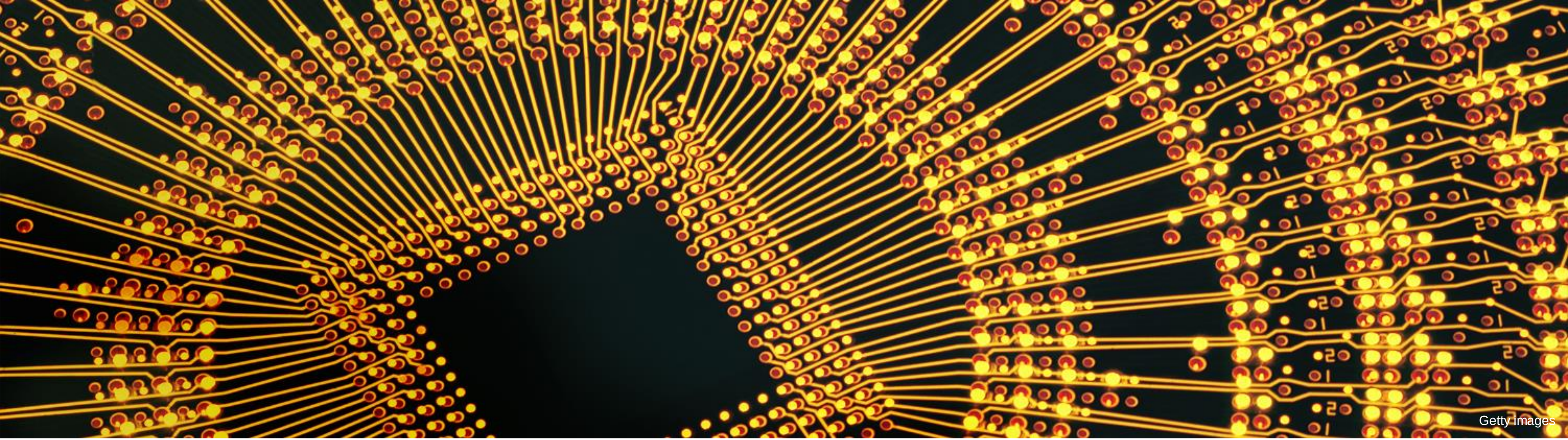

Monte Carlo 2017

Fit for a game change

Monte Carlo, 10 September 2017

Torsten Jeworrek, Thomas Blunck

Munich RE

Agenda

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1. Munich Re strategy
   Torsten Jeworrek
2. Global reinsurance landscape
   Torsten Jeworrek
3. Insurance gap
   Flood insurance
   New solutions for governments
   Torsten Jeworrek
4. Financially motivated solutions
   Thomas Blunck
5. Expanding the boundaries of insurability
   New coverages
   Thomas Blunck

Fit for a game change

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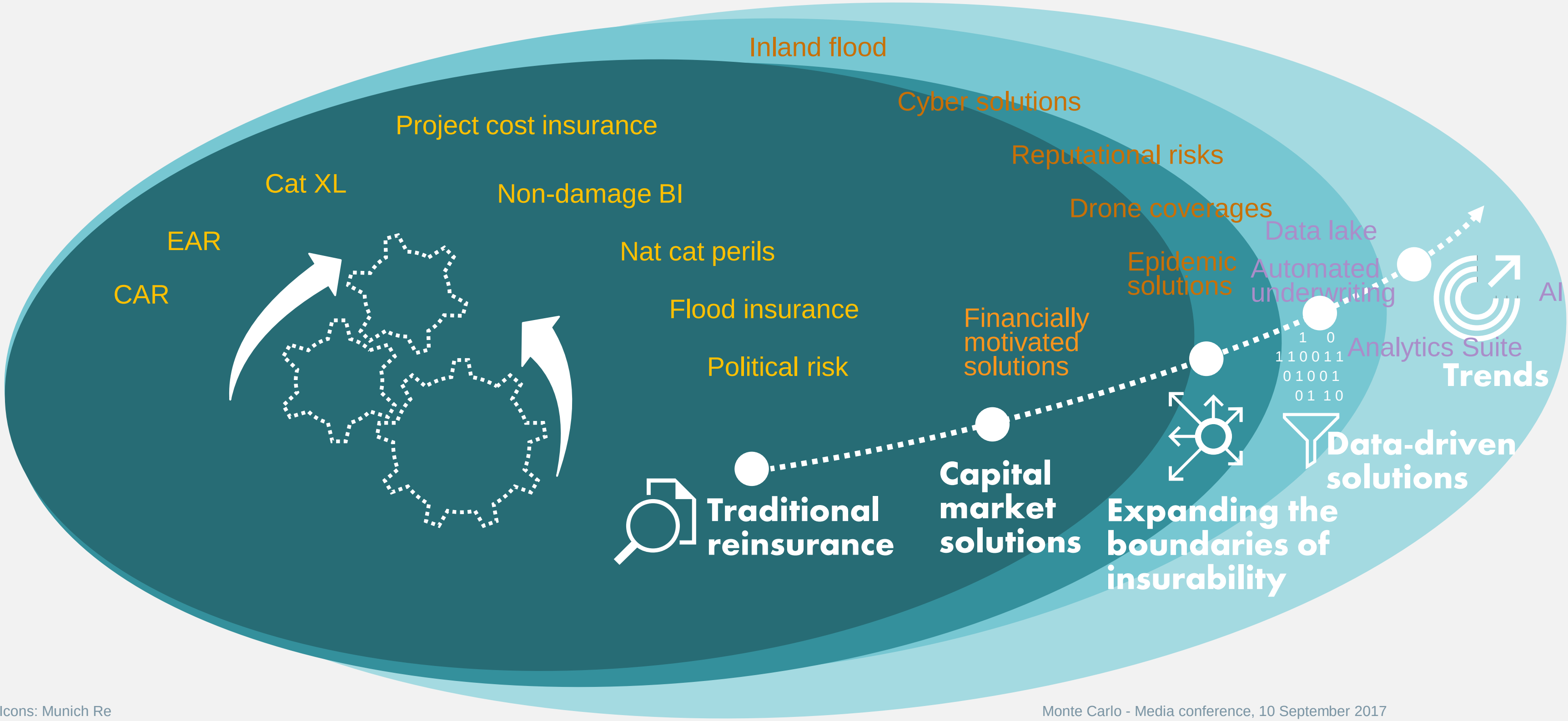
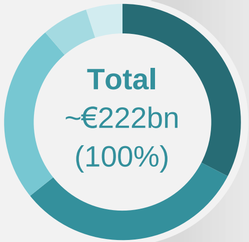


