

# *vertiv*

**RQUEST**™ - Liquidity Risk Management

An introduction to **Liquidity Risk Management Suite**



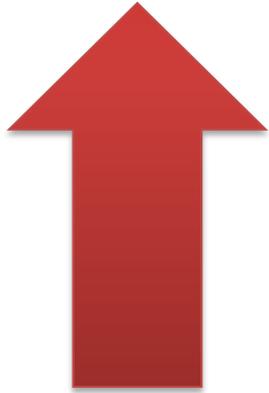
## Liquidity Risk Management

- Real-time configuration of Asset Class
- Configurable of Rules, Formulae
- Real-time trace-back from to sources
- Data Lineage Tracking

- Cash flow Calculations
- Mismatch Calculations
- Concentration Risk

- Stress Testing and What-if analysis
- Adjustments Features
- Out-of-the-box rules and reports

**Liquidity Risk:** The risk that a firm, although solvent, either does not have available sufficient financial resources to enable it to meet its obligations as they fall due, or can secure such resources only at excessive cost



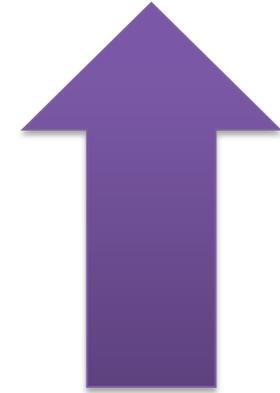
## Rapidly changing Regulatory requirements

- Limitation of organically grown systems
- Need for cross functional systems



## Increasing audit controls

- Visible calculations
- Trace-back



## Increasing calculation complexity

- Increasing data granularity – contract level
- Time-series analysis

## System Limitations

- Adhoc systems (Excel/Access/Scripts)
- Data Integration Challenges
- Rules hard-coded into the system

## Implementation Challenges

- Drill back to source not possible
- Metadata and structural integrity missing
- Reconciliation needs to be done manually

## Increasing Complexity

- Increasing calculation complexity and data volumes
- Several key attributes are dropped in aggregation

## RQUEST

Liquidity Risk Reporting

Financial  
Rules Manager

Reconciliation  
Engine

Report Metadata

Data Integrator

Hierarchy  
Manager

Real-time Traceability Data model

- **Financial Rules Manager**
  - Two step transformation from transactions to report
  - Built in Statistical functions and time-series analysis
- **Reconciliation Engine**
  - Ability to bring in multiple datasets to same dimensionality
- **Report Metadata**
  - Ensures rules and results tie-up
- **Data Integrator**
  - Consolidates data silos
  - Supports XBRL

**Solution approach delivers data model and business rules out of the box**

## Data Management

- Centralized Reference Data
- Strong and robust data model - End to end functionality
- Complete transaction data with no loss of granularity – Transparency issue
- Unification – Bringing data from various sources together
- Complete historical and market data to support risk calculation – High volume/Scalability
- Data archival and retrieval

## Business Rules

- Configuration Driven – Changing a rule should not involve code change
- Transparent and Auditable
- Drill back capability for data and Lineage
- Performance Efficient
- Minimal Data Trucking
- Historical Rule Definition Maintenance

## Calculations

- High performance
- Tightly integrated with underlying data model
- Support simulations
- Support stress testing
- Support complex mathematical functions

## Asset Class Coverage

OTC derivatives, ETD margins, OTC margins, OTC derivatives (downgrade triggers), FX, Debt securities, Own account debt securities, Equities, Repos and reverse repos, Stock borrowing and lending, Deposits, Loans, Commodities, Facilities, GL accounts and current year P/L, Non-margin collateral movements, nostros and vostros

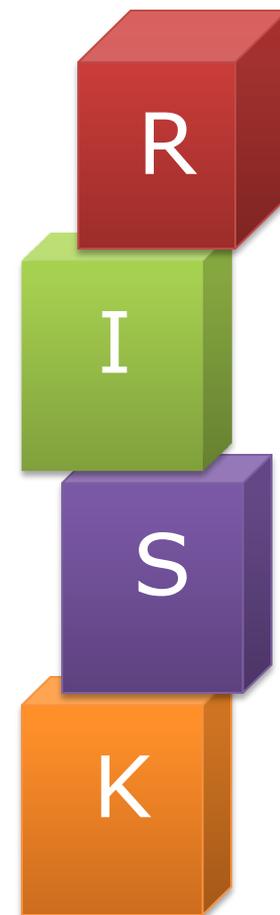
## Reports Coverage

FSA 047, 048, 049, 050, 051, 052, 053, 054

## Dimensions

Business/Organization, Legal Entity, Cost Centre, Business Sector, Accounting book, Trading Book, Customer Data, Customer Type/Code, Geography, Credit Rating, Internal Reference Data, Product Type, Source Product Code, Source System, Industry sector codes and others

