Committee
  - Similar style & format

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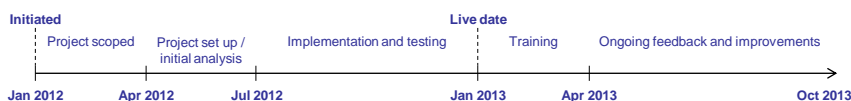# Embedding

- Flexible
  - Slicers
- Adjustable levels of detail
  - Drill down
- Automated
  - Reporting tool
  - Data feeds

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A case study: Arch MI tool

- MI project was initiated in January 2012

Initiated			Live date		
	Project scoped	Project set up / initial analysis	Implementation and testing	Training	Ongoing feedback and improvements
Jan 2012	Apr 2012	Jul 2012	Jan 2013	Apr 2013	Oct 2013

- The aim was to improve the existing MI dashboard by upgrading the systems and allow more flexibility and automation
- Objectives:
  - One central hub
  - Audience specific:
    - Management (High level – Top down)
    - Head underwriters (Medium level – Top down by LOB)
   - Assistants (Low level – Bottom up)

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A case study: Arch MI tool

- Implementation
  - Web page
  - SQL server reports in MI tool
  - SQL server reports in Excel
  - Cube reports in Excel
- Embedding
  - Communication / getting buy-in early on from staff
  - Ideally have permanent staff on implementation team
  - Regular meetings with team of key underwriters
  - Wider training
  - Ultimately have experts in each team
- Feedback
  - Largely positive
  - Engagement with the tool varies for each team
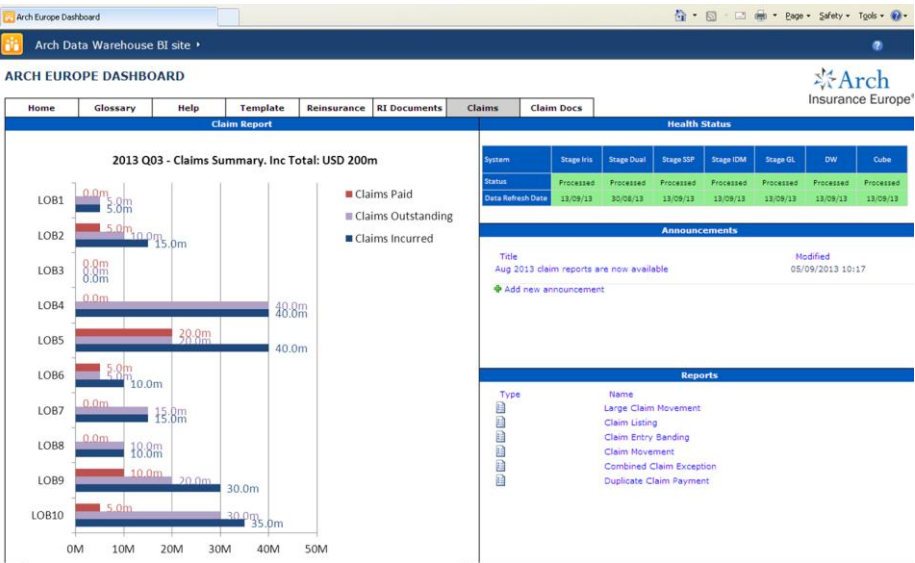 - Some individuals struggle with Excel

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Arch MI tool
Screenshots – Front page
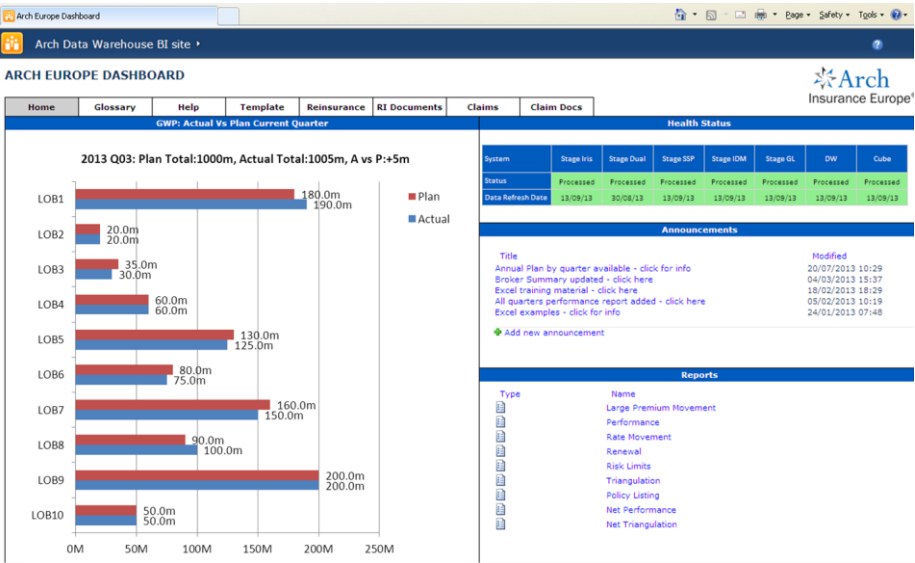
Note: figures are fictional and do not represent Arch's actual view   13   Arch Insurance Company (Europe) Ltd

