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GIS in Reinsurance: Estimation of Losses due to Natural Hazards

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Agenda

1. Exposure Management of a (Re)insurance Operation
2. PRECED Architecture and Network
3. Underwriting Process
4. Exposure Recording & Visualization
5. Exposure Control
6. Portfolio Analysis
7. Event Loss Estimation
8. Geographic Underwriting
9. Conclusions

Exposure Management of a (Re)insurance Operation

- **Exposure Analysis and Limitation is a key element in the insurance and reinsurance industry.**
- **Windstorm and Earthquake exposure is considered to be most critical**

⇨ Insured Market Losses:

Hurricane Andrew: USD 20‘900Mio

Northridge Earthquake: USD 17‘300Mio

- **Flood , Hail, Tornados and major man made perils such as Terrorism, Nuclear, Asbestosis, Nanotechnology etc. are also challenging the (re)insurance industry.**

⇨ Insured Market Losses:

European Floods 2002: USD 2‘500Mio

Terrorist Attacks Sept 2001: USD 21‘000Mio – excl. Liability and Life

Problem: Data availability, reliability and geographic resolution in most parts of the world is still insufficient!!!

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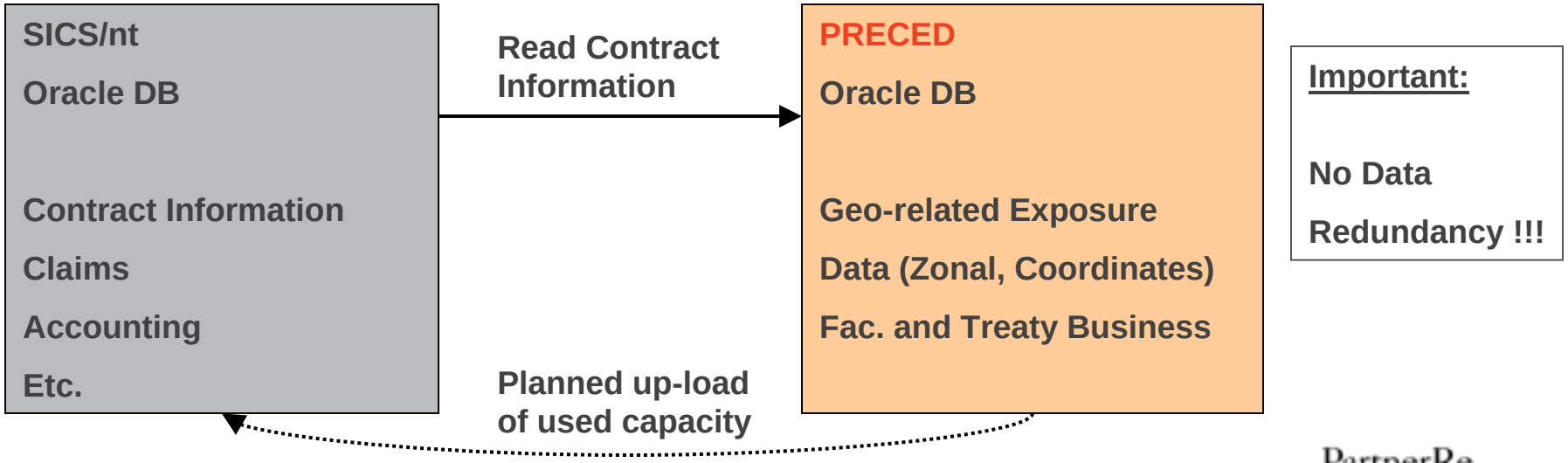
Exposure Management of a (Re)insurance Operation

In the year 2000 Partner Re in co-operation with Ernst Basler & Partners decided to develop a geographic information system which should be accessible for all underwriters of the company (Idea: Geographic Underwriting).

A centralized data base – PRECED – recording all actual and historical geo-related information was developed.



