

# Risk Scenario Analyzer



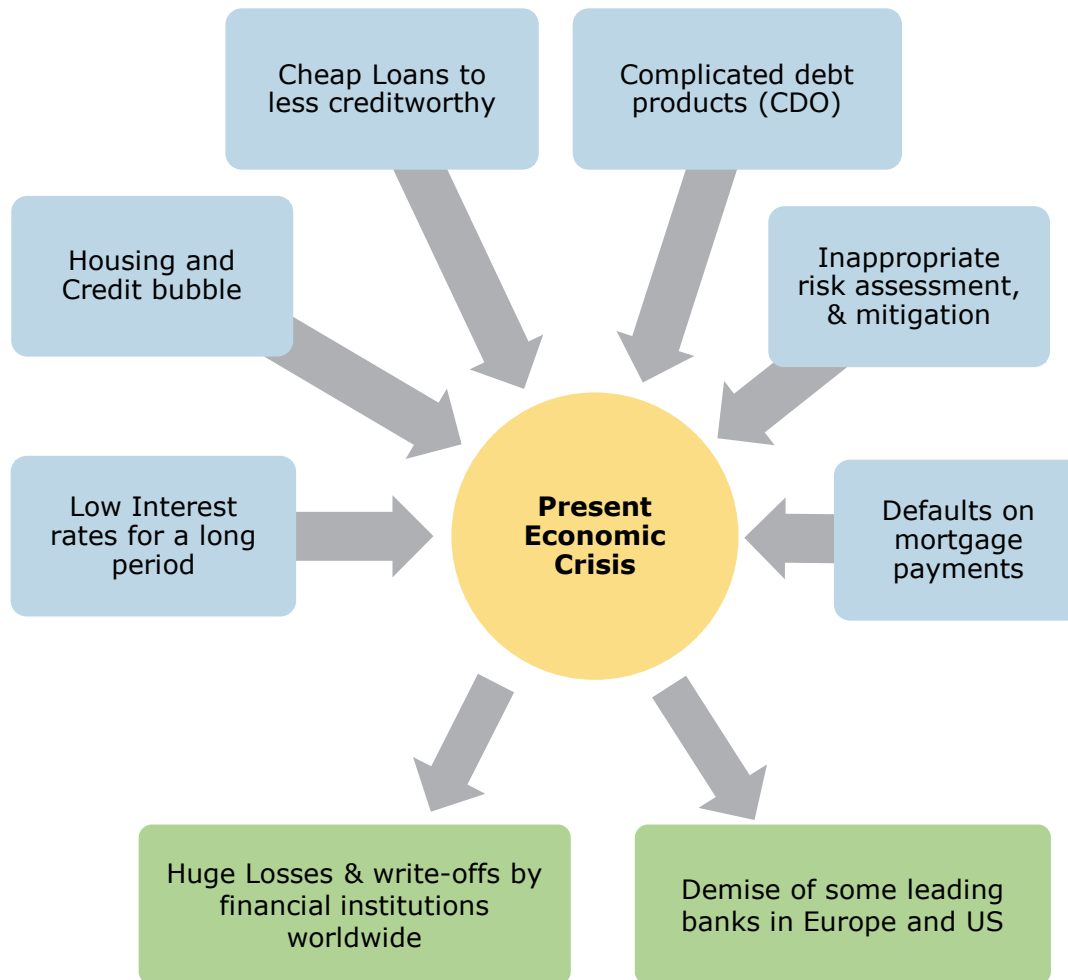
## **Business Solutions Forum**

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# Current Economic Scenario



*Spread the risk, not the losses*

## Impact on Global Economy

- Severe Liquidity Crunch and drying-up Credit lines
- Developing lack of Trust
- Risk Aversion
- Failure of Banks
- Ever changed financial industry landscape

## Folie 2

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**MSOffice1** 1/ While we look at various primary factors leading to present market scenario – should we also not include “Inappropriate or non-standard risk assessment, mitigation and contingency structure, which led to much heavier impacts on some while others remained less impacted.

2/ Further, I would like to get a clear understanding on the influence of the following factors (for my speech, others are more clear):

- Low interest rates for long period
- Complicated debt products – I assume CDS is only an example? I need to understand this also further.

3/ Impacts of the present Economic scenario – would we also like to mention “changing ownership structure” – with government bailouts and stake holding in Private sector banks

4/ What is the significance of "Spread the risk, not the losses"?

; 07.11.2008

# Why no one saw it coming

## Organization and Governance

- Lack of Standard Practices for Risk Identification, measurement and reporting
- Organizational Risk Management focus tending to be Cyclical and Episodic
- Lack of Organizational experience in risk management and risk analysis Methodologies
- Lack of comprehensive recognition of Risk Management influence in Business goals