Arch MI tool
Screenshots – Claims summary

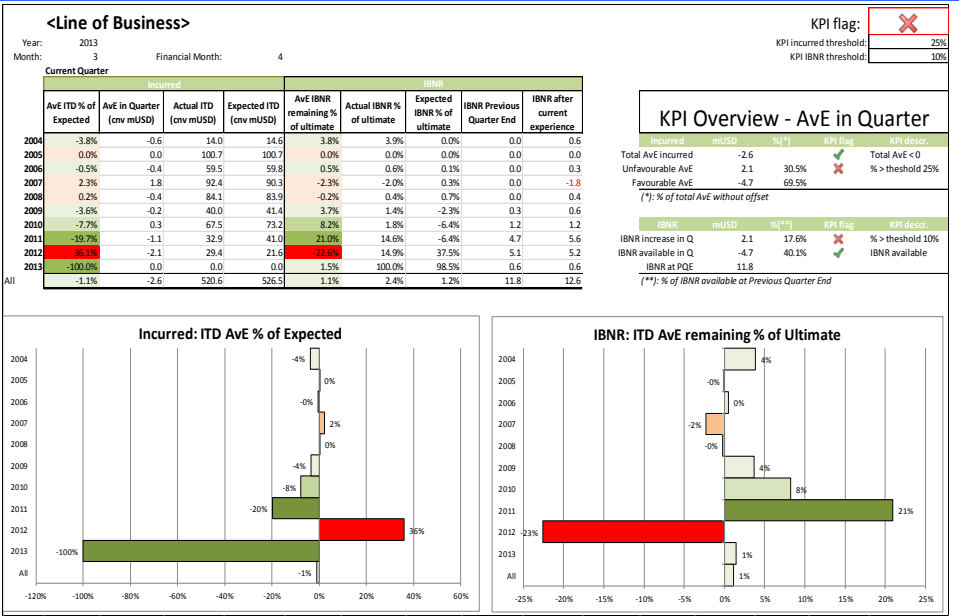Note: figures are fictional and do not represent Arch's actual view   14   Arch Insurance Company (Europe) Ltd
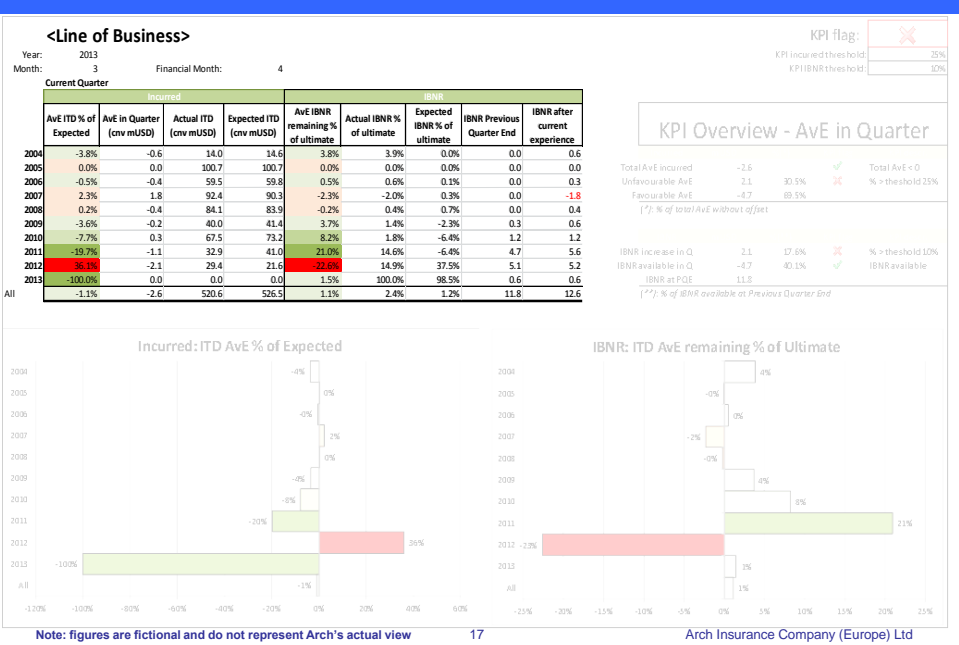
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Some top MI issues