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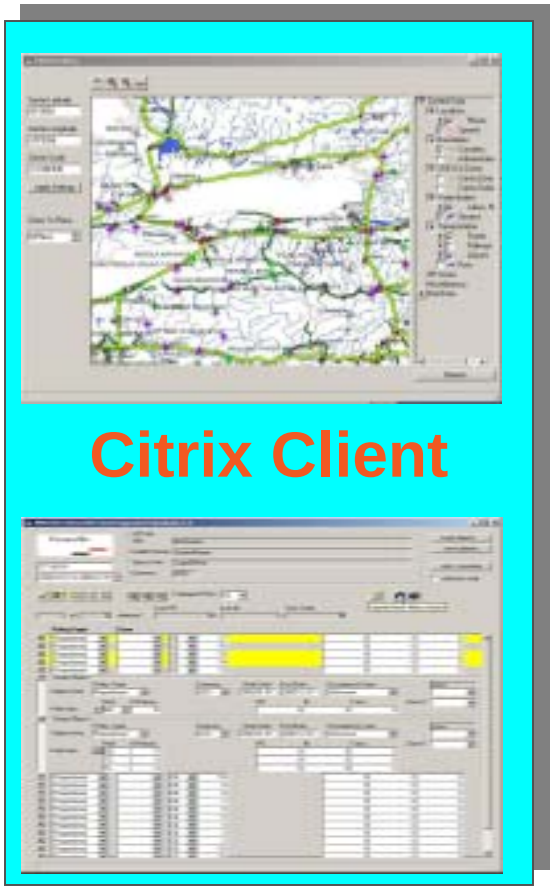
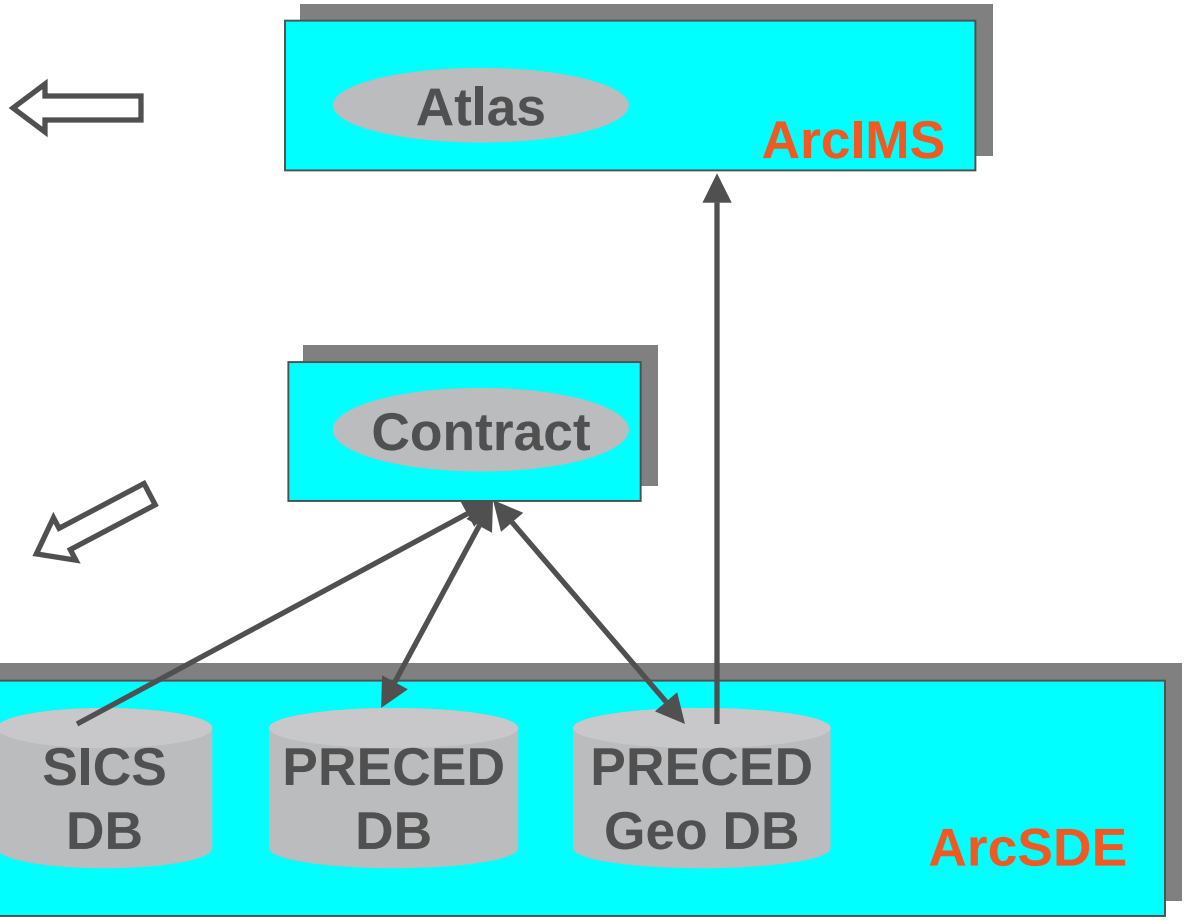
PRECED - Architecture