Icons: Munich Re

Moderate reinsurance premium growth expected until 2019, slightly stronger growth in primary insurance

Global premium development from 2010–2016/2017e–2019e

P-C RI: Ceded premiums 2016 €bn



Europe	€72bn	33%
North America	€70bn	31%
Asia Pacific	€54bn	24%
Latin America	€14bn	7%
Africa/Middle East	€11bn	5%

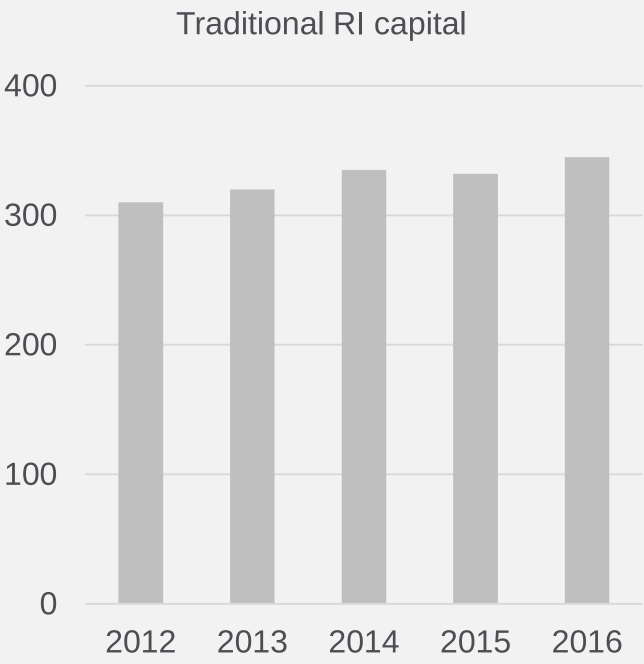
P-C RI and PI real growth rates (CAGR)

	RI		PI	
	10–16	17–19	10–16	17–19
Europe	1%	1%	0%	2%
North America	3%	0.5%	2%	1%
Asia Pacific	5%	2%	6%	4%
Latin America	5%	3%	5%	3%
Africa/Middle East	2%	4%	3%	5%
Total	3%	1%	2%	2%

Source: Munich Re Economic Research

Traditional reinsurance capital stable overall
ART outstanding covers growing

Dedicated reinsurance capital US$ bn



Trends

Traditional capacity

- Capital base of the reinsurance industry stable overall over the last 3 years
- Many reinsurers use dividend payments and share buy-backs to manage their capital more actively

ART

- Alternative capital grew from US$ 72bn in 2015 to approx. US$ 81bn in 2016

Existing tradeable instruments (ILS/ILW)

- Record issuance of ~US$ 9bn in H1/2017, including renewals and new sponsors
- First move towards non-standard solutions in the ILS area with the Pandemic Emergency Facility by World Bank

Illiquid structures

- Illiquid, (partially) collateralised ART structures (collateralised reinsurance, sidecars and retro) represent ~70% of the market
- Munich Re with established sidecar programme well positioned to utilise this market