- Reserving
  - Monthly A vs E
  - Trends: exhibits to show movements
  - Top down: highlighting key areas to dig into
  - Drilling down into the detail
- Capital
  - Capital results: Capital Dashboard
  - Trends in key risks: bubbles and ghost bubbles tool
  - Tail dependency: how to describe

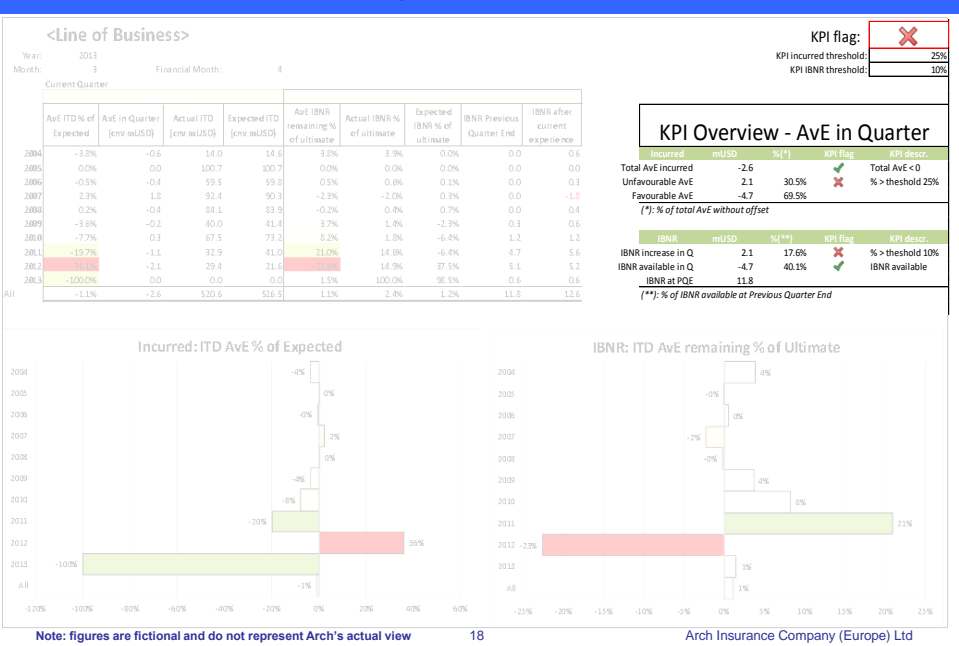15   Arch Insurance Company (Europe) Ltd

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Reserving MI
Actual vs Expected

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Reserving MI
Actual vs Expected

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Reserving MI
Actual vs Expected

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**Reserving MI
Actual vs Expected**

