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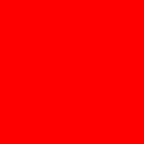
# qx Club

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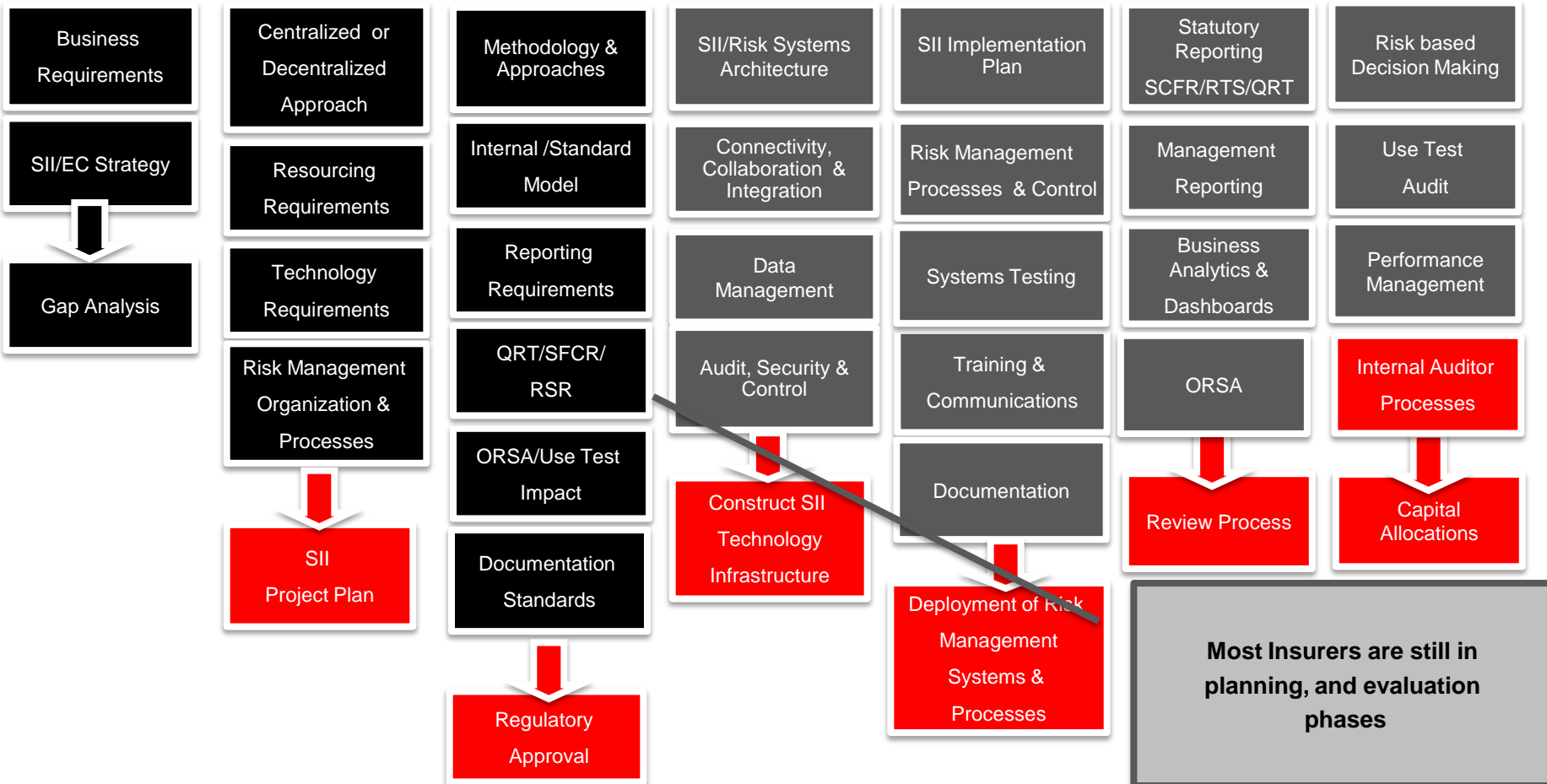
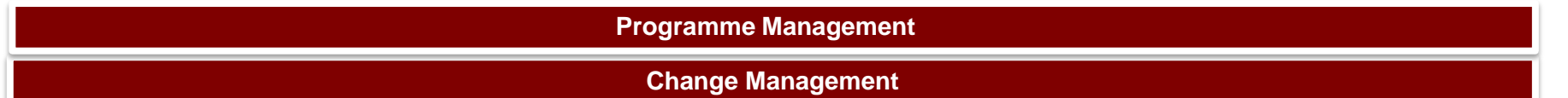
# **Solvency II Update**

# Even the US is looking at SII!

## U.S. insurers begin work on Solvency II - Eventual equivalence with E.U. rules eyed

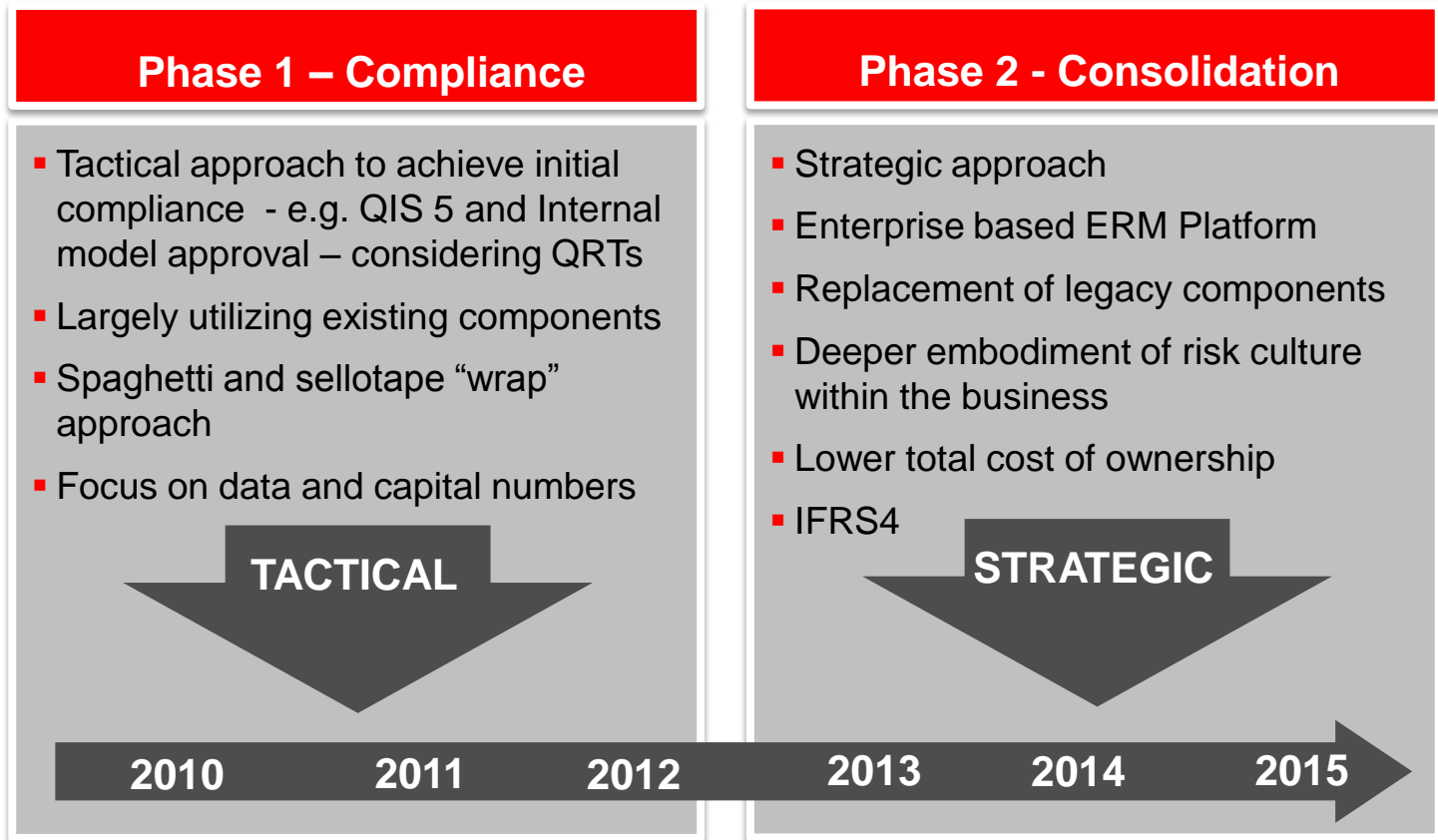
- WASHINGTON—While a final date to implement the European Union's Solvency II regulatory regime is not yet certain, observers say U.S. insurers should be planning now to comply with the rules.
- In the United States, for example, the National Assn. of Insurance Commissioners is making adjustments to its solvency modernization initiative to incorporate portions of Solvency II, said Robert Gordon, Washington-based Senior VP-Policy development and research for the Property Casualty Insurers Assn. of America.
- US Companies also are devising internal capital models at the individual company and group levels, he said. Some PCI members also have met with domestic and foreign regulators to talk about areas that Solvency II would address even before formal rules are issued, he said.

# SII/EC Typical Program Steps



# Solvency II – Is being implemented in phases

- SII is complex and impacts the enterprise as a whole.
- For most major insurers SII is likely to be implemented in two phases or for some three!!!