Source: AM Best, Guy Carpenter, Aon Benfield, Munich Re

Global threats call for new insurance coverage to mitigate risk potentials

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- Exchange-rate fluctuation
- Loss of intellectual property/data
- Workforce shortage
- Pension scheme funding
- Technology failure/ system failure
- Capital availability/ credit risk
- Share price volatility
- Growing burden and consequences of governance/compliance
- Accelerated rates of change in market factors and geopolitical risk environment
- Political risk/uncertainties
- Failure to innovate/ meet customer needs
- Interest-rate fluctuation
- Kidnap and ransom/extortion
- Damage to reputation/brand
- Product recall
- Environmental risk
- Disruptive technologies/innovation
- Terrorism/sabotage
- Increasing competition
- Outsourcing
- Cash flow/ liquidity risk
- Lack of technology infrastructure to support business needs
- Economic slowdown/ slow recovery
- Third-party liability (incl. E&O)
- Resource allocation
- Injury to workers
- Inadequate succession planning
- Counterparty credit risk
- **Weather/natural disasters**
- Business interruption
- Concentration risk (product, people, geography
- Failure to react or retain top talent
- Failure of disaster recovery plan/ business continuity plan
- Unethical behaviour
- Absenteeism
- Sovereign debt
- **Social media**
- Pandemic risk/ health crisis
- Property damage
- Distribution or supply chain failure
- Commodity price risk
- Cyber crime/hacking/ viruses/malicious codes
- Harassment/discrimination
- Climate change
- Crime/theft/fraud/ employee dishonesty
- Natural resource scarcity/ availability of raw materials
- Regulatory/ legislative changes
- Aging workforce and related health issues
- Corporate social responsibility/sustainability
- Directors & officers personal liability
- Failure to implement or communicate strategy
- Major project failure
- Globalisation/emerging markets
- Merger/acquisition/restructuring
- Asset value volatility

Partially insurable | Uninsurable | Insurable

Tag cloud based on Aon Global Risk Management Survey 2017; Munich Re weighting

Protection gap still very large after nat cat events

Loss events worldwide 1980–2016

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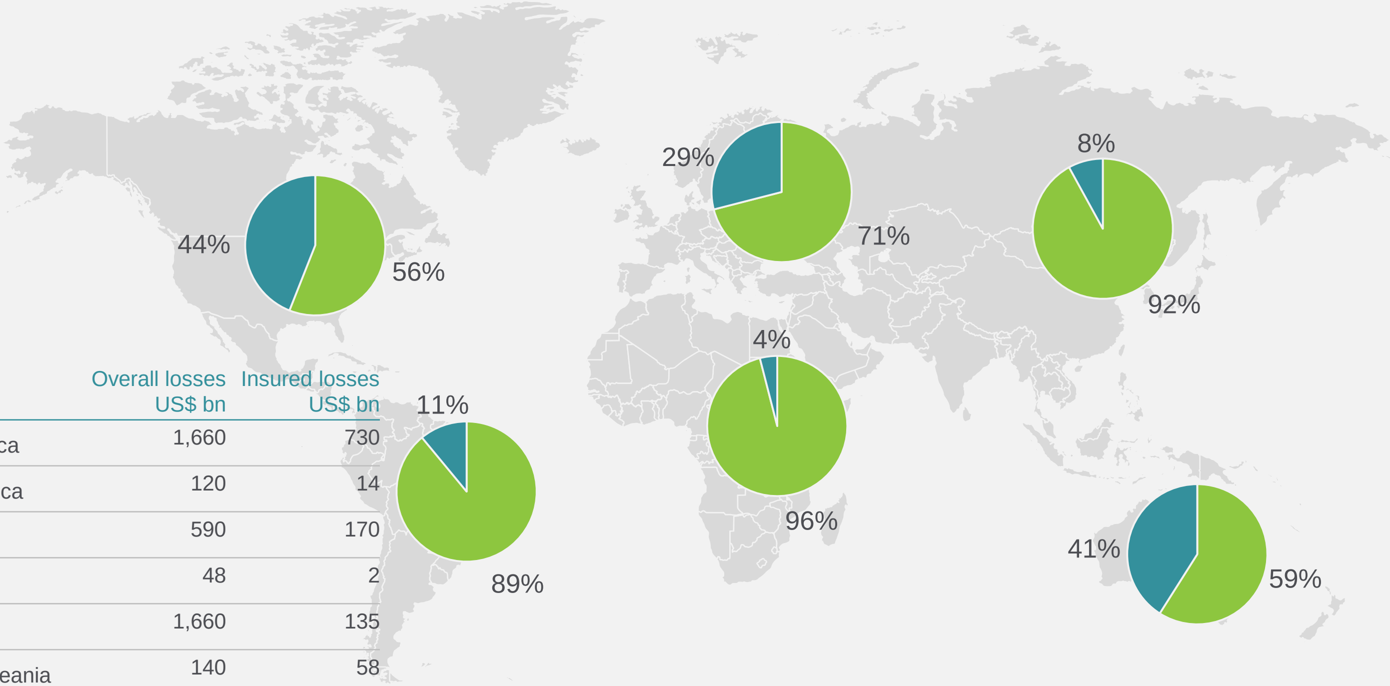

Losses per continent as percentage of overall losses

- Uninsured loss share
- Insured loss share

Continent	Overall losses US$ bn	Insured losses US$ bn
North America	1,660	730
South America	120	14
Europe	590	170
Africa	48	2
Asia	1,660	135
Australia/Oceania	140	58