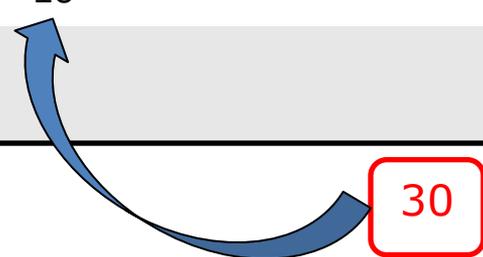
- ❑ Extensive Stress tests support to
  - Identify sources of potential liquidity strain
  - Ensure liquidity exposures are within limit
  - Identify impact on pricing assumptions
  
- ❑ The impact of liquidity stresses assessed on banks'
  - Cashflow
  - Liquidity position
  - Profitability
  - Solvency
  
- ❑ Stress test consideration parameters
  - Short term and protracted scenarios
  - Company specific and market wide scenarios
  - Combination of two above

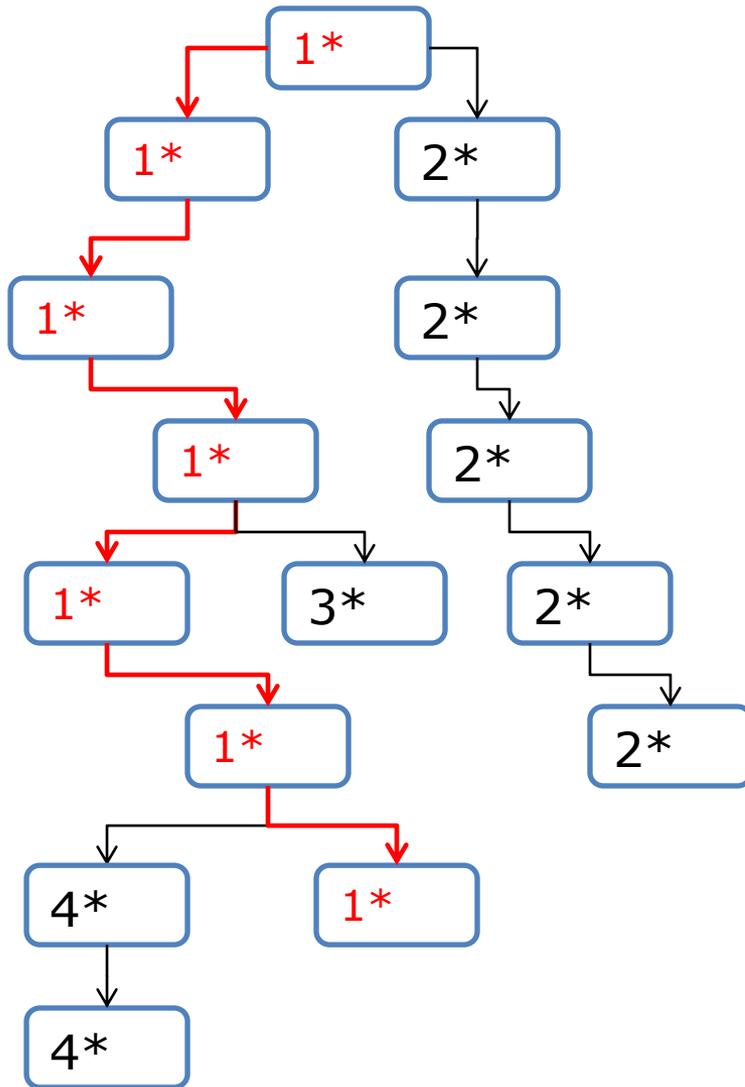


## Robust Adjustment Module

- Adjustments can be made at various stages of report gen
- Adjustments can be applied to other reports
- Adjustments are version controlled and audit trail generated
- Updating transactions supported for privileged users

Contractual	Spot	Open maturity	< 1wk	1wk -1m	1m-3m	3m-6m	6m-12m	>12m
Total Assets	110	20	10	30	55			
Total Liabilities	70	30	10			200	250	400
Off Balance Sheet Liquidity	20							