Oracle Unix Server in Bern

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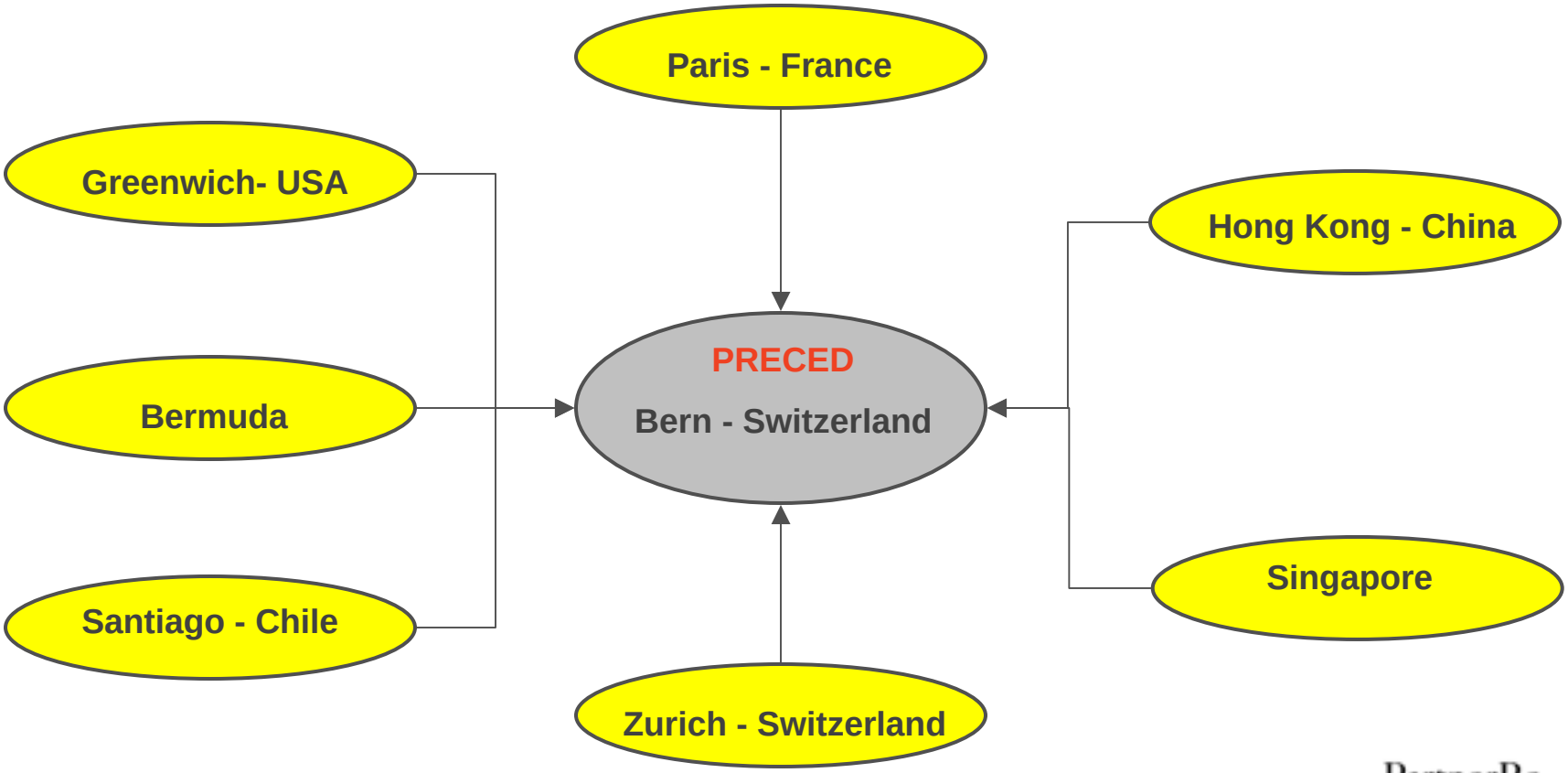
PRECED – Citrix Network