(Losses in values at 2016)

Inflation-adjusted via country-specific consumer price index and consideration of exchange-rate fluctuations between local currency and US$

http://natcatservice.munichre.com/
Source: Munich Re, NatCatSERVICE, 2017

Hurricane Harvey with extraordinary precipitation

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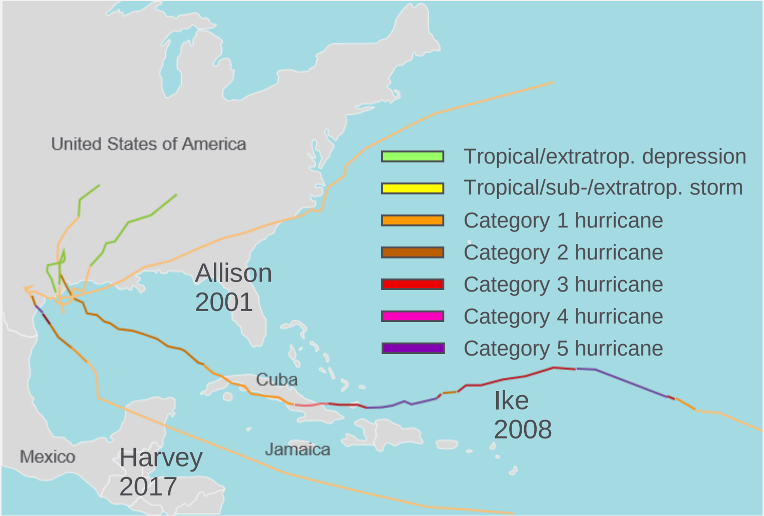
- 1st landfall of a major hurricane (Cat4 at landfall) on US mainland since 2005 (Wilma)
- Due to blocking system of high pressure systems over the North American continent Harvey stuck in the Houston area for 6 days, with continuous connection to warm gulf water
- Precipitation of up to 1,300 mm set new record for Texas and is close to all time record for US set by a hurricane in Hawaii in 1950
- Slightly above-average Atlantic hurricane activity until the end of the year expected due to neutral ENSO conditions (natural climate cycle) and above-average sea surface temperatures in relevant regions

Atlantic Hurricane Storm Tracks



Hurricane Harvey is primarily a flood event – loss assessment is complex

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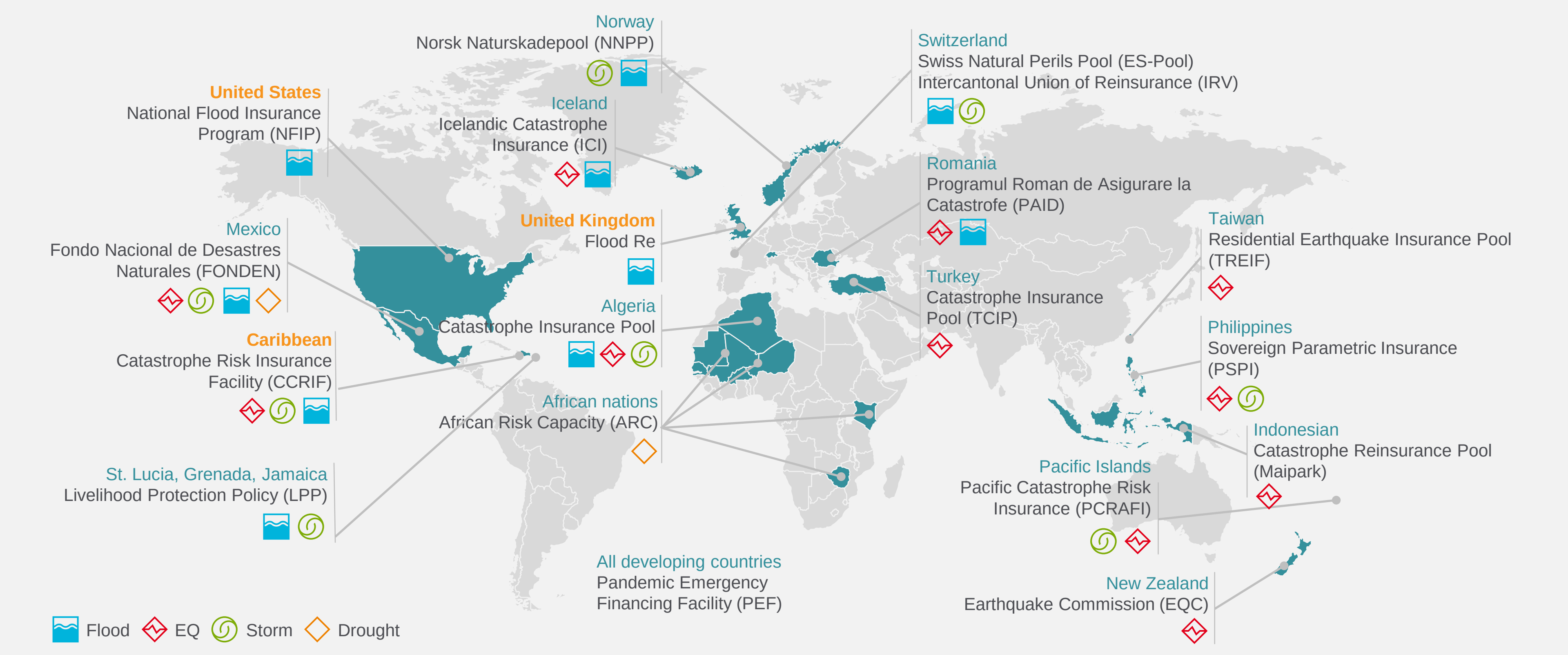
- Hurricane Harvey is primarily a flood event
- Commercial and industrial risks, especially oil and petrochemical industry:
  - Wind and flood damage usually covered, often sub-limited
  - Potential business interruption losses
- Homeowners and renters policies do not generally cover flood damage, coverage can be purchased through NFIP
- Small portion of NFIP is reinsured, Munich Re America is one of the reinsurers
- Loss assessment complex, it will take long time for necessary estimates leaving high uncertainty in the market
- Too early for reliable loss estimate, regarding Munich Re well in accordance with risk appetite and strategy