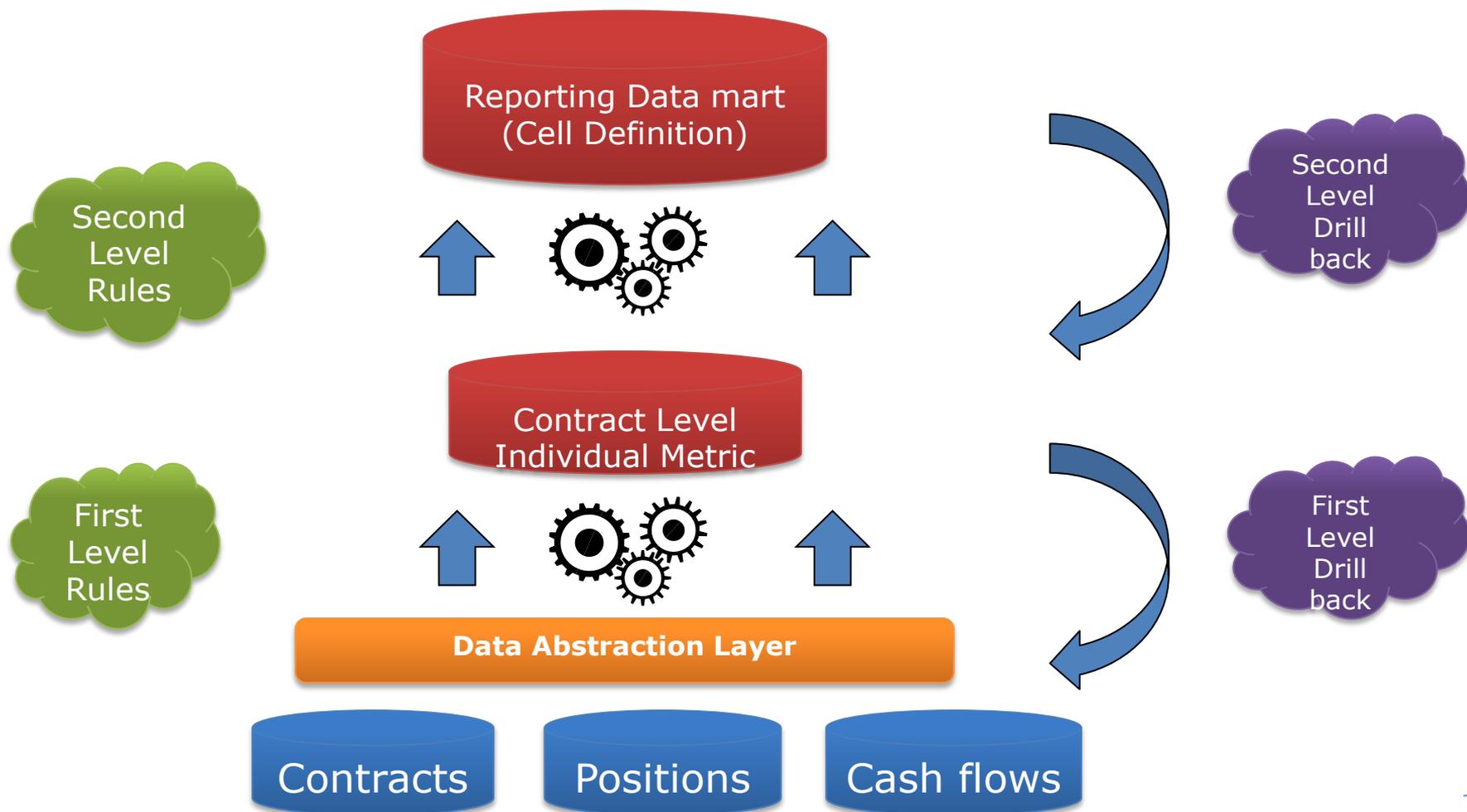


- Data lineage
  - Transformation **PATH** from source to target is always maintained
  
- Drill back
  - Intermediate **VALUES** at various stage are also maintained from source to target Identify sources of potential liquidity strain
  
- Ensures complete traceability and lineage for reconciliation and auditing requirements