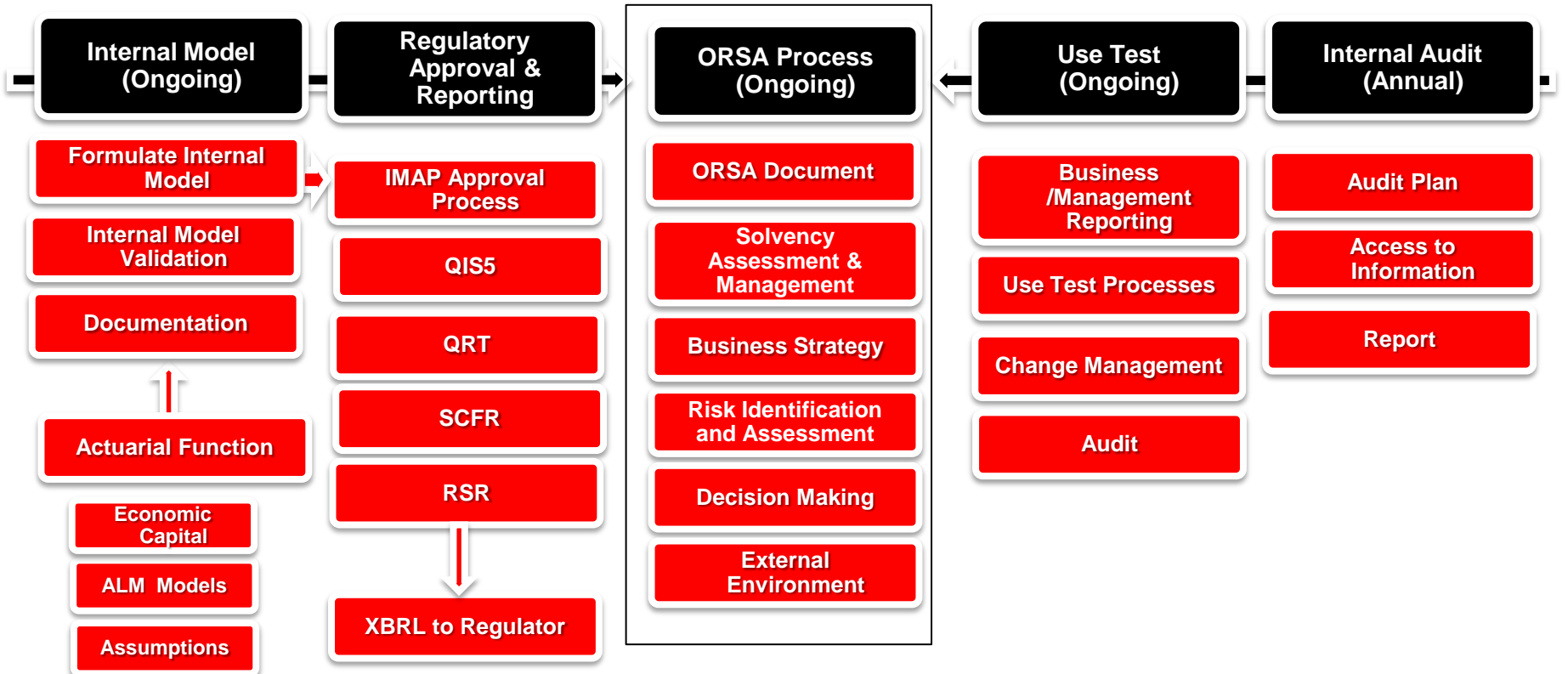


# SII Programs – Key Issues

- **Reporting/QRTs– QIS5** Solvency II dry run was completed by end of November 2010 for UK and will similar requirements across the world. **Key Focus to get some SCR/MCR numbers!** – now moving on to QRTs and that is a different problem!
- **Data Quality** – how do we ensure that the input data has lineage, auditability and is consolidated, accurate and validated? **Can we trust the data for Pillar II purposes**
- **Use Test Implementation** – is the internal model genuinely important to the business? Is it widely used in decision making? **How do show to the regulators we are using the models in decision making?**
- **Balance Sheet Projection** – what is the methodology for balance sheet projection for ORSA –**ORSA requires a three year balance sheet projection – should it be stochastic or deterministic – methodology & tools**
- **Auditability & Transparency** - how do we audit, track and control our actuarial and risk management processes? **Particularly as most of the existing systems are Desktop based**
- **Documentation Standards** – is there a proper documentation to describe the models, the supporting processes and how is it kept up to date? **Documentation is a real issue**
- **Actuarial/Risk Management Processes** - do we actually have defined, controlled and documented processes? **How do we demonstrate full audit trail? Do we have an IT solution?**
- **Driving out real Business Benefits.....**

# High Level View

## SII Pillar II Controls



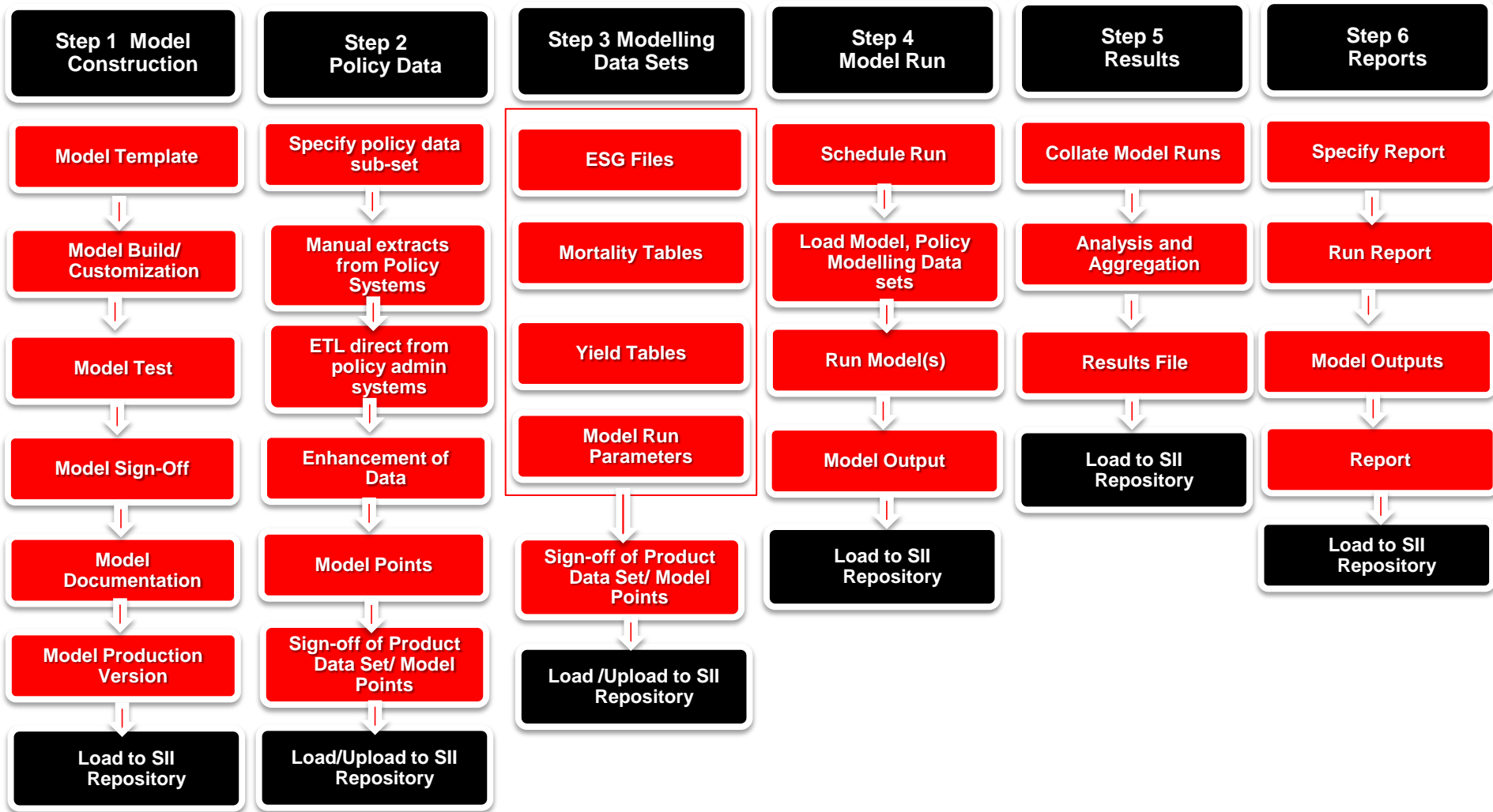
Data

Process Flow – Audit, Security & Controls

Documentation



# Example Actuarial Modelling Process



# Documentation Requirements Overview

The Internal Model will need to be underpinned by robust documentation, it is expected to include:

- Demonstrate compliance with the 6 other Internal Model tests
- Insurers must have a clear documentation policy
- Which sets out the theory, assumptions, and mathematical and empirical basis “such that an independent, knowledgeable third party could understand the reasoning and the underlying design and operational details of the internal model”.
- “Rationale for the decision to adopt certain practices and all major changes
- Documentation will take into account its target audience

# Solvency II – Impact on the Insurer

- **Consolidation** – larger, well capitalised insurers may acquire financially constrained smaller players. Diversification benefits for larger insurers will also mean they are best placed to utilise surplus capital
- **Increased use of reinsurance** – to improve Solvency positions e.g. reduce life mortality capital
- **Capital Generation** – raising capital may become more difficult particularly for insurers with less than excellent ratings and track records
- **Different Products** – Solvency II will cause insurers to look at the types of products they sell and the capital required to support those products e.g. Annuity re-pricing
- **Group Capital Requirements** – Insurers prefer to hold capital centrally and not at company level as required by Solvency II – this may lead to restructuring such turning subsidiary companies into branches
- **Costs of Compliance** - Complying with Solvency II and maintaining compliance will cost a lot of money!!!!