How to close the insurance gap?

Examples of sovereign and public-private nat cat risk transfer schemes



Continued significant insurance gap, even in developed countries
More nat cat and sovereign risk transfer solutions for emerging countries

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	Flood Re, UK	NFIP, US	Caribbean Catastrophe Risk Insurance Facility
Demand	Maintain flood insurance for home owners in the UK	Affordable insurance for property owners	Timely emergency response to reduce the economic and humanitarian impact of quakes and hurricanes
Solution	Not-for-profit scheme funded by insurers, publicly accountable	Encourages communities to adopt and enforce floodplain management regulations	First multi-country risk pool in the world, and first insurance instrument to develop parametric policies backed by traditional and capital markets
Stakeholder benefit	UK government does not have to commit funds to the set-up of Flood Re or to pay claims	Reinsurance treaty contributes to NFIP with risk expertise and more insurance coverage options, thus promotes flood protection, and reinforces basis for improved risk management	Avoids amplification of economic and humanitarian loss due to belated emergency response, and protects public budgets

Cooperation with public institutions to enable private insurance coverage

More solutions for governments in emerging countries

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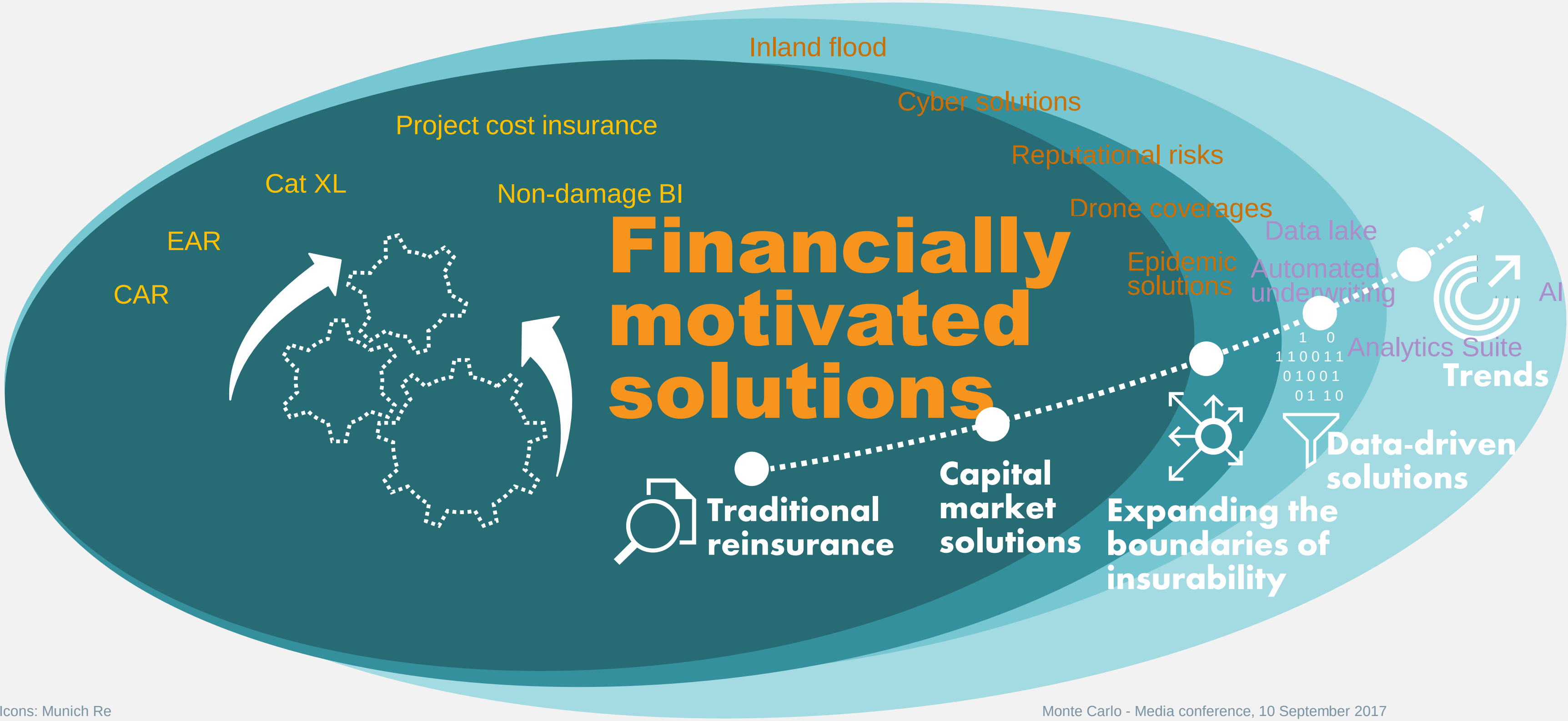
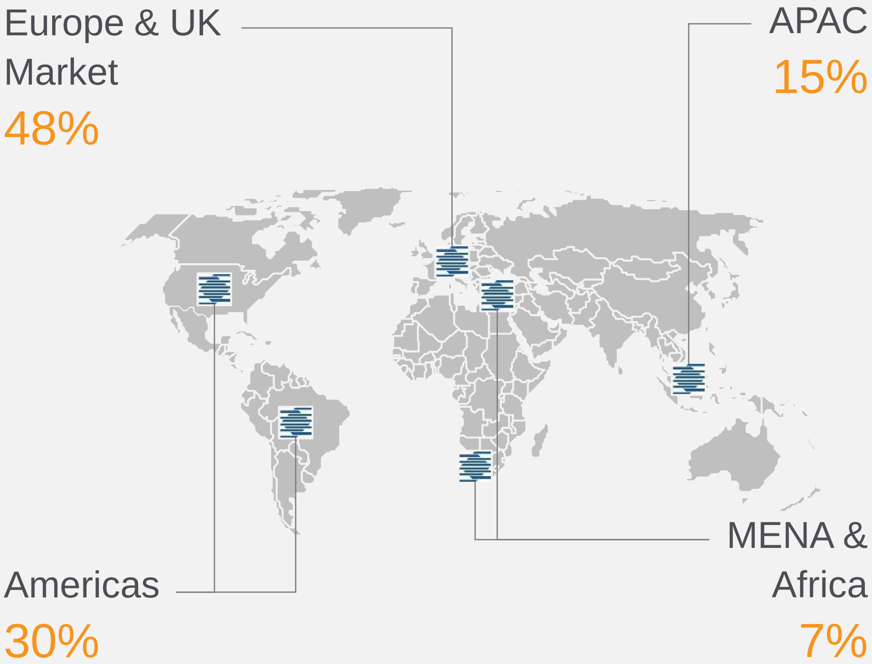


Icons: Munich Re

Market environment and changing needs of clients drive financially motivated reinsurance worldwide

Deal experience 2015–2017: Overview of non-life inquiries



- Increasing demand for financially motivated reinsurance and capital market solutions
  - Close to 400 inquiries have been evaluated over the last two years
  - Close to 60 transactions have been closed
- The inquiries are coming from all over the world, but with different regional patterns
- Not only insurance companies, but also captives, the public sector, and the run-off sector are target segments

In addition to risk transfer we support our clients to achieve their financial KPI’s and enable growth

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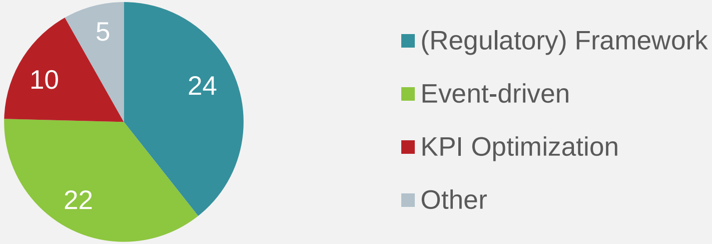
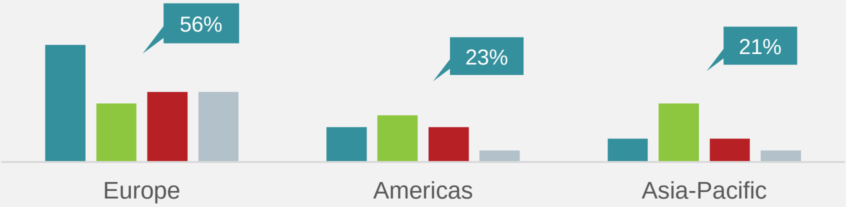
Deal experience 2015–2017