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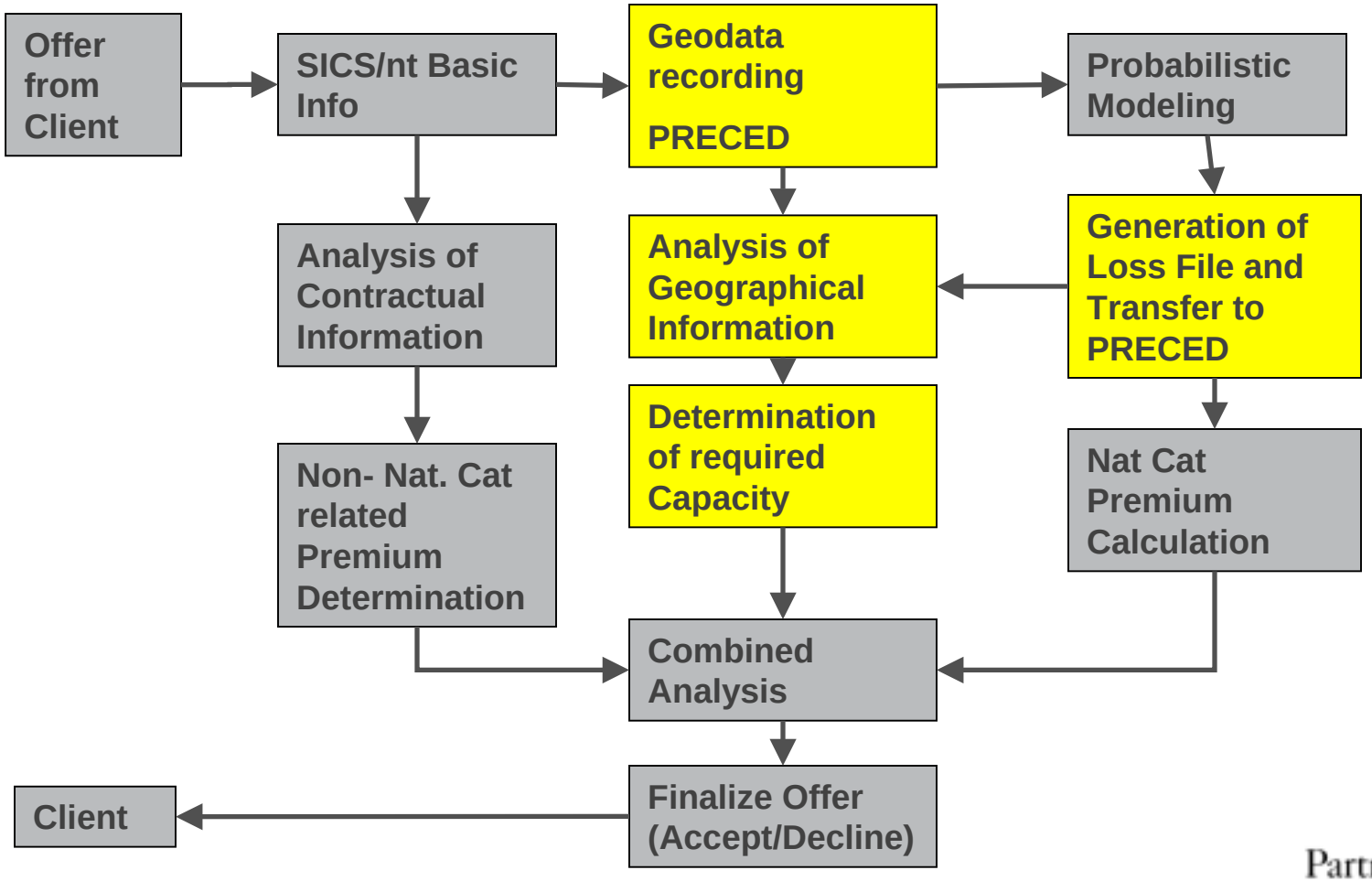
Underwriting Process