# Market Dynamics

- European banks spent €30bn on Basel II thus far and Basel III to yet to be implemented
- Solvency II Budgets
  - Large Multinational 1 = €300m+
  - Large Multinational 2 = €300m+
  - Large UK Insurer = €100m+
  - UK Multinational = €200m+
  - Implementing Pillar II/III is far more onerous than Pillar I
- Compliance to SII is important but so too is driving business benefits
- IT typically represents **60% upwards** of total SII budget
- Significant Country differences! UK/Germany/Switzerland relatively advance – Spain/Italy lagging behind



# **Solvency II Challenges**

# Drivers, Demands & Challenges

## Regulation

- 2013 Solvency II
- 2014 IFRS Phase II
- Sarbanes Oxley
- FSA/DNB/BAFIN

## Market Drivers

- Market volatility
- Rating agencies
- Financial environment
- Corporate governance

## Business Demands

- Faster, frequent & more granular analysis
- Compliant & transparent risk processes
- Better information for business decision making – Use Test
- More efficient use of capital
- Consistent enterprise wide risk information
- Information beyond SII

## Challenges

- Approval & documentation of “internal model” in timescales
- Gearing-up for Regulatory Reporting – QRTs/SFCR/RSR – data/content
- ORSA Process and Impact – BS Forecasting
- Embedding a “Use Test” capability & Culture within the business
- Running increasingly complex actuarial/capital models frequently
- Consolidating multiple legacy risk/actuarial systems
- Demonstrable and documented risk management systems & processes
- Data lineage, quality and validation
- Realizing any tangible business benefits

# Solvency II – Key Business Benefits

**1. Better understanding of Risk within the business and it's impact**

**2. Improved risk & financial information for business decision making & strategic purposes**

**3. Competitive advantage and value through improved product design & pricing**

**4. Improved Capital Allocation through more accurate risk modelling**

**5. Minimisation of the cost of capital & reinsurance by making risk more transparent & measurable**



# **Solvency II Technology**

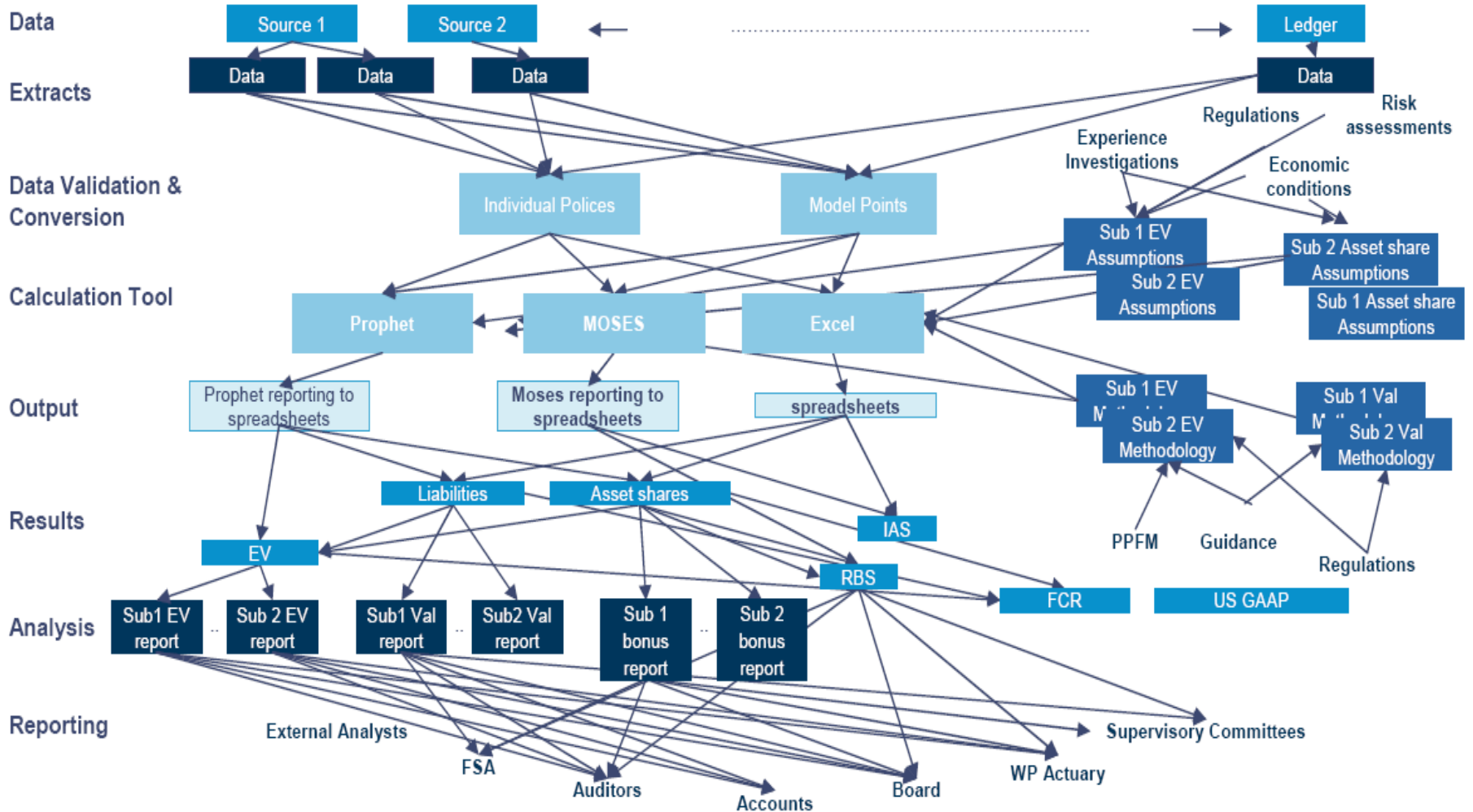


# Current Solvency II technology landscape

- Traditional actuarial and risk systems are desktop oriented and supplemented heavily with manual controls
- Often insurers have multiple risk systems as a result of multinational structures or M&A activity
- These systems tend to lack enterprise capabilities making security, auditability and control difficult
- Risk data is collected from multiple sources and generally lacks consistency, quality and controls
- Reporting is split across multiple systems making it difficult to aggregate risk information
- Desktop computing power inhibits the ability to undertake frequent and ever more complex actuarial/risk models

# Case study of Actuarial Spaghetti!

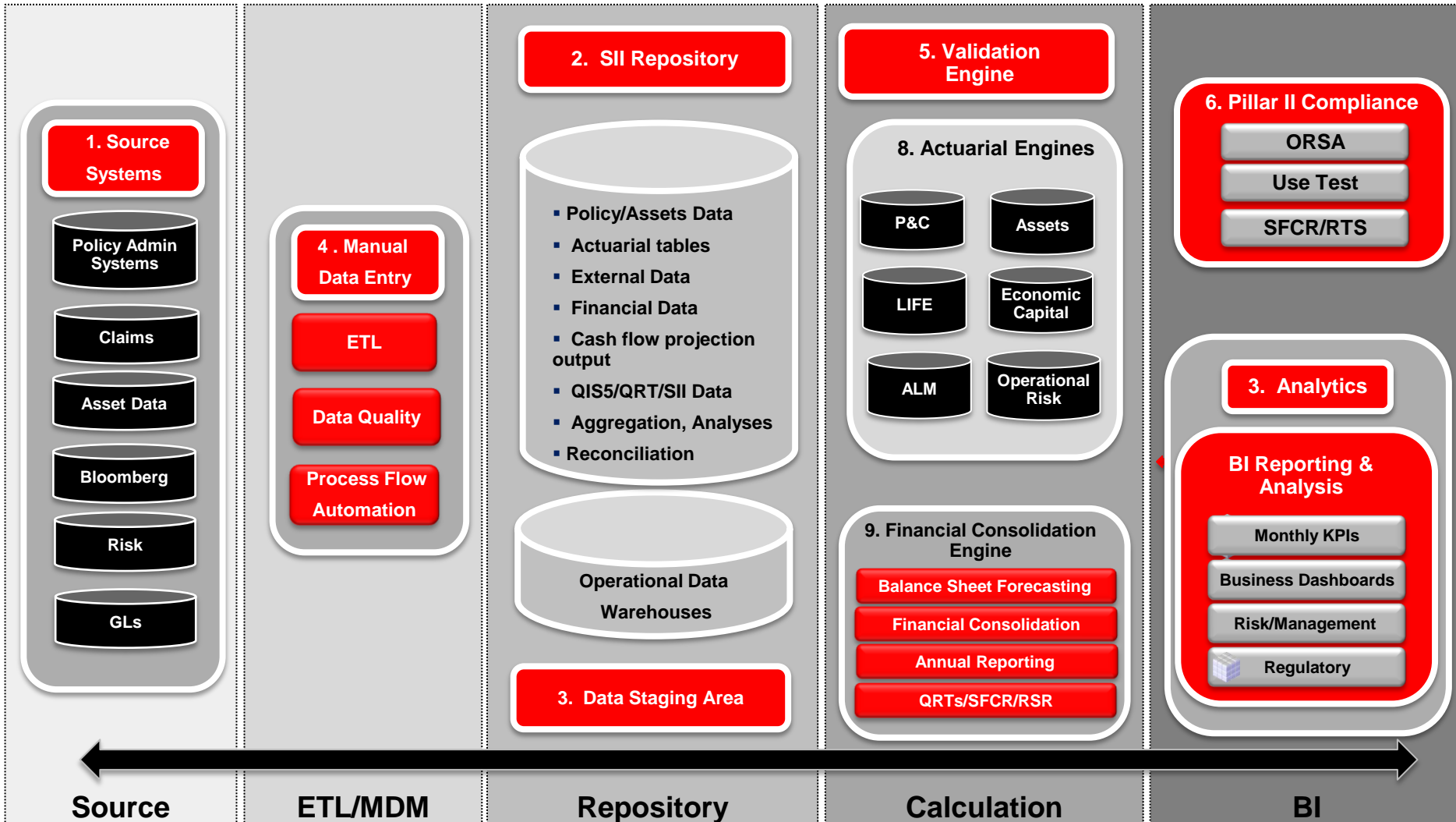
## Current financial reporting and actuarial systems processes