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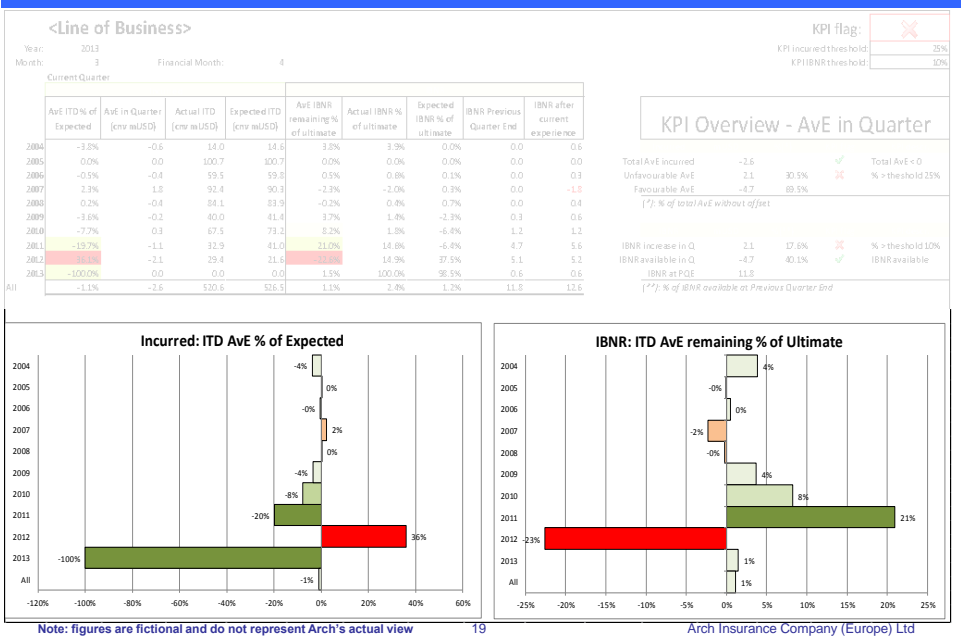
**Reserving MI
One pager**
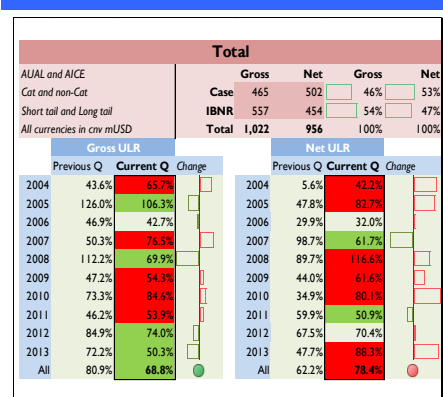
- Start with total gross and net ULRs
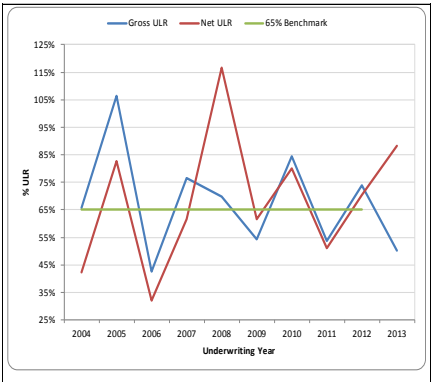- Split by uw years

- Change in loss ratios shown for each uw year

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Reserving MI
One pager

Total

USD

GBP

EUR

AUD

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Reserving MI
One pager

Total

Currency splits

Cat / Non-Cat splits

Short / Long tail splits

Company / Syndicate splits

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Reserving MI
IBNR exhibit

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Reserving MI
Line of business drill down

<Line of Business>

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Capital MI
Capital dashboard

| Standalone Capital £m | 20.00 |
| Diversified Capital £m | 15.00 |

Key metrics	
2014 Plan GWP (£m)	500
2014 Plan NWP (£m)	400

Operational Risk - AUAL   Ultimate Basis

Sensitivities (£m impact to standalone capital)	
-20% to maximum operational loss	- 2.0
+20% to maximum operational loss	+ 2.0
"Low range" probability of a given control failing	- 5.0
"High range" probability of a given control failing	+ 2.0
One additional control for each op risk	- 4.0
Two fewer controls for each op risk (min of 1)	+ 5.0
+25% correlations between all op risks	+ 1.0

Stress Tests / Scenarios	Impact (£m)
Impact of an escaped tiger in Lloyd's	5.00
Loss of catering team	3.00
Office supplies run out of staples	1.00

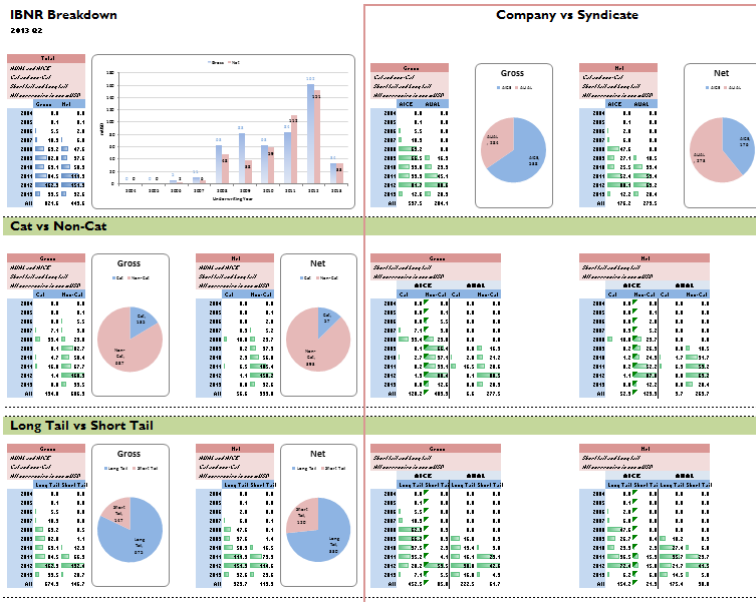| Key drivers |
| --- |
| Risk severity ratings of operational risks |
| Risk likelihood ratings of operational risks |
| The number of controls in place for each operational risk |
| Dependencies between operational risks categories |