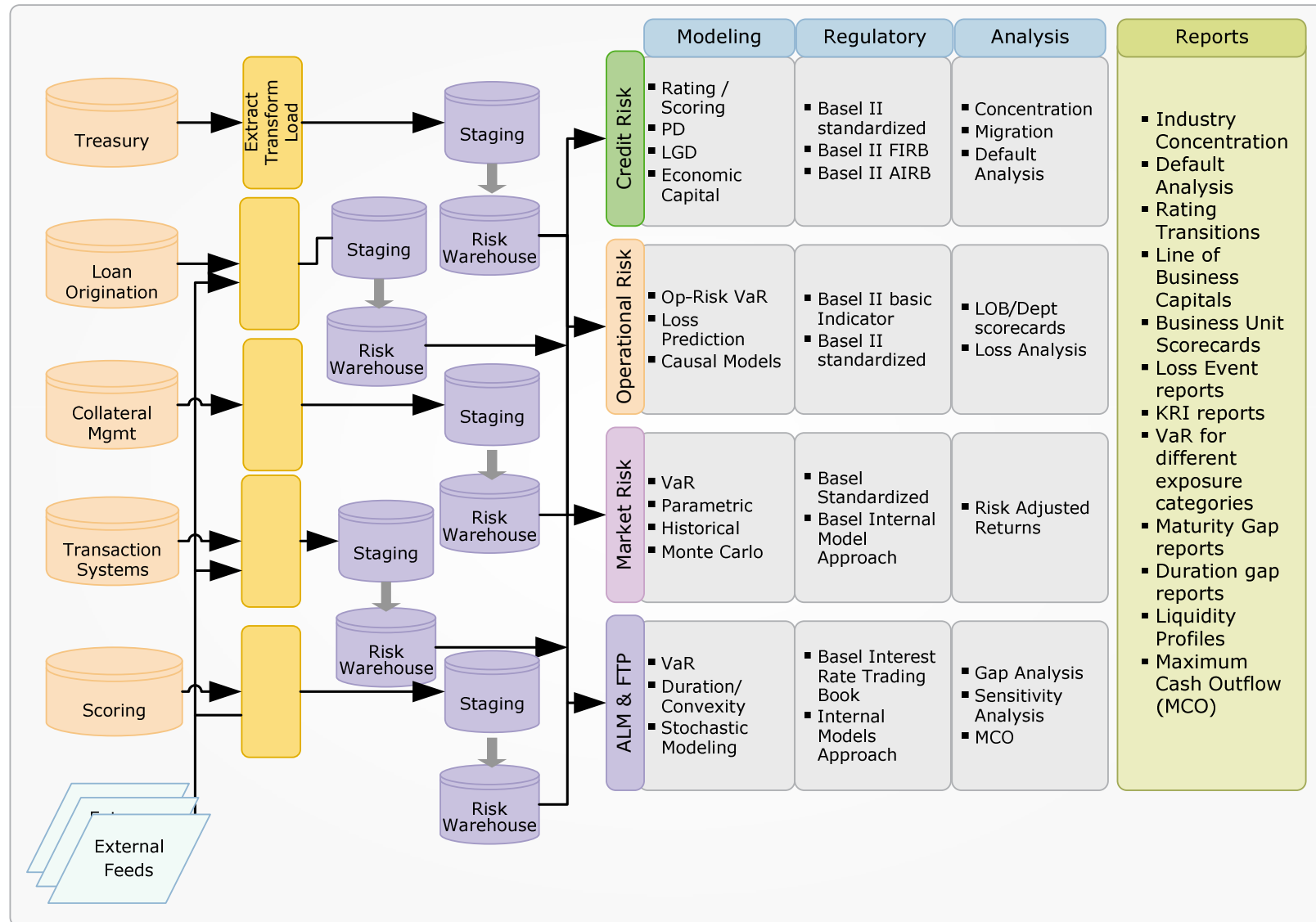
## Risk Measurement Methodologies

- Inadequate recognition of certain risk categories, particularly liquidity risk
- Inadequate coverage of Risk factors
- Over reliance on external risk rating agencies
- Lack of independent and rigorous internal valuation for complex structured products
- Many of the products, considered trading assets, not subjected to the fundamental credit analysis

## Regulatory Guidance

- Simple risk-based approaches inadequate in the context of structured credit products
- Basel II implementation subject to individual country regulator adoption timetables

# Current State – Siloed Risk Management Framework



# Need for Analytical Capability

## Drivers for 'On demand' analysis capabilities

- Business requirements
  - » Understand risk-return profile from new & complex products
  - » Capability to include additional parameters in Risk Measurement and Pricing
- Regulatory requirements
  - » Basel II , Solvency II – capital adequacy
  - » Market Transparency (MiFID)
  - » Clients' Suitability for selling complex products
- Client requirements
  - » Need for an integrated view of the portfolio
  - » Ability to understand risk-return characteristics in different scenarios

## Current Practice

- Front office analyses pricing scenarios
- Middle Office creates an approximate model for VaR and some standard stress tests
- Back-office uses FO models to price the positions and calculate P&L
- Very little effort to challenge Front Office proactively in good times

## Expected Capabilities

- On the fly dynamic & intuitive scenario creation
- Data required for the scenarios available reasonably easily
- Statistical, reporting and graphics capability readily available

Wide gap between what a existing scenario analyzer does and what it should ideally do

Siloed Risk Management systems that don't interface with each other cannot help estimate the real risk in the organization.

Need a solution which captures the cumulative effect of a scenario on the Trading books as well as the Banking books.

# Risk Management System - Business Expectations

## Risk Management Systems Coverage

- Anticipated Market Movements
- Future Liquidity Situation
- Counterparty Credit Worthiness
- New complex financial products
- Exposures overlooked in Traditional Systems

## Analysis Types

### ***VaR Calculation***

- ***Sensitivity analysis*** - Identifying how portfolios respond to shifts in relevant economic variables or risk parameters.
- ***Scenario Analysis*** - Assessing the resilience of financial institutions and the financial system to severe but plausible scenarios covering known historic as well as hypothetical Scenarios

## Business expectations from Risk Management Application

- Intuitive reporting and presentation capabilities for senior management.
- Capture cumulative effect of the proposed scenario on the financial books
- Scalable and extendable in order to accommodate new products, new risks, and higher volumes
- Stress testing of models with extended coverage of historic and hypothetical scenarios,
- Capability to include multiple factors and their correlation in a business rule based approach
- Efficient and cost effective

# How we propose to do it

## **Identify applications in key business areas, both in assets and liabilities**

- Reference and Market data - Asset Control, Golden Source, etc.
- Trading - Calypso, Murex, etc.
- Commercial Lending - LoanIQ, ACBS, Homegrown Scorecards.
- Retail Secured Lending - NetOxygen, etc. combined with SAS or SPSS for analytics
- Unsecured Lending - Transactional Core Banking systems combined with SAS or SPSS for analytics
- Liabilities - Transactional Core Banking systems combined with SAS or SPSS for analytics
- Risk & ALM - Algo, QRM, RiskPro, etc.

## **Identify key information sources in each of the above areas with the required data and analytical capabilities and create consumable services**

- Data model analysis and standardization
- Evaluate availability of pricing and analytical capability as API in each of the applications
- For others we intend to use the existing analytics functions in SAS or SPSS and use them as services in the Scenario Analyzer.

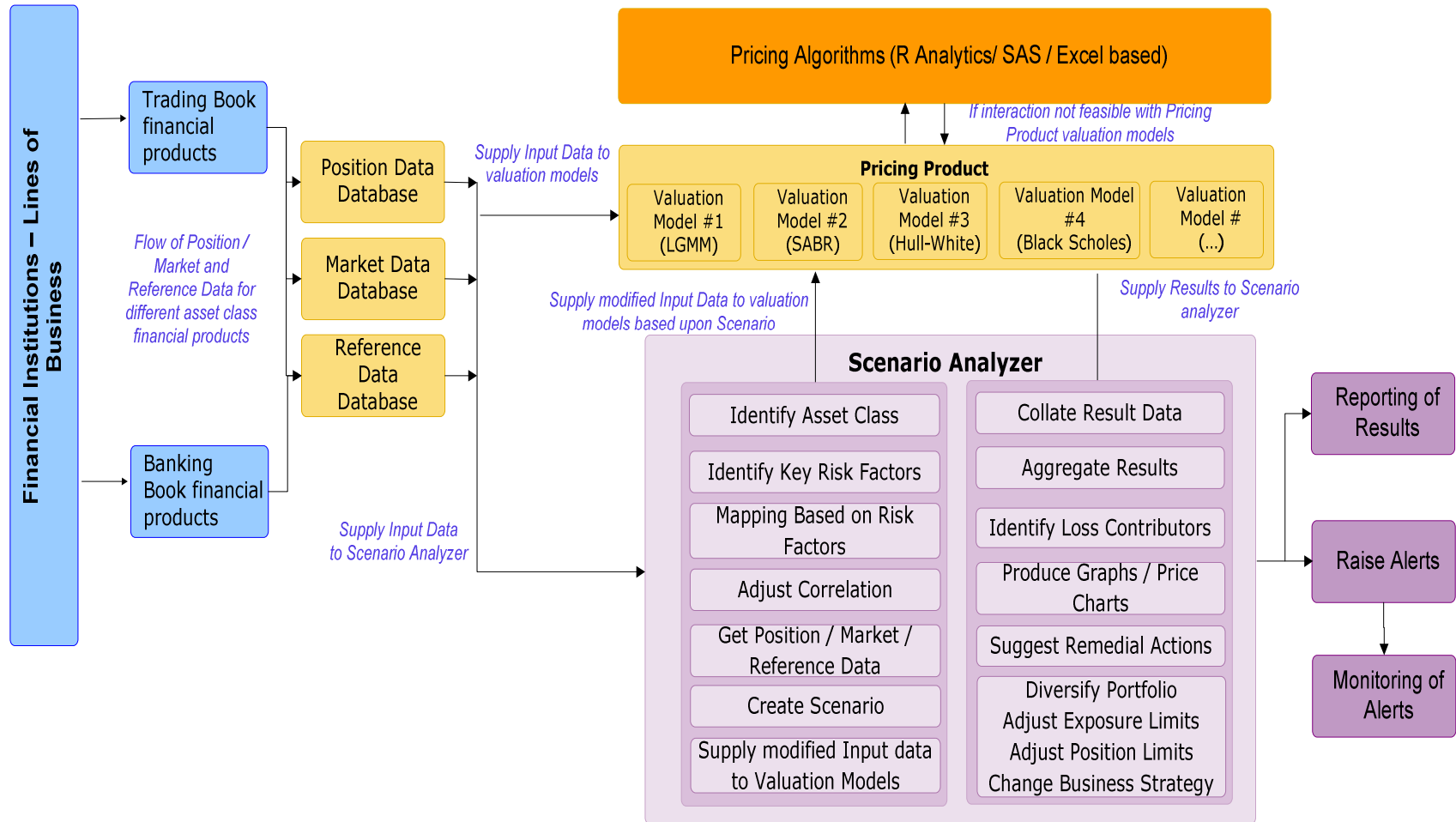
### **Usage Profile**

- Comprehensive Reporting to Risk Management
- Executive Dashboards for quick view of the Risk Profile of the Organization
- As a sales tool to enable sales force and clients to have limited view of the risk profile of offered products