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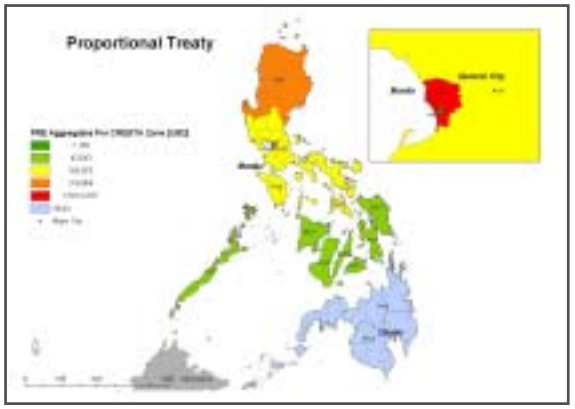
Exposure Recording & Visualization

a) Treaty Exposure – Aggregated Data (Cresta, Unicede)



b) Treaty Exposure – Detailed Data (Policy / Location Level)

Raw Data

⇩

Convert to Partner Re Standard Format ⇨ **Data Transfer To PRECED** ⇨

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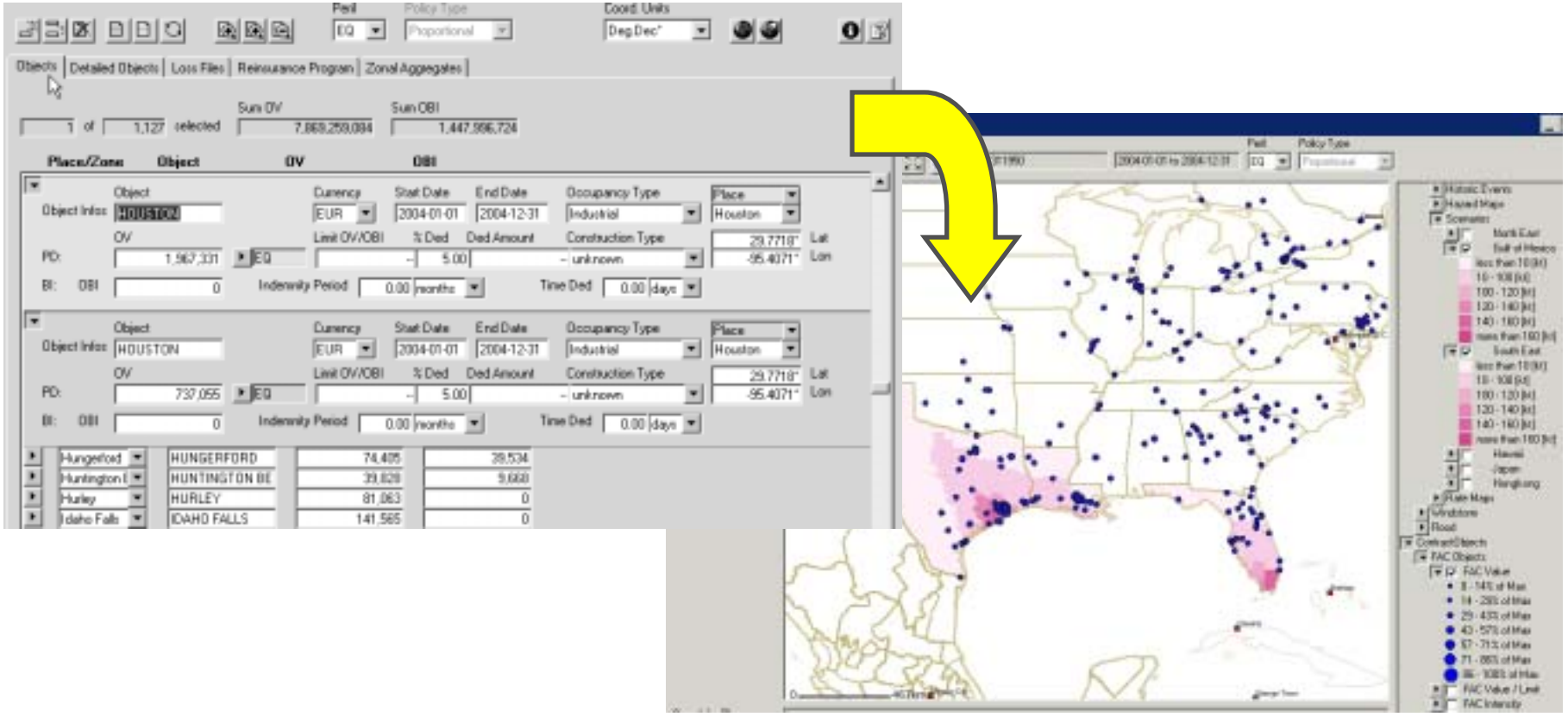
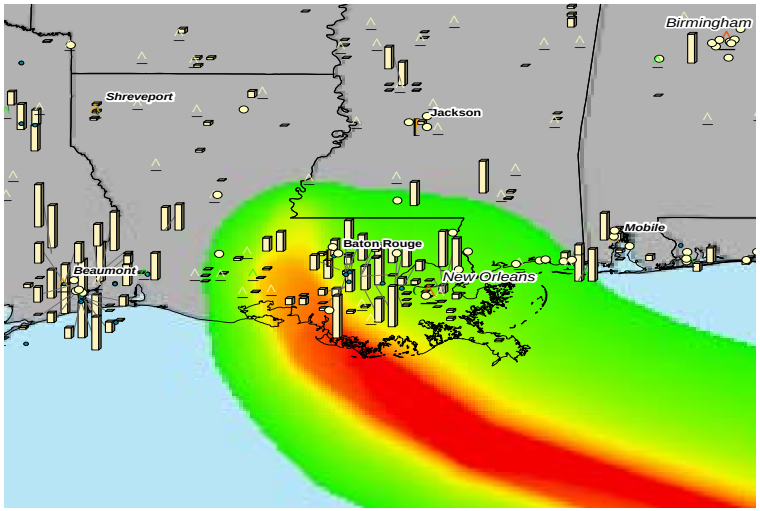
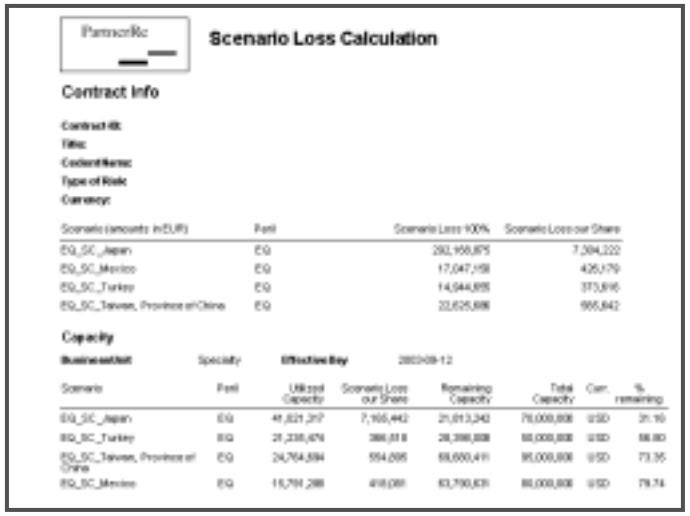
Exposure Recording & Visualization (2)