# Possible Solution

# Typical SII Architecture

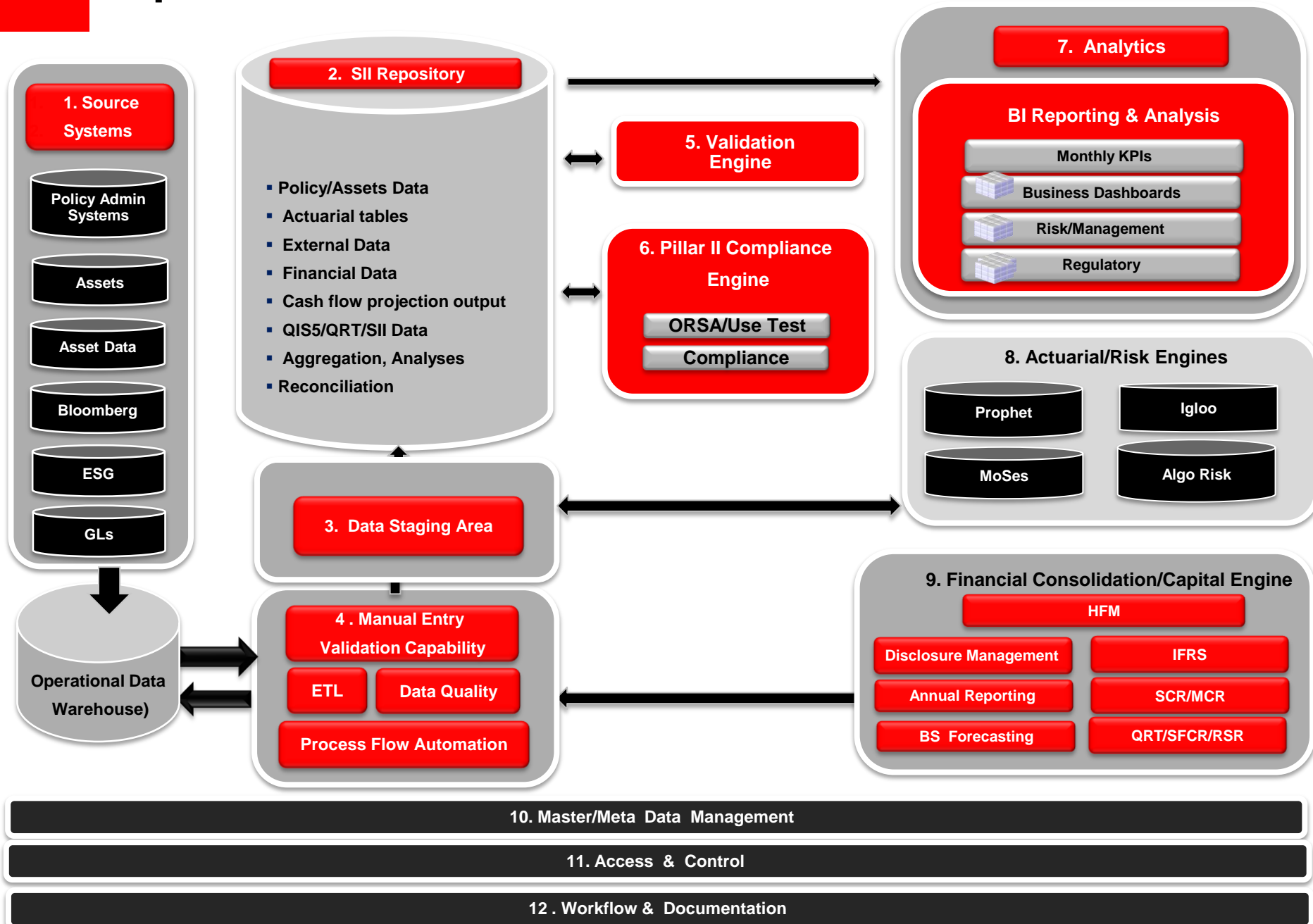


12. MDM

11. Access & Control

12. Workflow & Documentation

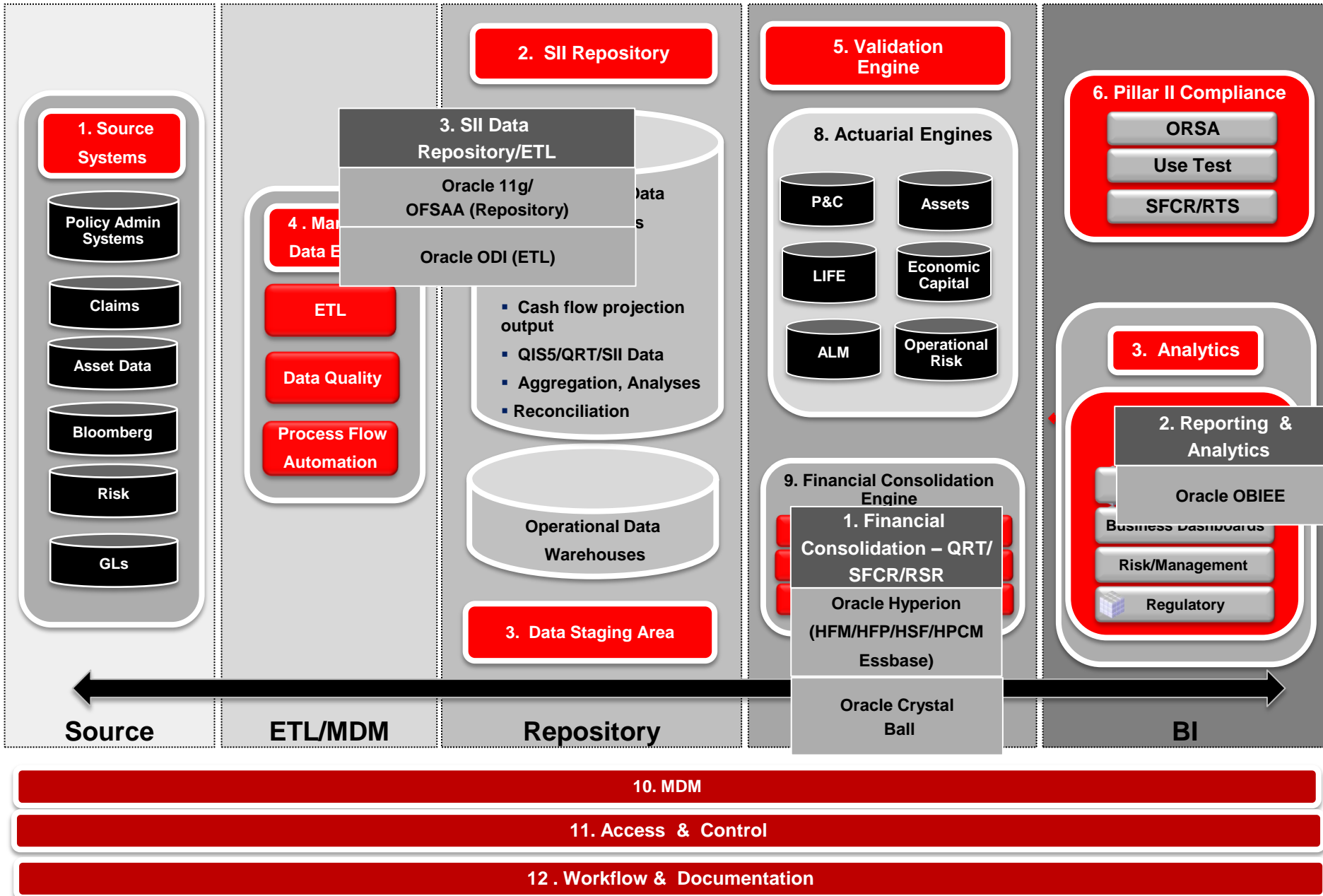
# Aspirational SII Architecture



# Questions

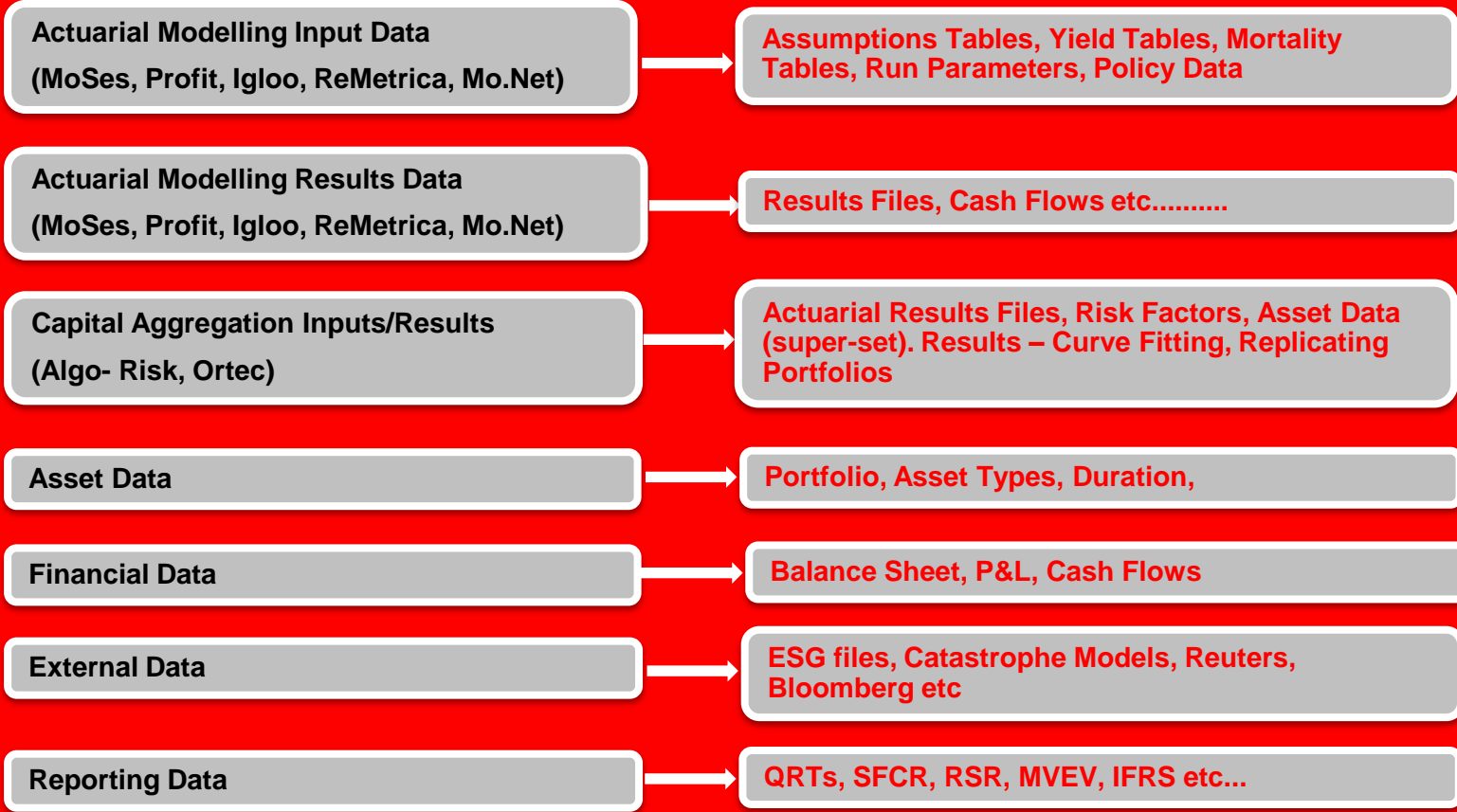
- We you are adopting an Internal Model approach ?
- How are you going to calculate, aggregate and allocate economic capital(diversified SCR) – Prophet, Algo Risk or other tool?
- Are you going to utilize Replicating Portfolios?
- What engines are Sanlam using for sophisticated ALM and Balance Sheet Forecasting for the purposes of ORSA?
- Is the data warehouse a true SII repository – e.g. does it :
  - Store assumption tables for actuarial engines – yield, mortality, ESG, parameter etc
  - Store portfolio valuations for Replicating Portfolios
  - Store results files from actuarial engines in sufficient granularity for analysis and QRTs
  - Can it calculate/support SCR, MCR, Diversification matrices
  - Does it have a reconciliation engine
- Do you have an Asset Repository (in HFM) just for loading data to engines or will it be used for asset reporting and input to QRT?
- How are you envisioning producing your ORSA?