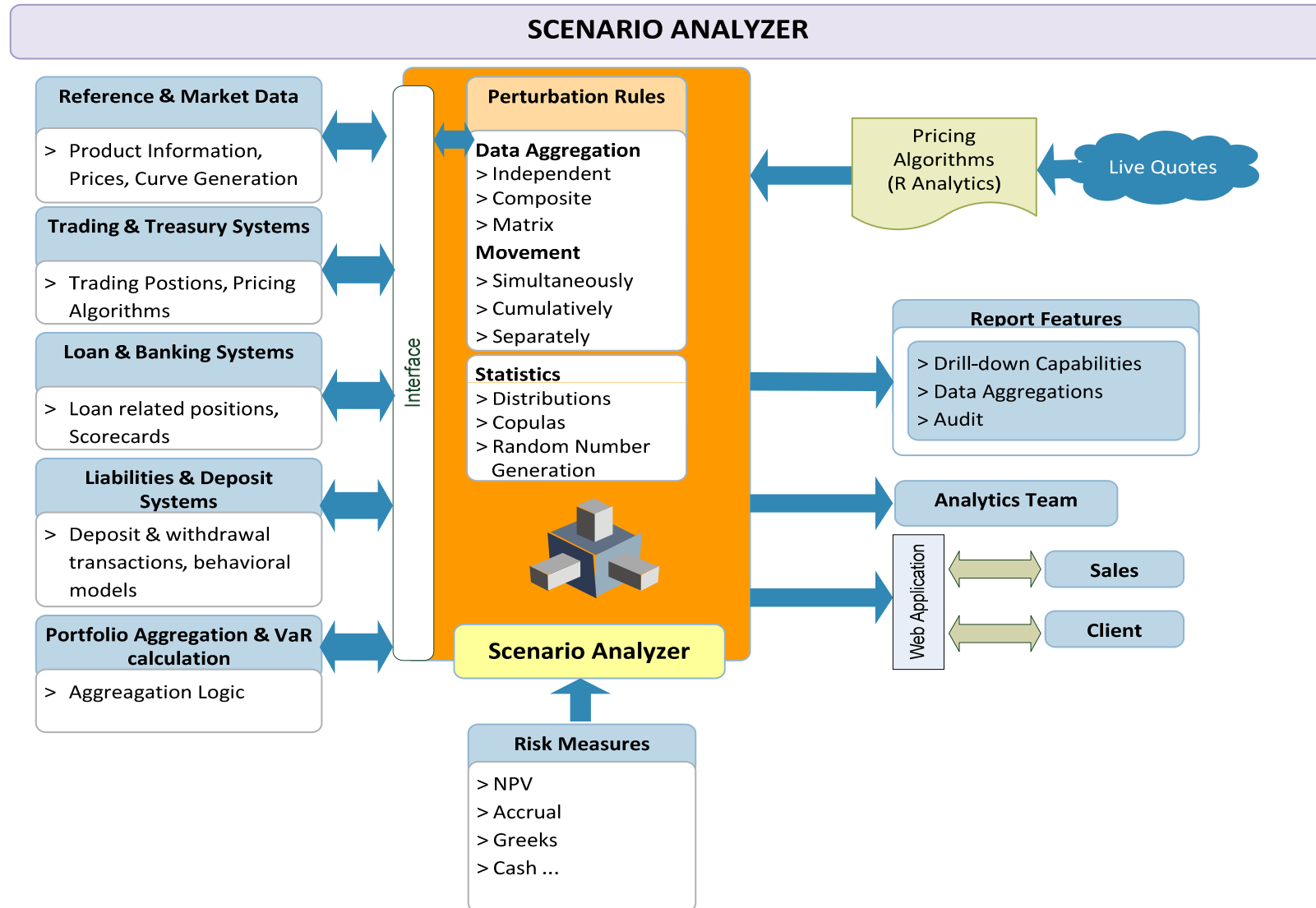
## Guiding Principles – Proposed Scenario Analyzer

- The Scenario analyzer will have a unified risk framework that links disparate sources of risk
- The Scenario Analyzer will have Analytics capability to perform post pricing calculations in order to adjust for the correlation between the various Pricing Parameters
- The analyzer will incorporate a common data model for the various disparate risk systems
- The system shall have a Metadata repository containing information of all the products and parameters to be used in developing various scenarios
- The framework will be scalable to accommodate new asset classes, financial models and simulation methods
- The scenario analyzer will be able to reuse scenarios and historical data for simulation