Closed Transactions



Currently Active Opportunities



Outlook

Increasing focus on reinsurance deals motivated by corporate finance objectives

Examples

Large insurance companies	**Relief of capital** for, e.g., dividend payouts and **capital optimization**
Regional insurance companies	**Improve capital allocation** geared towards capital relief for, e.g., future growth
Captives	**Manage volatility** in the light of earnings expectations and solvency needs
Public sector	Availability of **capacity and liquidity** after an event
Run-off providers	**Capital efficiency** for financing transfers of portfolios

Explore, transact and scale by expanding beyond core → adding value for our clients

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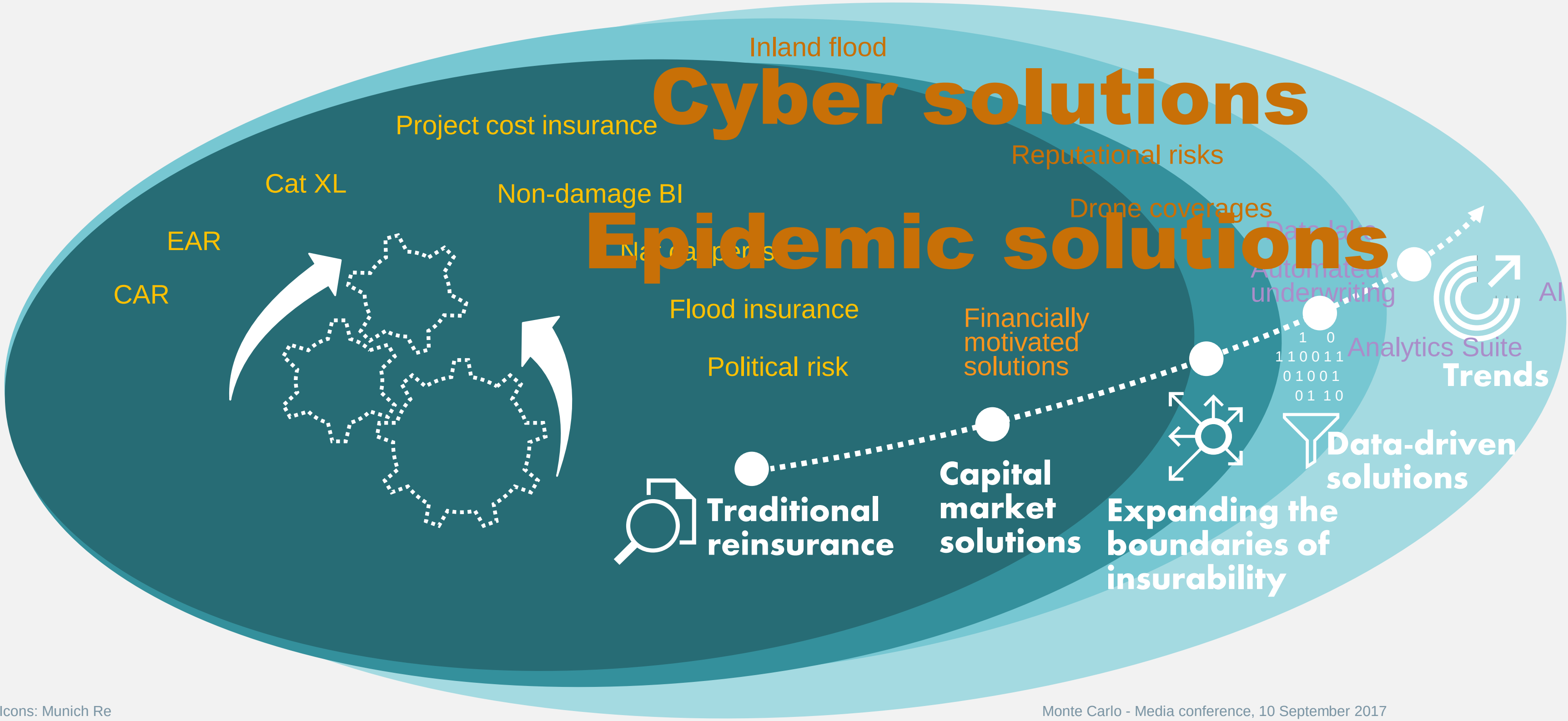