# Oracle SII Components



# Component 1 – SII Repository

## Dedicated Solvency II Data Repository:



Meta Data Management



# Actuarial – Input & Results

## Assumption Tables

- Yield
- Inflation
- Mortality/morbidity
- Lapses
- Expenses and commission
- ESG Files
- Reinsurance
- Tax
- New Business volumes and margins
- Bonus rates
- Batch parameters
- Claims Data
- Model Version ID

## Dimensions & Groupings

- Batch Run
- Periods
- Scenarios (Deter/Stoch)
- Legal Entities
- Products / Portfolios
- Currency
- Net value (MCEV, EV, VAR)
- Business Type
- GAAP
- Risk Drivers
- Gap Analysis/Sensitivity

## Policy Data

- Policy Number
- Age
- Gender
- Post Code
- Product Type
- Benefit Structures
- Premium
- Duration
- Asset shares
- Unit holdings
- Claim
- Expenses

## Actuarial Engines



## Output/Results

- Cash Flows
- Reserves
- Loss Triangles
- Balance Sheets
- P&L
- Net Cash

# Economic Capital Aggregation/RPTs

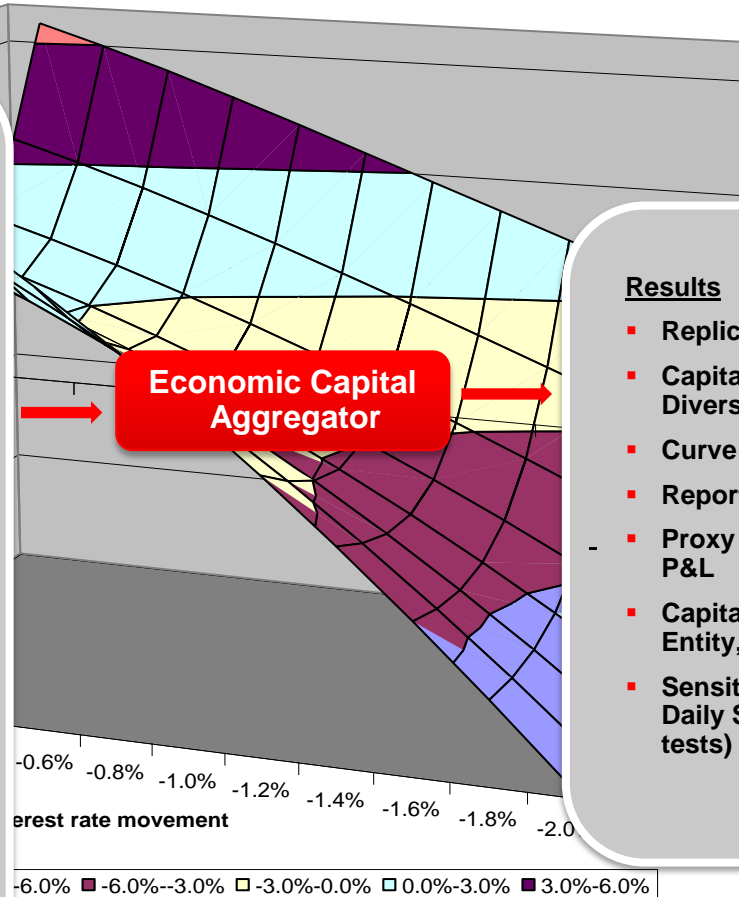
## Inputs

- Risk Factors
- Risk Factor Calibration
- Risk Profiles
- Loss Functions
- Tail Dependencies
- Assumption Sets
- Tax Data
- Reinsurance Data
- Portfolio Values
- Diversification Matrices
- Copulas
- Stress Tests
- Capital Allocation
- Fungibility Rules
- Cash Flows (actuarial Engines)
- Results Files (Actuarial Engines)
- Scenarios

**Economic Capital  
Aggregator**

## Results

- Replicating Portfolios
- Capital Aggregation, Diversification, Allocation
- Curve Fitting
- Reports
- Proxy balance sheets / P&L
- Capital Allocation by LOB, Entity, risk driver
- Sensitivity Analyses (e.g. Daily Solvency, Stress-tests)



# Risk Factor Calibration

**USA Equity Calibration**  
 Type: Risk Factor Calibration  
 Path: CSD > RAEC

Content Run Parameters Version History Run History Properties

**Calibration Details**

**Calibration Method:** Percentiles

**Distribution Type:** Normal

**Calibration Data:** Equity distribution percentiles

**Data version:** Last Checked-In

**Fitting Technique:** Horizontal Errors

**Optimization Algorithm:** Sequential Quadratic Programming

m GBP

Diversified

	Company	BU	Product	Risk factor name	AEC		99.5th Percentile	99.9th Percentile
1	Total				90.00	1	46.06	52.14
2	Insur ABC				90.00	2	46.06	52.14
3		France GI			0.00	3	44.33	50.74
4			Motor		0.00	4	1.16	1.11
5				Claim volat:	n/a	5	1.12	0.78
6				Equity	n/a	6	-0.11	-0.08
7				Reinsurance	n/a	7	0.15	0.42
8			Property		0.00	8	43.17	49.63
9				Claim volat:	n/a	9	33.50	23.32
10				Equity	n/a	10	0.23	0.17
11				Reinsurance	n/a	11	9.44	26.14
12		UK Life			90.00	12	1.73	1.40
13			Annuities		60.00	13	1.30	1.02
14				Equity	n/a	14	1.22	0.92
15				Mortality	n/a	15	0.08	0.10
16			TA		30.00	16	0.43	0.38
17				Equity	n/a	17	0.34	0.25
18				Mortality	n/a	18	0.09	0.13

**3) Calculate calibrated parameters (or input manually)**

**1) Set Distribution for Risk Factor**

**2) Set Distribution Data**

**Equity distribution percentiles**  
 Type: Risk Factor Percentiles Data  
 Path: CSD > RAEC

Content Version History Properties

**Risk Factors Data**

Percentile	Risk Factor Value	Weight
0.005	-0.4	1
0.5	0	1
0.9995	0.5	1

CCF

-0.0032082674

1.54341067584

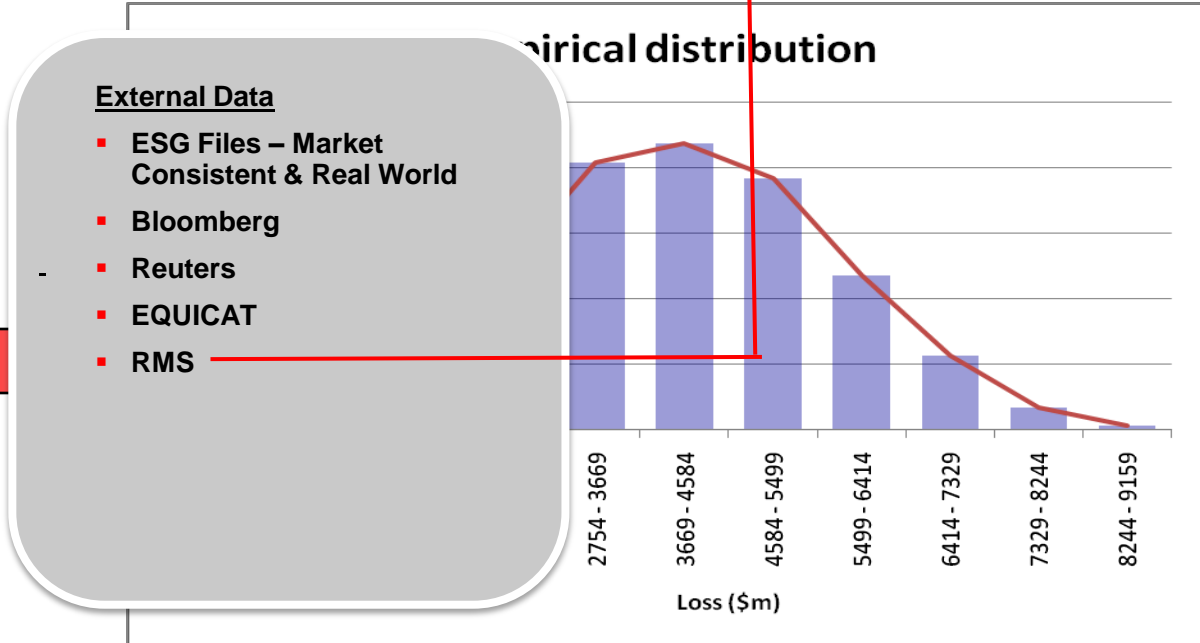
# External Data Sources

## RMS Hurricane Feed

Event ID	Annual Rate	Mean Gross Loss	$\sigma$ Correlated	$\sigma$ Independent	Exposure Value
1102153	0.00004498	4,684,577,776	1,048,267,401	44,265,035	1,501,518,735,009
1100050	0.00004498	3,795,882,120	726,188,833	53,147,644	1,063,321,290,183
1103518	0.00008998	2,569,325,591	684,635,264	29,661,689	1,474,398,355,515



Simulated annual aggregate losses
1,427,515,081
2,552,358,376
1,585,880,460
1,948,920,472
1,884,949,537
....
4,412,507,974