c) Facultative Business Exposure



Exposure Limitation per Business Unit and Peril Zone





Scenario Loss Calculation

Contract Info

Capacity

Partner Re allocates to each Business Unit a certain amount of capacity per peril zone. Capacity usage is controled by using a scenario approach.

Centralized Exposure Control in SICS/nt

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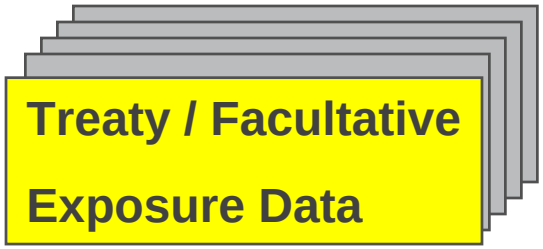
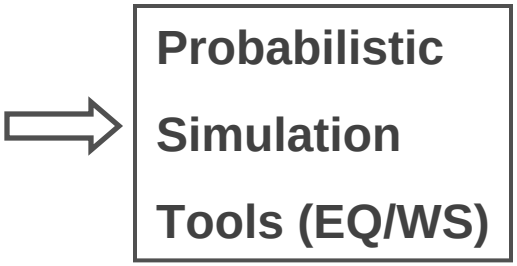
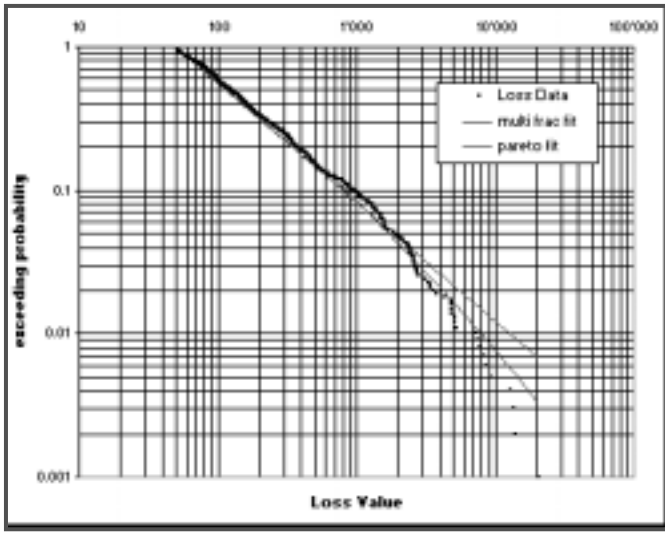
Portfolio Analysis