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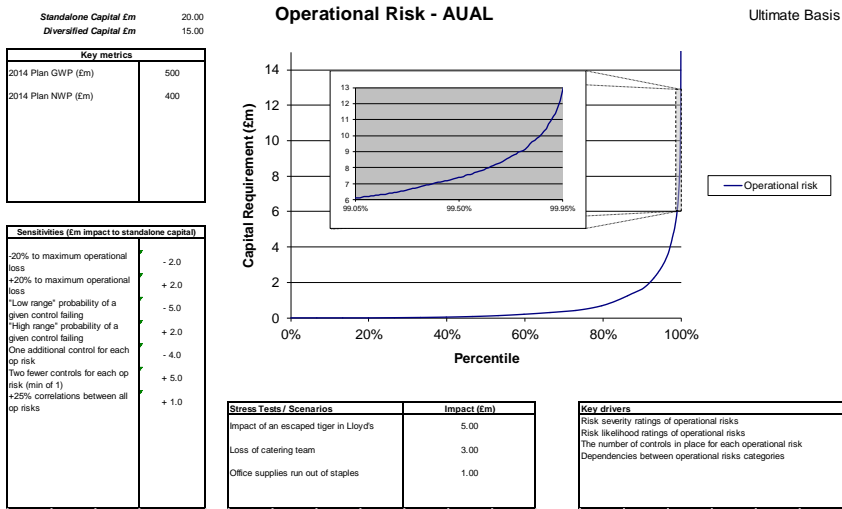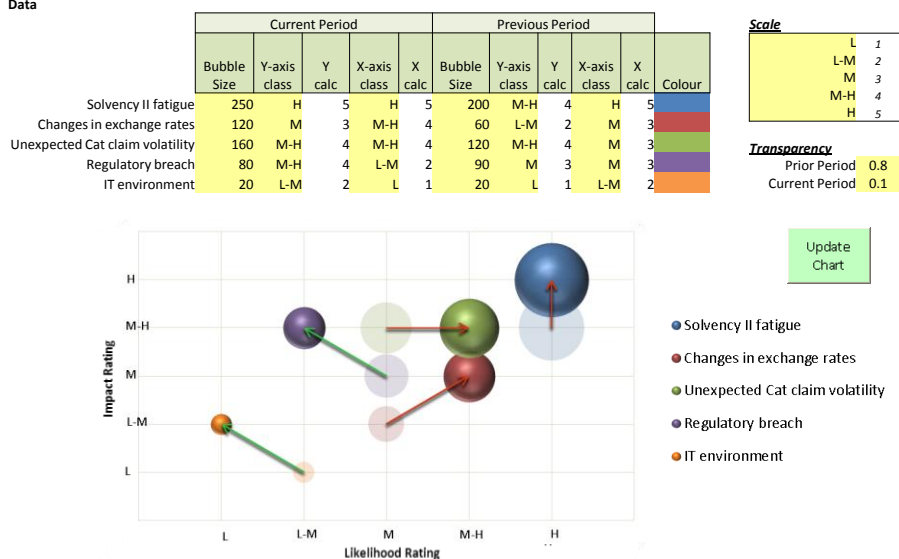---

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Capital MI
Trend key risks

- Challenge of showing key movements of risks over the year within the ORSA
- Particular example considers 5 risks and their movements since prior period
- Impact and likelihood ratings have 5 categories:
  - Low
  - Low/medium
  - Medium
  - Medium/High
  - High