# Assets

Portfolio Data

Securities Data

Market Data

Transactions

Positions

Limit Data

Analysis

## Asset Types

- Equities
- Full range of Investments
- Fixed-Interest(government and corporates)
- Cash
- Derivatives
- Securitized Assets
- Foreign Exchange
- Mortgages
- Property
- Prices

Economic Capital  
Aggregator

Actuarial  
Engines  
including ESG

# Financial

## 9. Financial Consolidation Engine

Balance Sheet Forecasting

Financial Consolidation

Annual Reporting

QRTs/SFCR/RSR

### Financial Consolidation

- PL
- Balance sheet
- Disclosures
- Management reporting
- Multi Gaap
- Statutory reporting
- Tax reporting
- 
- Participations
- Intercompany Eeminations
- Currency Conversion & Consolidation
- Correction Journals
- Eliminations
- Capital Consolidations

### Product Profitability/ ABM

- Costing
- Allocations
- G/L feeds
- 
- Products
- Channels
- Commissions

### Budgeting

- Departments
- Budget holders
- Value Drivers
- Value Trees
- 
- Indirect costs allocation
- Balance Sheet Allocation
- Balance Sheet Projections
- Rolling Forecasting
- Tactical Planning

### Strategic Finance

- Scenario analysis
- Acquisition modeing
- Cost of Capital
- Finance structures
- 
- Funding
- Capital expenditures
- Finance programmes

# Reporting & Analytics

## Solvency II

- MCR
- SCR
- VAR
- MCEV
- Sensitivity Analysis
- Gap Analysis
- ORSA
- Use Test
- Regulatory Reporting
- ▪ Statutory Reporting
- Cash flow roll-forward
- Capital Allocations
- Risk Reporting
- Disclosure Requirements
- Audit trail
- Logging
- Back up/ Reproduction

## Management Reporting

- Profitability
- Costing
- Balanced scorecards
- Remuneration
- Budgeting
- ▪ Variation Reporting
- Exception Reporting
- Analysis and Trending
- Forecasting
- What If & Scenario Planning

## IFRS

- IFRS 4 phase II calculation
- Reconciliation Process
- ▪ Other EV
- Reconciliation Process between metrics (S2 <-> IFRS <-> MCEV)