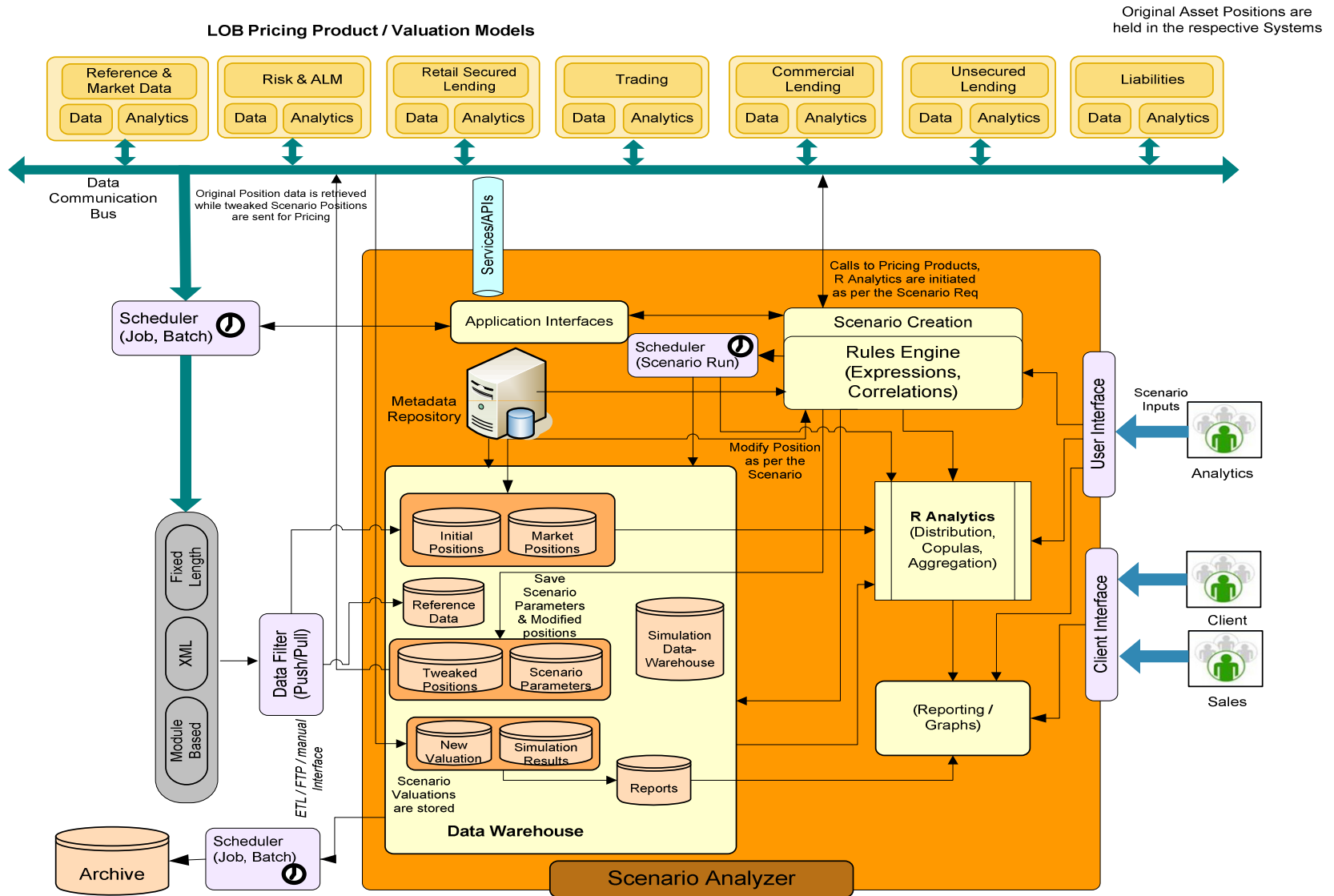
# Business Flow – Scenario Analyzer



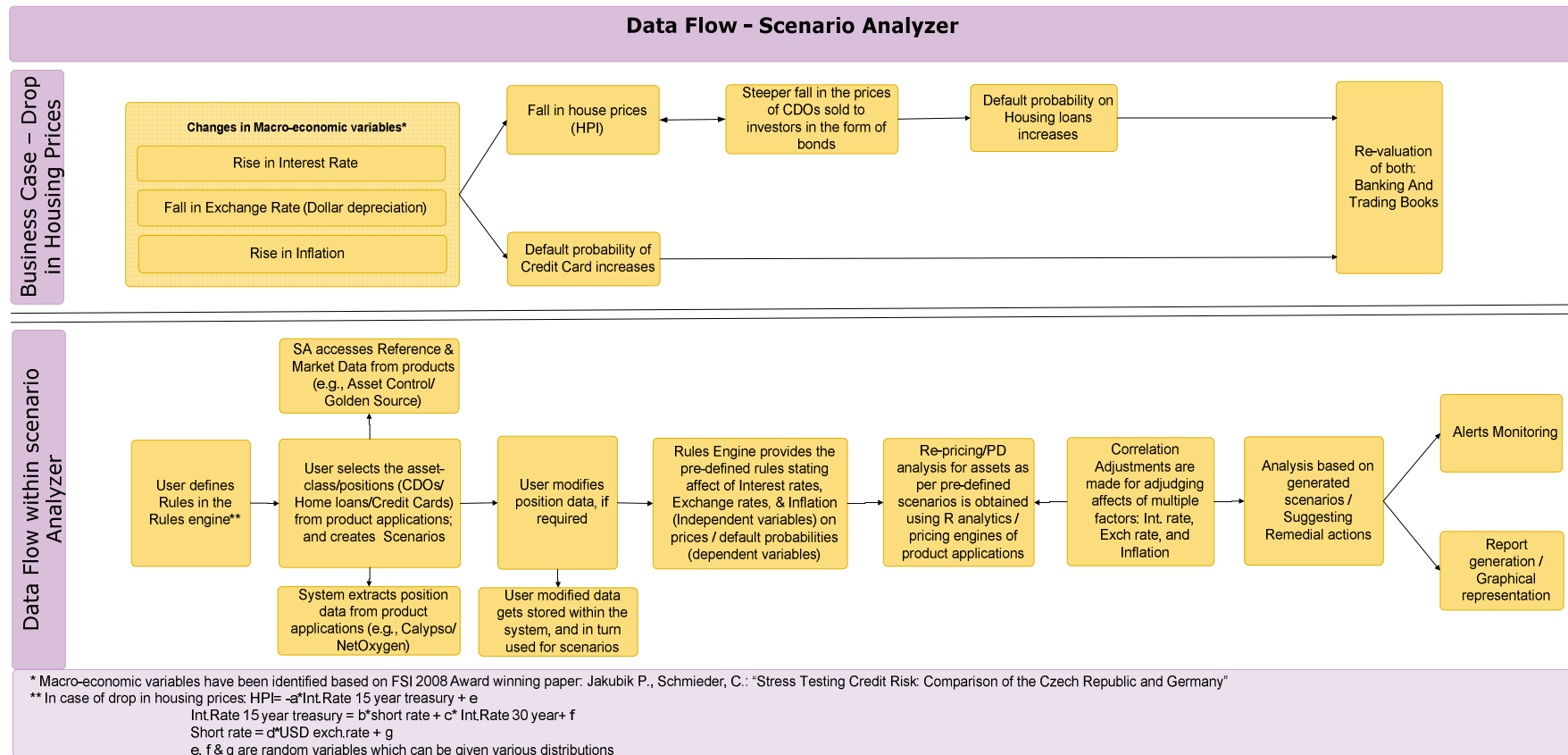
# Proposed Framework - Scenario Analyzer