- Determination of capital requirement and allocation to Business Units
- Profitability analysis (ROE – Return on Equity)
- Verification of deterministic scenarios
- Information to be provided to rating agencies (S&P, Moody‘s..)







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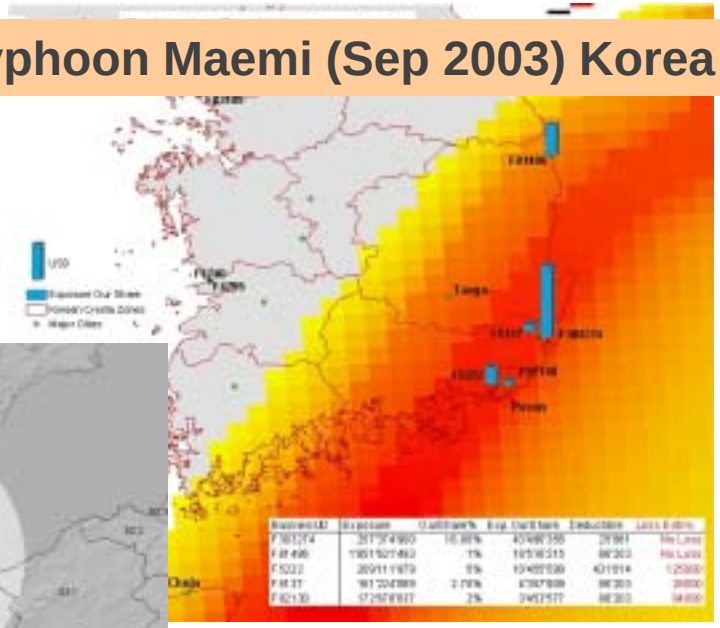
Event Loss Estimation

- Fast and reliable post-event information to the Board of Directors and Executive Management
- Accurate and timely information to investors and media

Bushfires California (Nov 2003)

Typhoon Maemi (Sep 2003) Korea



Earthquake Al Hoceima Morocco (Feb 2004)

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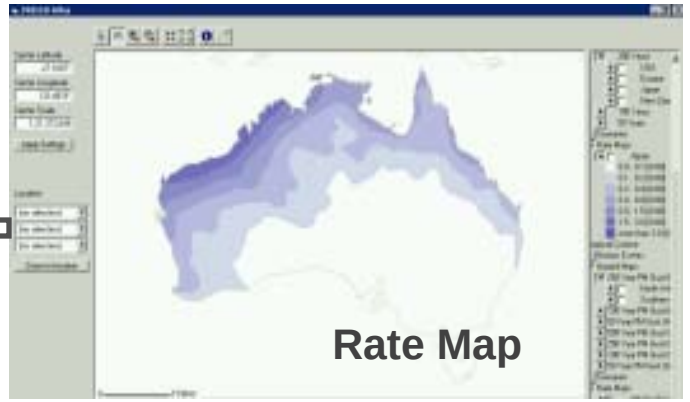
Hazard – and Rate Maps: Geographic Underwriting

Earthquake

Premium Calculation

PML Calculation

Windstorm



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Conclusions

Partner Re has realized how important GIS Tools are for the insurance and reinsurance industry

PRECED is used by all underwriting units and therefore enables enterprise wide exposure management and offers steering and control opportunities to achieve strategic decisions.

With PRECED

- **the pricing consistency has been improved**
- **the determination of capital requirement is State of the Art**
- **the catastrophe capacity is utilized more efficiently**
- **the post event loss estimation is faster and more accurate**