## BI Reporting & Analysis

Monthly KPIs

Business Dashboards

Risk/Management

Regulatory

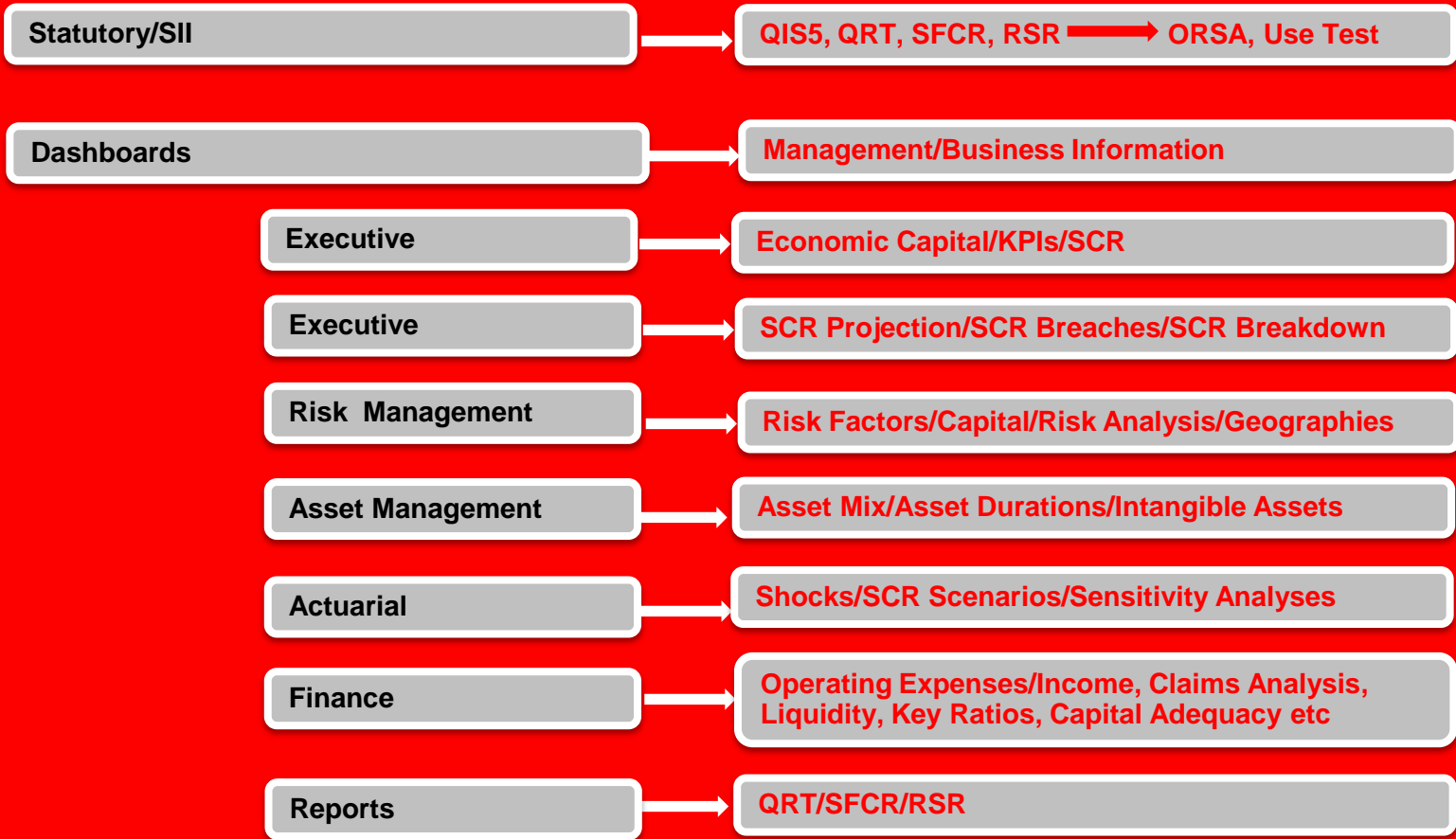


# **SII Reporting Pack**



# Component 2 – SII Reporting

## Solvency II Data Reporting



# Executive Reports

ORACLE Interactive Dashboards

Examples  
Dashboards

Solvency II

Executive

Dashboards

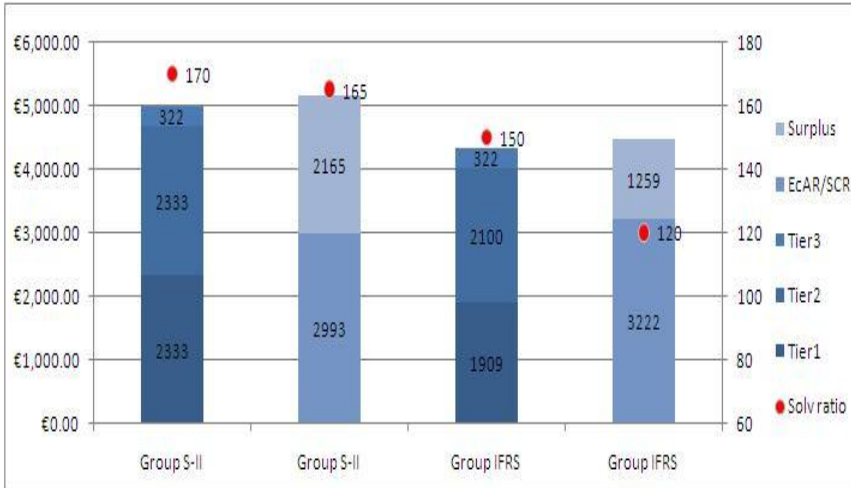
Answers

More Products

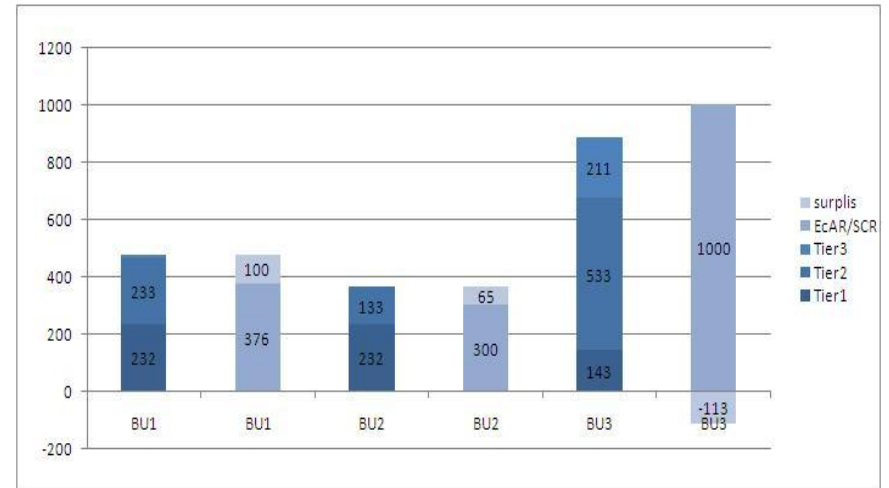
Settings

Log Out

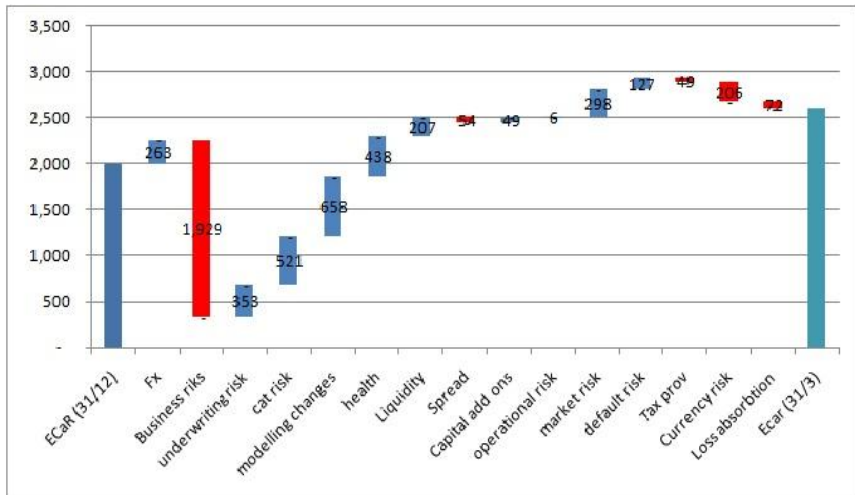
## Group SCR



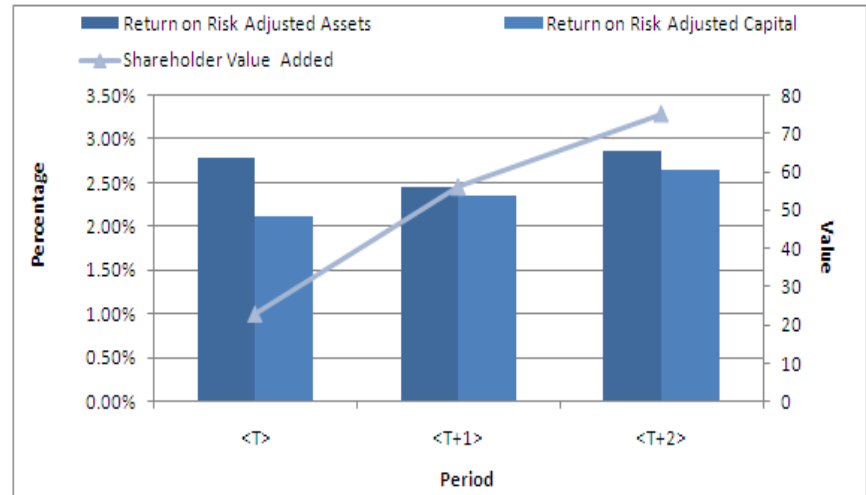
## SCR by Line of Business



## Reconciliation of ECaR

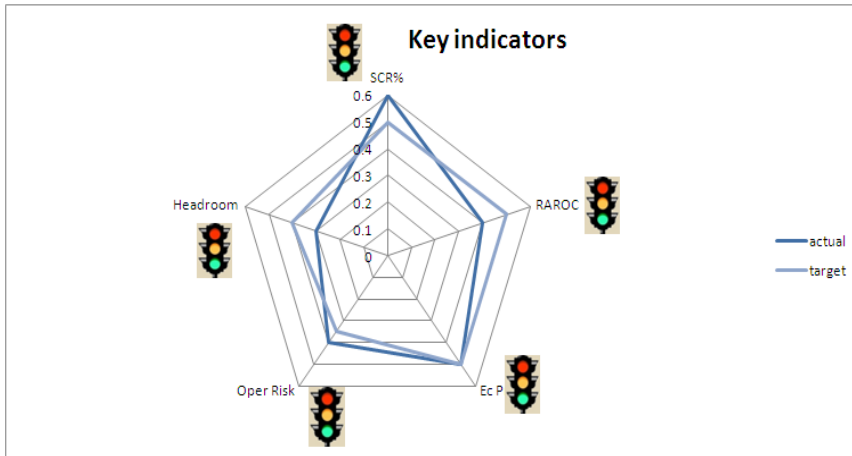


## Risk Adjusted Return on Capital

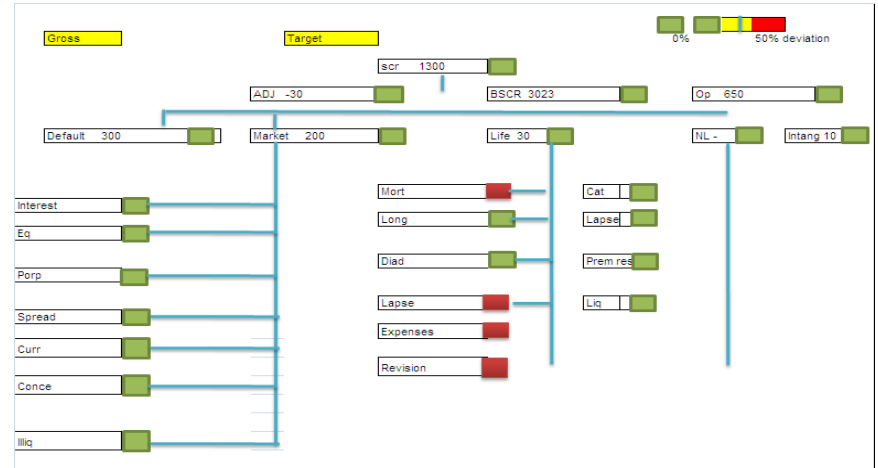


# Executive Reports

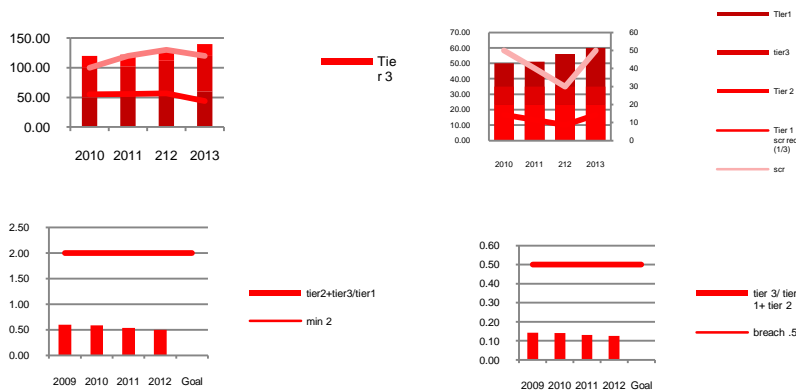
## Key Indicators



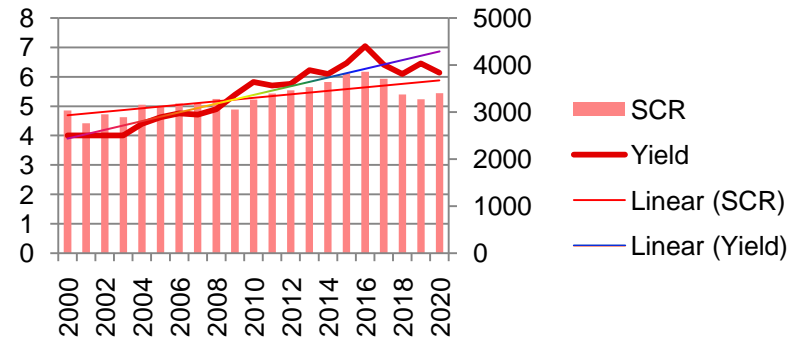
## SCR Decomposition



## SCR Minimum Values



## SCR Development





# **QRT/SFCR/RSR Reporting**

# SII Report Types

## QRT

Quantitative  
Reporting  
Templates

- Frequency – Quarterly/Annual
- Information – Qualitative
- Stakeholders – Public
- Scope – Part of SFCR and RSR

## SCFR

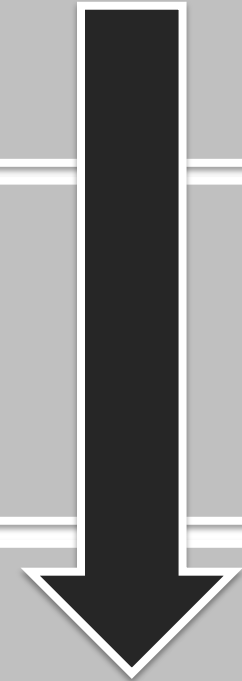
Solvency &  
Financial Condition  
Report

- Frequency – Annual
- Information – Qualitative & Quantitative
- Stakeholders – Public
- Scope – Solo & Group

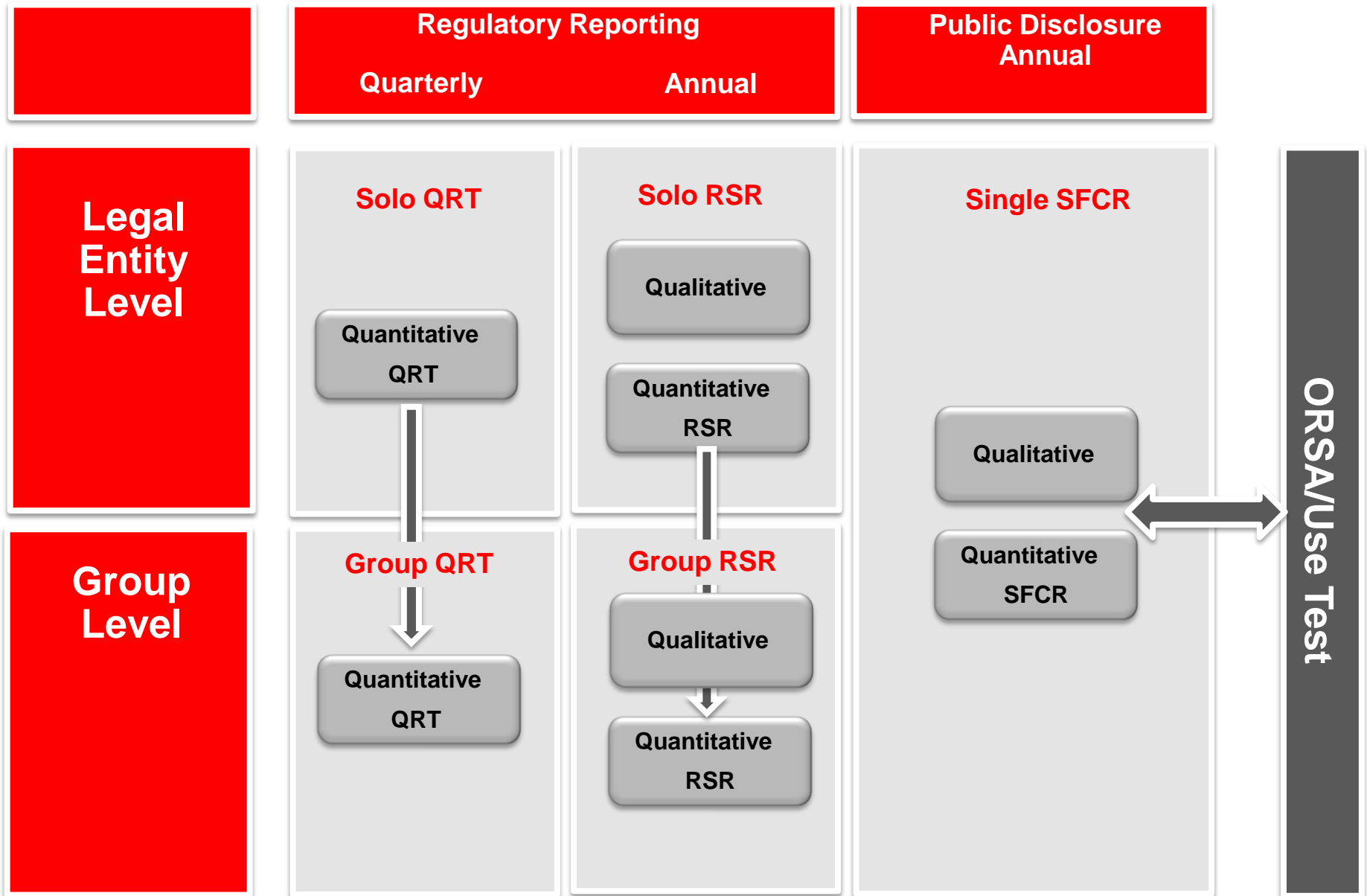
## RSR

Regular Supervisor  
Report

- Frequency – Annual
- Information – Qualitative & Quantitative
- Stakeholders – Regulators
- Scope – Solo & Group
- Additional - Greater level of detail / confidential disclosures