# Functional Block Diagram



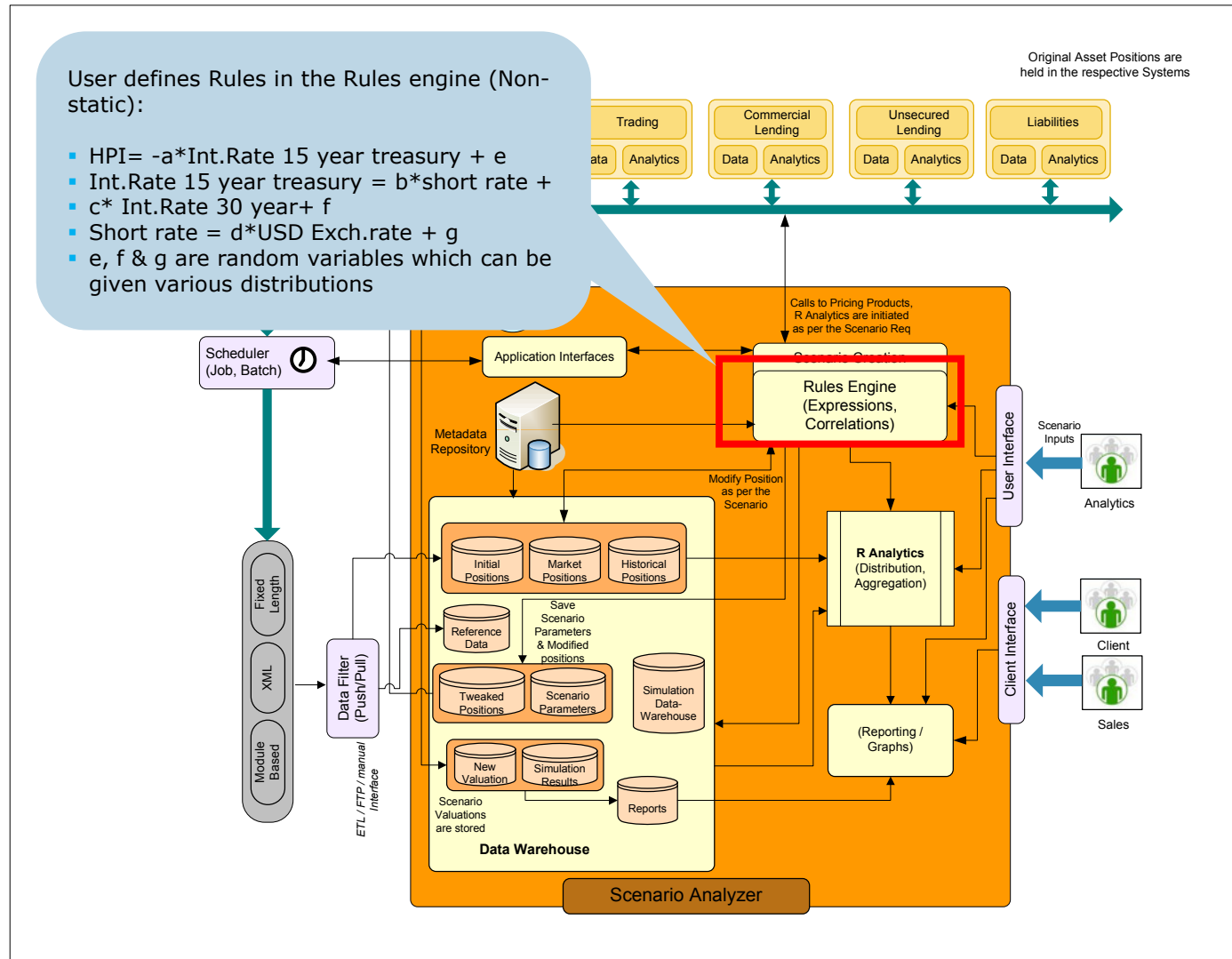
# Business Case: Drop in House Prices



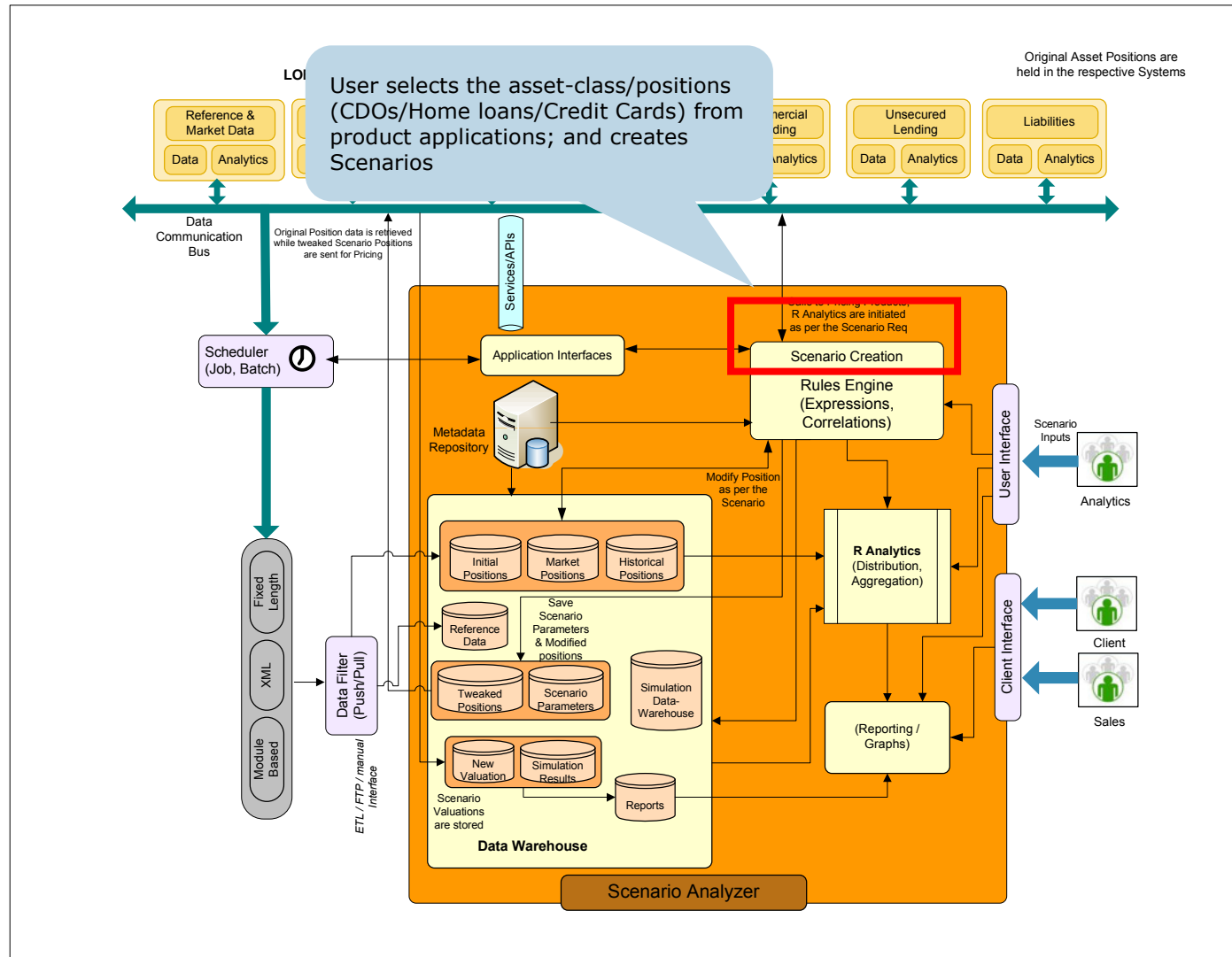
# Data Flow – Step 1

User defines Rules in the Rules engine (Non-static):