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Capital MI
Trend key risks

Data

	Current Period					Previous Period						Scale		
	Bubble Size	Y-axis class	Y calc	X-axis class	X calc	Bubble Size	Y-axis class	Y calc	X-axis class	X calc	Colour	L	1	
												L-M	2	
												M	3	
												M-H	4	
Solvency II fatigue	250	H	5	H	5	200	M-H	4	H	5		H	5	
Changes in exchange rates	120	M	3	M-H	4	60	L-M	2	M	3				
Unexpected Cat claim volatility	160	M-H	4	M-H	4	120	M-H	4	M	3				
Regulatory breach	80	M-H	4	L-M	2	90	M	3	M	3				
IT environment	20	L-M	2	L	1	20	L	1	L-M	2				

Transparency
Prior Period 0.8
Current Period 0.1

Update Chart

- Solvency II fatigue
- Changes in exchange rates
- Unexpected Cat claim volatility
- Regulatory breach
- IT environment

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Capital MI
Dependency

- Challenge of demonstrating tail dependency to senior management
- Particular example uses three random variables:
  - RV1 = Independent uniform distribution ~U(0,1)
  - RV2 = Market Risk variable
  - RV3 = RI Migration variable ~U(0,1)
    (chance of credit rating move)
- Wanted to show the tail dependency between market risk variable and the probability of a change in reinsurer credit rating
- Consider the upper tail to be top 15% percentile
- Consider the lower tail to be bottom 25% percentile

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Capital MI
Dependency – 0% correlation, no tail dependency
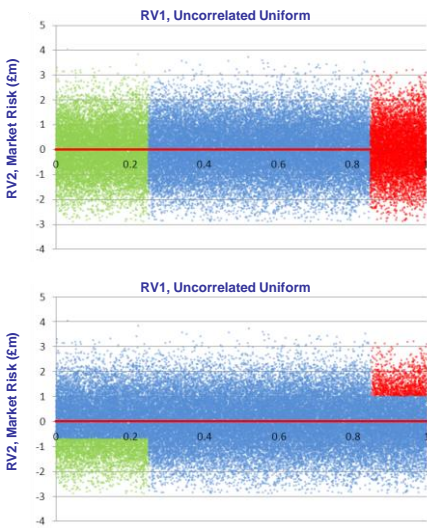
RV1, Uncorrelated Uniform
RV2, Market Risk (£m)

Single variable probabilities

Area	Number of simulations	Proportion of simulations
Low	12,517	25.03%
Middle	30,049	60.10%
High	7,434	14.87%
Total	50,000	100.00%

RV1, Uncorrelated Uniform
RV2, Market Risk (£m)

Joint variable probabilities

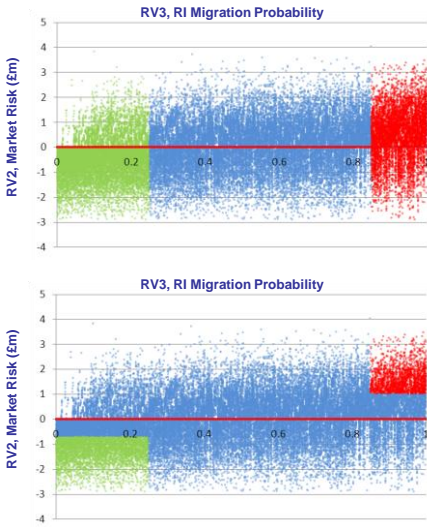| Area	Number of simulations	Proportion of simulations
Low	3,155	6.31%
Middle	45,736	91.47%
High	1,109	2.22%
Total	50,000	100.00%

Also known as joint exceedance probability

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Dependency – 33% correlation, with tail dependency

RV3, RI Migration Probability
RV2, Market Risk (£m)

Single variable probabilities

Area	Number of simulations	Proportion of simulations	Impact
Low	12,499	25.00%	-
Middle	29,985	59.97%	-
High	7,516	15.03%	-
Total	50,000	100.00%	-

RV3, RI Migration Probability
RV2, Market Risk (£m)

Joint variable probabilities

Area	Number of simulations	Proportion of simulations	Impact
Low	4,928	9.86%	56%
Middle	42,941	85.88%	(6%)
High	2,131	4.26%	92%
Total	50,000	100.00%	-

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- Make use of all space
- Colours have a purpose
- 3D versions of 2D charts add no value
- Avoid pie charts if precision is required
- Excel charting is limited
  - Add-ins
  - Code it yourself
- Use similar style or format -> recognisable

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