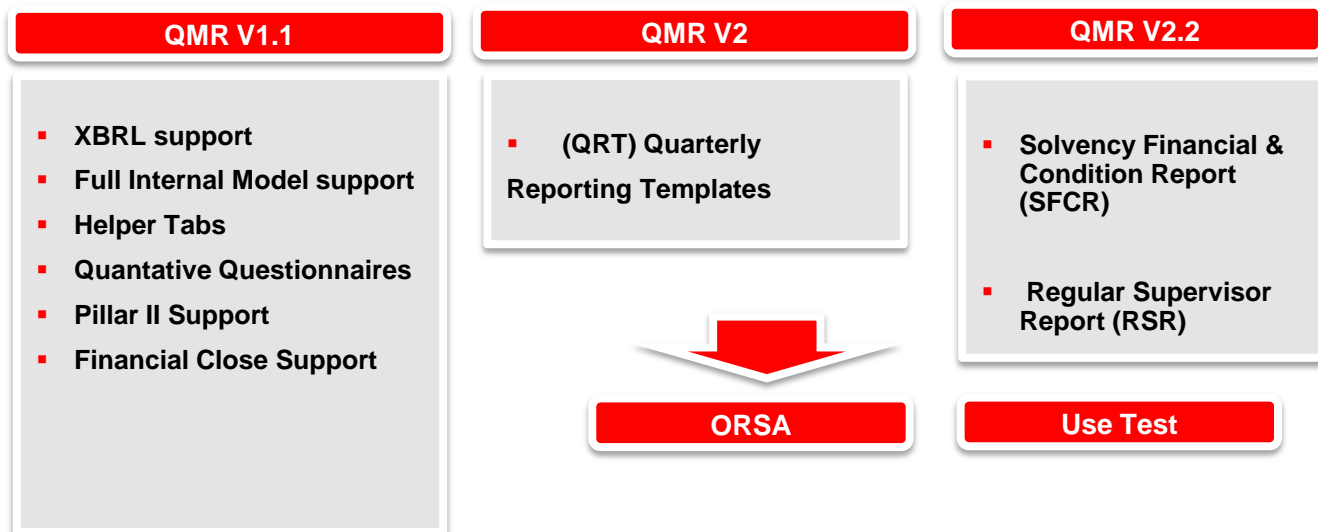


# Reporting Cycles



# QRTs – Proposed Structure

- Quantitative Reporting Templates will be the cornerstone of the future SII reporting regime for insurers
- Current expectations are that the QRTs will comprise multiple templates:
  - Group Specific Templates (15 Forms)
  - Balance Sheet (3 Forms)
  - Assets (7 Forms)
  - Technical Provisions (15 Forms)
  - Reinsurance (4 Forms)
  - Capital Requirements (12 Forms)
  - Own Funds (2 Forms)
  - Variation Analysis & Miscellaneous (3 Forms)



# EIOPA QRT Templates

Template	Content	S	G	QS	IAG	DS	DG
BS - C1	Balance sheet	X	X	Tbd	Tbd	X	X
BS - C1B	Off-balance sheet items	X	X	X	X	X	X
BS - C1D	Assets and liabilities by currency	X	X				
OF - B1A	Own funds - Annual	X	X			X	X
OF - B1Q	Own funds - Quarterly	X	X	X	X		
SCR - B2A	Solvency capital requirement (for undertaking on standard formula or partial internal model)						
SCR - B2B	Solvency capital requirement (for undertakings on partial internal models)	X	X			X	X
SCR - B2C	Solvency capital requirement (for undertaking on full internal models)						
SCR - B3A	Solvency capital requirement - market risk	X	X				
SCR - B3B	Solvency capital requirement - counterparty risk <sup>5</sup>	X	X				
SCR - B3C	Solvency capital requirement - life underwriting risk <sup>5</sup>	X	X				
SCR - B3D	Solvency capital requirement - health underwriting risk <sup>5</sup>	X	X				
SCR - B3E	Solvency capital requirement - non-life underwriting risk <sup>5</sup>	X	X				
SCR - B3F	Solvency capital requirement - non-life catastrophe risk <sup>5</sup>	X	X				
SCR - B3G	Solvency capital requirement - operational risk <sup>5</sup>	X	X				
MCR - B4A	Minimum capital requirement (except for composite undertakings)	X		X		X	
MCR - B4B	Minimum capital requirement (for composite insurance undertakings)						



# Cash Flows & Risk Factors

Projection of future cash flows (Best Estimate - Life)

Year projection of undiscounted expected cash-flows)	Insurance with profit participation					Unit-linked					Other life insurance					Annuities stemming from non-life contracts					Accepted reinsurance					Health SLT																																																																									
	Gross Cash out-flows		Cash in-flows			Gross Cash out-flows		Cash in-flows			Gross Cash out-flows		Cash in-flows			Gross Cash out-flows		Cash in-flows			Gross Cash out-flows		Cash in-flows			Gross Cash out-flows		Cash in-flows																																																																							
	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance	Future Benefits	Future expenses and other cash out-flows	Future premiums	Other cash in-flows	Recoverable from reinsurance																																																																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
A1	C1	D1	F1	G1	AU1	CU1	DU1	FU1	GU1	I1	J1	K1	L1	LU1	M1	N1	O1	P1	PU1	Q1	R1	S1	T1	TU1	U1	CH1	DH1	FH1	GH1																																																																						

## Solvency Capital Requirement - Market risk

### Market risk - Basic information

Initial absolute values before shock		Absolute values after shock					
Assets	Liabilities	Assets	Liabilities (including the loss absorbing capacity of technical provisions)	Net solvency capital requirement (including the loss-absorbing capacity of technical provisions)	Liabilities	Gross solvency capital requirement	
A1	A1A	B1	B1A	C0	B1B	D0	
A2	A2A	B2	B2A	C1	B2B	D1	
A3	A3A	B3	B3A	C2	B3B	D2	
A4	A4A	B4	B4A	C3	B4B	D3	
A5		B5		C4		D4	
A6		B6					
A7	A7A	B7	B7A	C7	B7B	D7	
A8		B8					
A9		B9					
A10	A10A	B10	B10A	C10	B10B	D10	
A11	A11A	B11	B11A	C11	B11B	D11	
A12	A12A	B12	B12A	C12	B12B	D12	
A13	A13A	B13	B13A	C13	B13B	D13	
A14	A14A	B14	B14A	C14	B14B	D14	

### Interest rate risk

interest rate down shock  
interest rate up shock

### Equity risk

global category  
global equity  
strategic participations (global category)  
other category  
other equity  
strategic participations (other category)  
duration-based equity risk (art. 304)

### Property risk

### Spread risk

bonds  
credit derivatives

# QRT Templates

(Re)insurance Solo requirements

To be filled by the group supervisor

If Solvency II rules have been used (EEA entities and non EEA entities included via D&A using SII rules)													Data for non EEA entities in all cases				
Legal name of the entity	Solo SCR	Solo MCR	Eligible Solo Own Funds	Standard Formula used			Group or solo Internal Model Used			Solo Capital Add-On			First level of capital requirement (equivalent of SCR) as laid down by the 3rd country concerned	Final intervention point (equivalent of MCR) as laid down by the 3rd country concerned	Eligible own funds as laid down by the 3rd country concerned	Decision on equivalence	
				if undertaking specific parameters used specify where	if Simplifications used specify where	if Partial Internal Model used specify where	Group or solo internal model	Date of initial approval	Date of approval of latest major change	Date of decision	Amount	Reason				Decision has been taken by EC or Group Supervisor?	Date of the decision
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1

Figures in the Solo Balance Sheet (with IGT) - in the currency used for group calculation																						Y1	Z1
Name of the undertaking	Solo Currency	Technical Provisions - Non-Life (excluding Health)				Technical Provisions - Health (similar to non-life)				Technical Provisions - Health (similar to life)				Technical Provisions - Life (excluding health and unit-linked)				Technical Provisions - Unit-Linked funds				Contribution in the Group Balance Sheet (without IGT)	
		Solo Gross BE and TP calculated as a whole	Reinsurance recoverables from entities within the group	Reinsurance recoverables from entities outside the group	Solo Risk Margin	Solo Gross BE and TP calculated as a whole	Reinsurance recoverables from entities within the group	Reinsurance recoverables from entities outside the group	Solo Risk Margin	Solo Gross BE and TP calculated as a whole	Reinsurance recoverables from entities within the group	Reinsurance recoverables from entities outside the group	Solo Risk Margin	Solo Gross BE and TP calculated as a whole	Reinsurance recoverables from entities within the group	Reinsurance recoverables from entities outside the group	Solo Risk Margin	Solo Gross BE and TP calculated as a whole	Reinsurance recoverables from entities within the group	Reinsurance recoverables from entities outside the group	Solo Risk Margin	Contribution to Group BE/TP calculated as a whole	Contribution to Group Risk Margin
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1	W1	X1