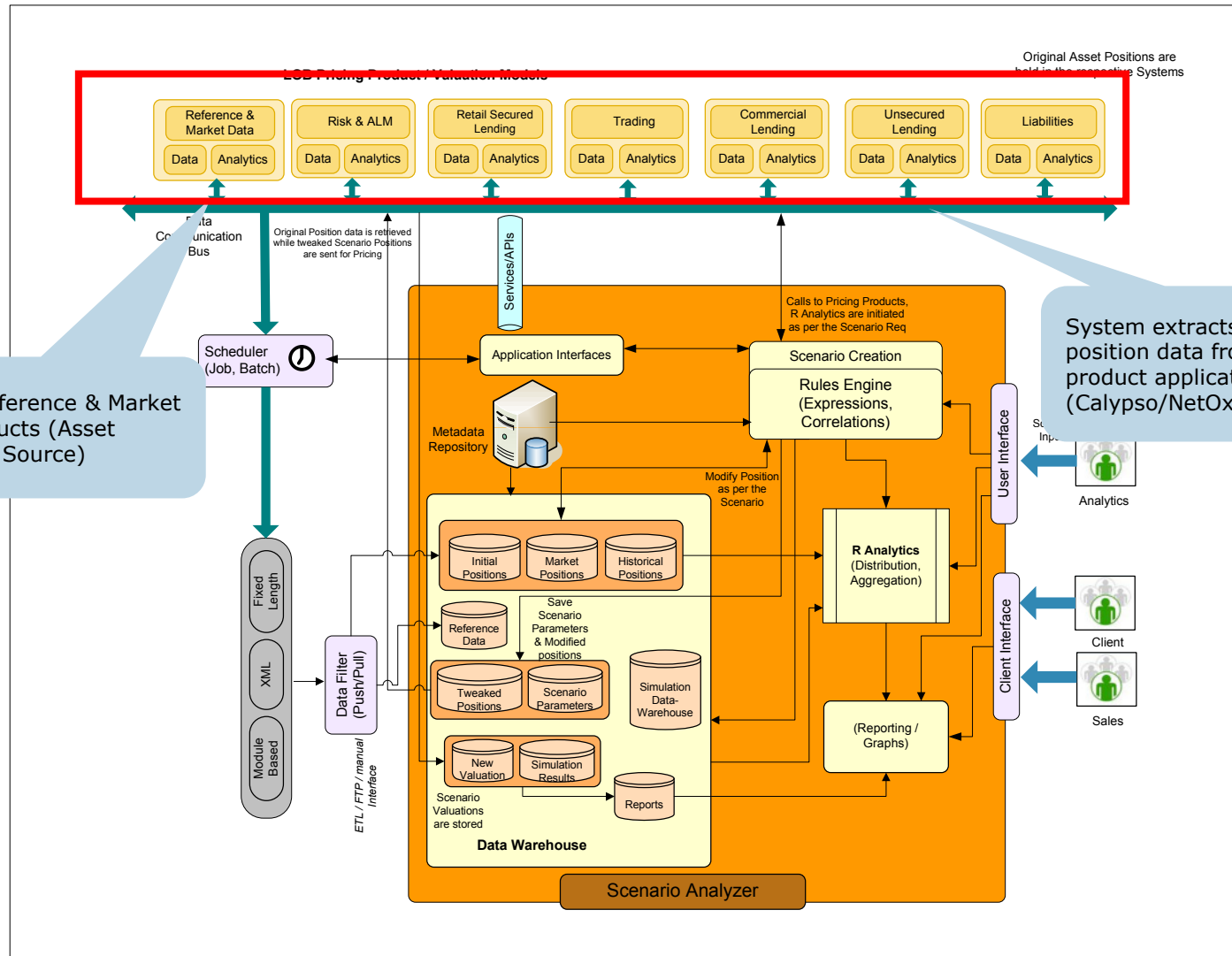
- $HPI = -a * \text{Int. Rate 15 year treasury} + e$
- $\text{Int. Rate 15 year treasury} = b * \text{short rate} + c * \text{Int. Rate 30 year} + f$
- $\text{Short rate} = d * \text{USD Exch. rate} + g$
- e, f & g are random variables which can be given various distributions