Strong long-term growth in cyber (re)insurance expected

Munich Re with cutting-edge experience and market presence

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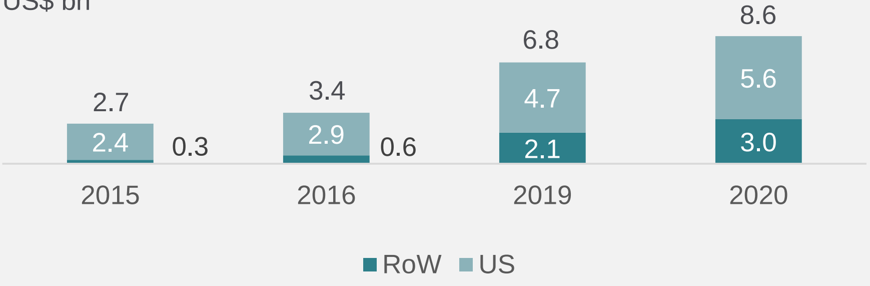
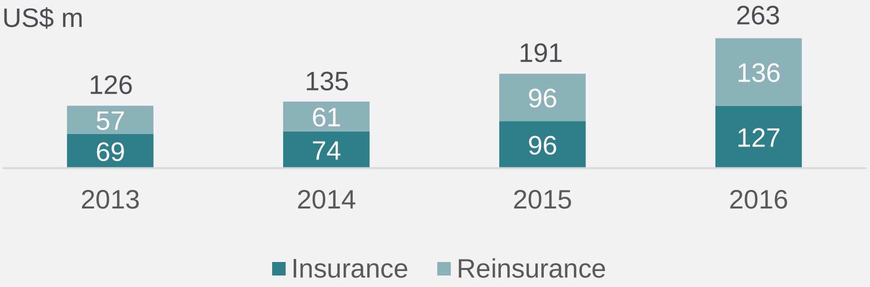
GWP global cyber insurance market[1]

US$ bn



GWP Munich Re cyber portfolio

US$ m



- Trends
  - Increasing awareness of cyber risks: recent cyber attacks (WannaCry, Petya)
  - Growing demand in Europe - but also worldwide – gaining pace due to change in legislation (GDPR)
  - Increasing exposure driven by integration (IoT) and complexity in supply chains; not only financial and service sector is seeking cyber protection, but also industrial sector
- High demand for expertise due to the nature of the business
  - Complexity (e.g. very specific per industry)
  - Dynamic risk (high risk of change, importance of in-depth understanding of risk)

1 Estimates based on different external sources (Marsh & McLennan, Barbican Insurance, Allianz).

Munich Re's cyber business strategy
Risk-taking and comprehensive service model

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Our value added in cyber insurance – Where can we offer support

Primary insurance

Traditional RI

Traditional risk-taking approach

&

Risk assessment/ Loss mitigation ⇄ Insurance policy ⇄ Post-loss service and recovery

Service and fee-based approach

- Risk assessment
- Risk mitigation
- Risk transfer
- Recovery
- Resilience

▶ Cyber ecosystem partnerships and access to tech world (software/hardware) are the foundation for augmenting our understanding of the risk

Course and severity of an epidemic outbreak can be influenced while it is ongoing – Pandemic Emergency Financing Facility

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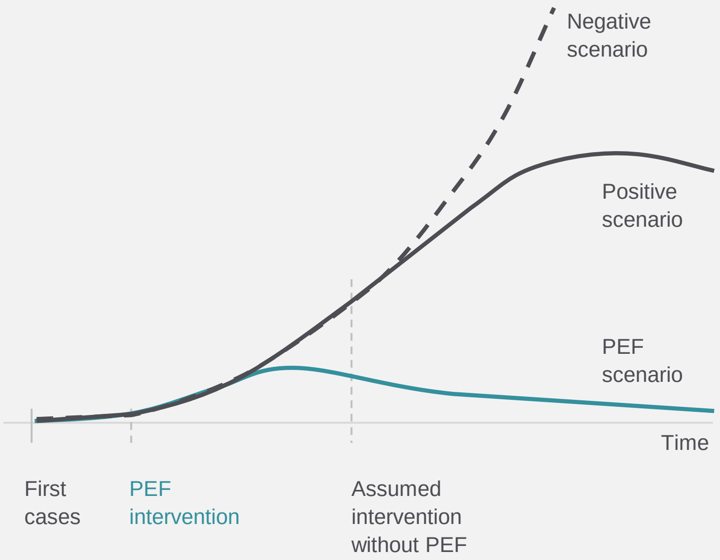
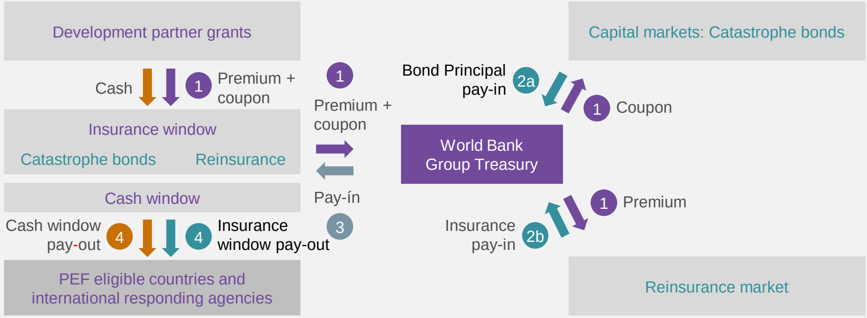
Casualties in the event of an epidemic (illustrative)



Financing mechanisms



1 Donors make yearly payment to PEF to buy the insurance coverage. The payment is passed on to risk takers.

2 IBRD[1]
(a) Issues bonds in the capital markets or (b) concludes an insurance contract.

3 An outbreak happens, which activates the pre-agreed activation criteria. The money is passed on to the PEF.

4 4 PEF disburses the funds for the response action to various agencies or directly to the affected country.

Relevant experience gained can be transferred to other transactions

1 International Bank For Reconstruction

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