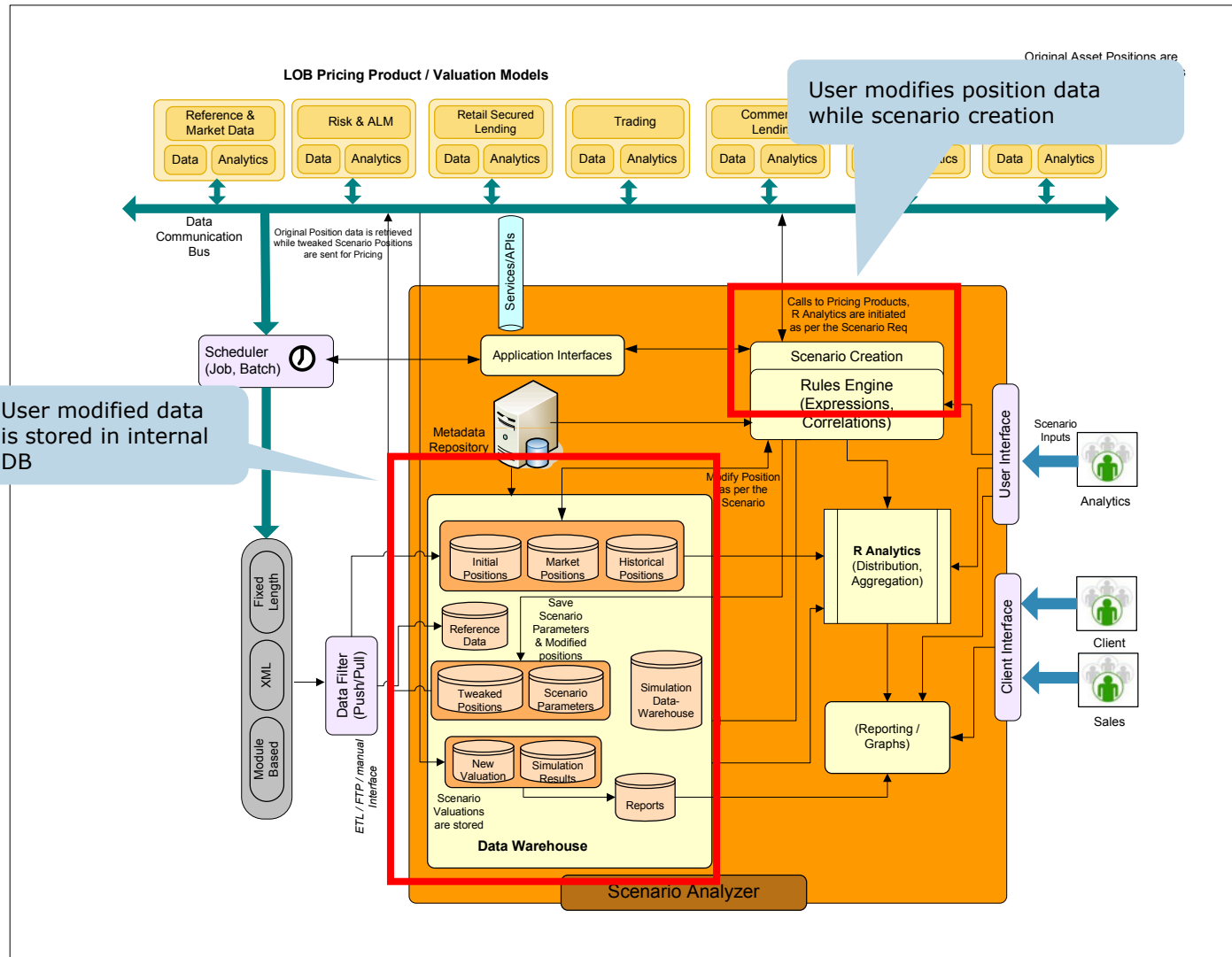
# Data Flow – Step 2



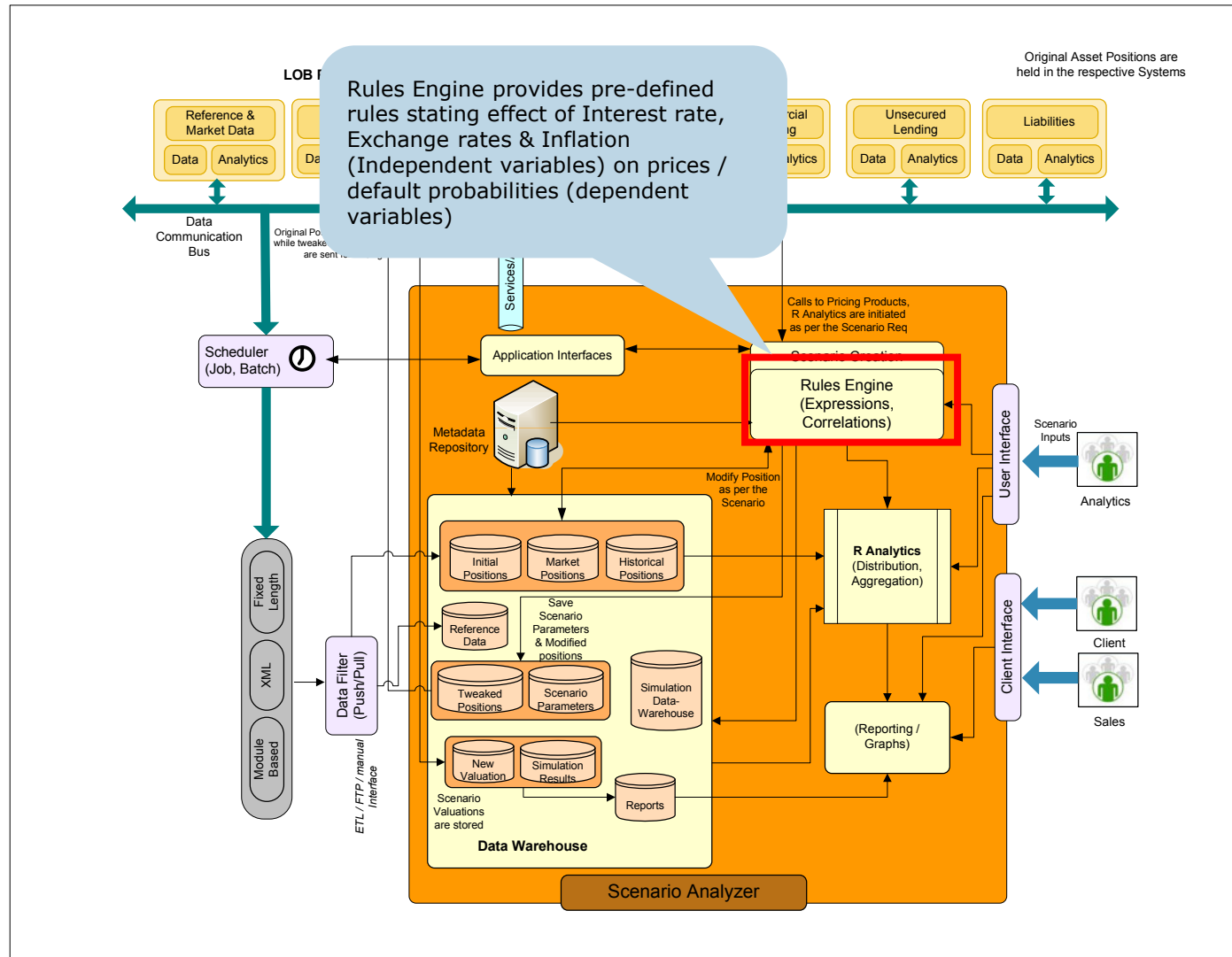
# Data Flow – Step 3



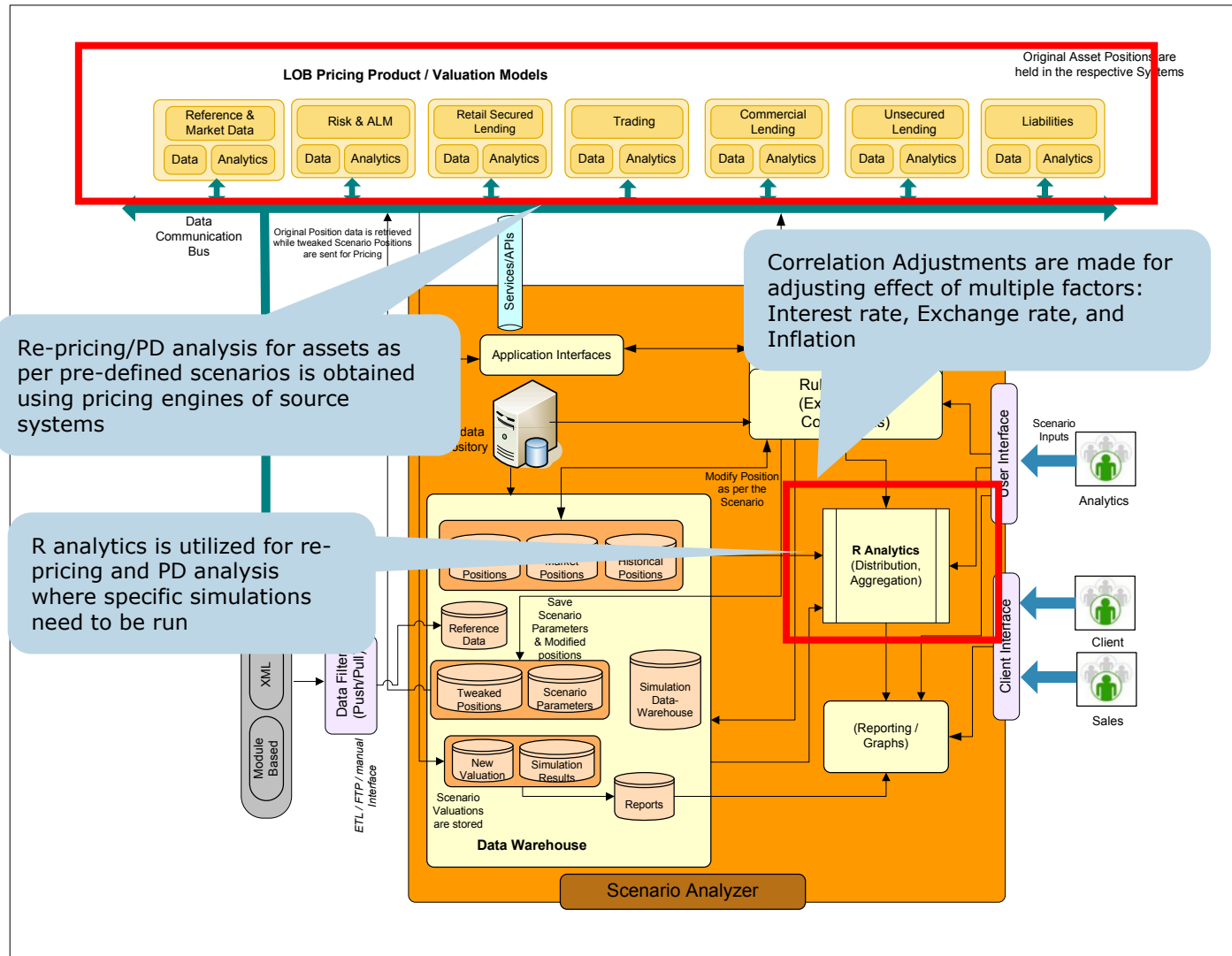
# Data Flow – Step 4



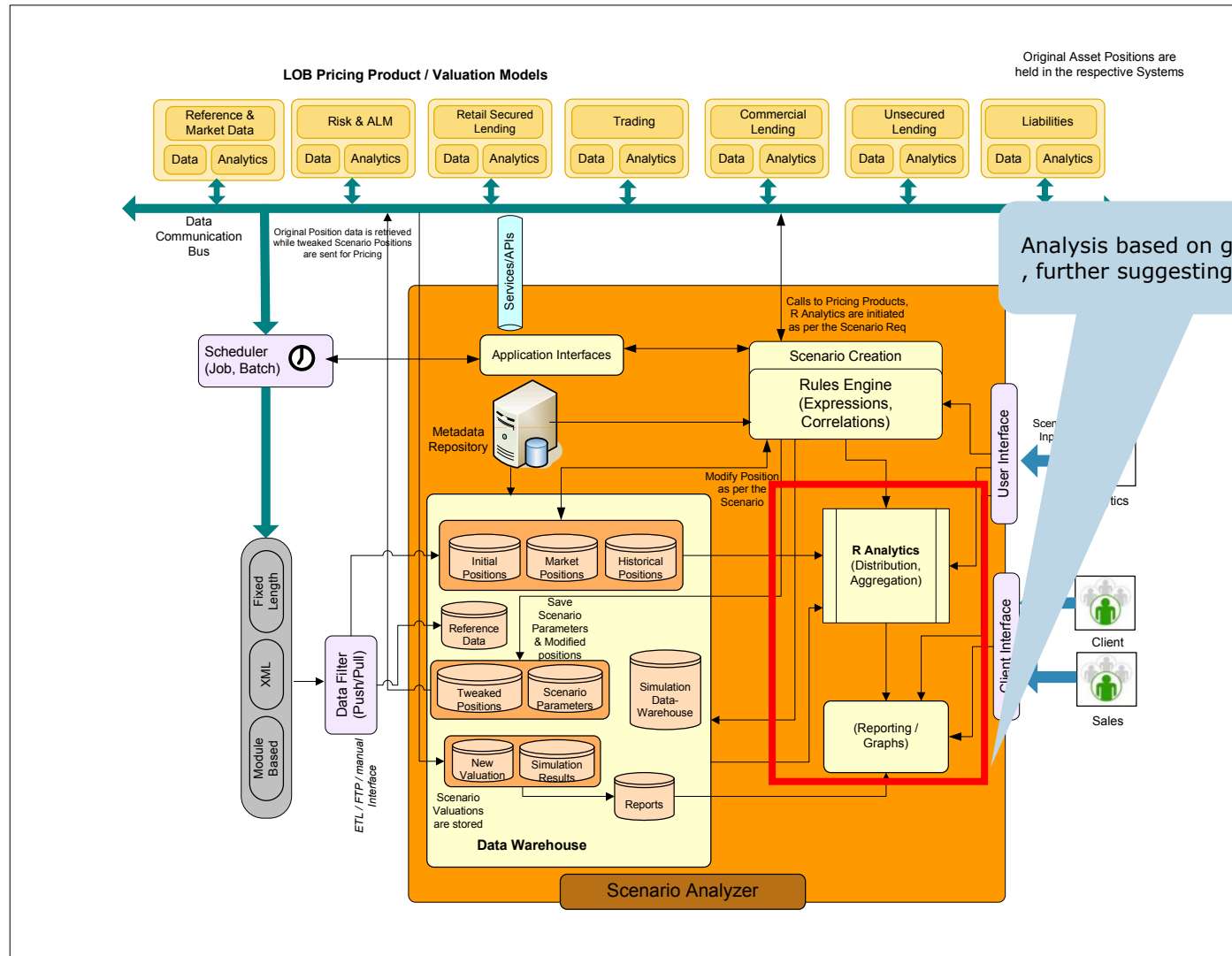
# Data Flow – Step 5



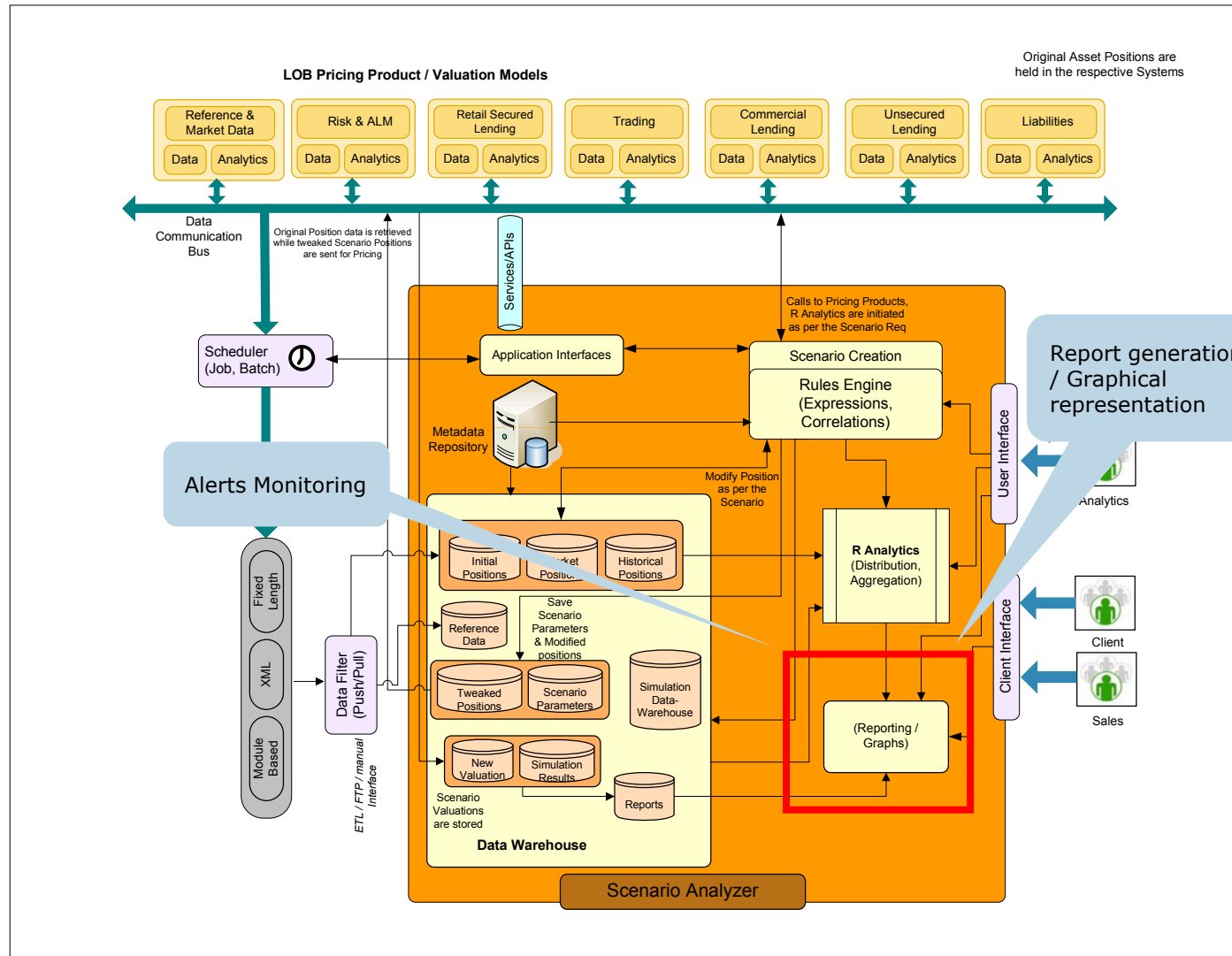
# Data Flow – Step 6



# Data Flow – Step 7



# Data Flow – Step 8



# Current Status and Further Developments

## Current Status

- Working with partner banks to refine the concept and identify areas for initial development
- Reviewing several trading and banking products to understand the extent to which the analytical capabilities are exposed
- Identification of Services based on Cognizant Service Identification Framework

## Future Developments

- Develop interface components for multiple source system that may be used by the various Banks
- Use of optimization algorithms to suggest hedging strategies
- Replacing open source components of the Scenario Analyzer by COTS products, depending on the client requirements
- Innovative use of R Graphics for reporting/charts



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Thank you