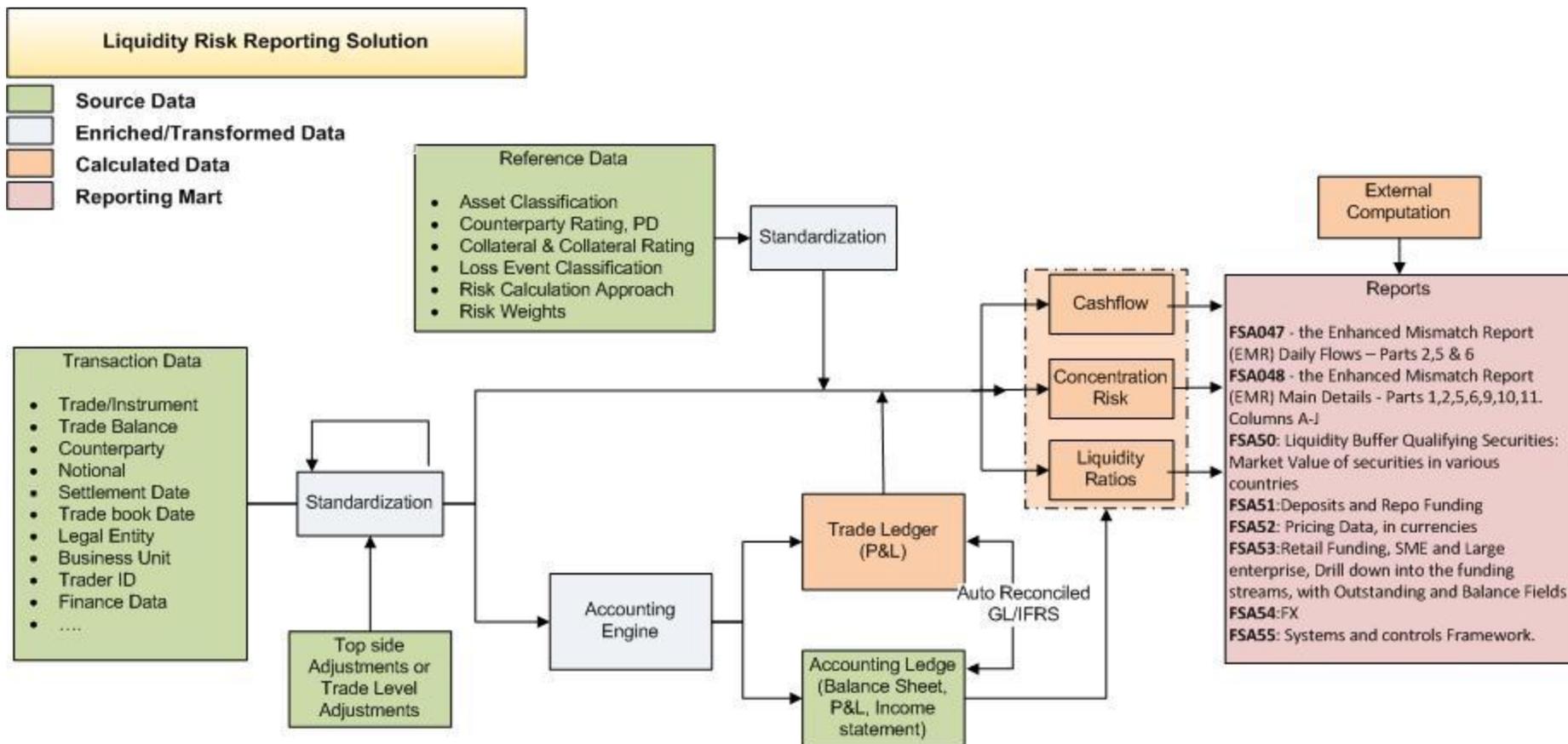
Contractual	Spot	Open maturity	< 1wk	1wk -1m	1m-3m	3m-6m	6m-12m	>12m
Total Assets	110	20	10					
Total Liabilities	70	30	20					
Off Balance Sheet Liquidity	20							
Mismatch	-20	10	10					
Mismatch as % of total Assets	-18%	50%	100%					

- Dimension rich data mart supports management reporting
- Time-series analysis and financial functions supported

- ❑ Minimized trucking of data ensures scalability
- ❑ Two stage approach for regulatory reporting ensures minimized data movement and enhanced performance



- ❑ Robust data integrator consolidates data silos
- ❑ Reconciliation module delivered for quick data checks
- ❑ Reports coverage for FSA 047 – 058, FFIEC 001-009, FR 2314 reports
- ❑ XBRL support for electronic filing
- ❑ Utilities like Hierarchy manager, Process Scheduler and Entitlements module
- ❑ User friendly features like copying and cloning of rules



Issue rating for debt securities	Residual Maturity	Sovereigns	Other issuers
AAA to AA-/A-1	≤ 1 year	0.5	1
	>1 year, ≤ 5 years	2	4
	> 5 years	4	8
A+ to BBB-/ A-2/A-3/P-3 and unrated bank securities per para. 145(d)	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
	> 5 years	6	12
BB+ to BB-	All	15	
Main index equities (including convertible bonds) and Gold		15	
Other equities (including convertible bonds) listed on a recognised exchange		25	
UCITS/Mutual funds		Highest haircut applicable to any security in which the fund can invest	
Cash in the same currency		0	

- ❑ Liquidity Risk Reporting warrants:
  - ❑ Trade data capture from several source systems
  - ❑ Generating cash-flows
  - ❑ Calculating mismatches and liquidity ratios
  - ❑ Expandable for future requirements
  
- ❑ Ideal solution should offer
  - ❑ Stress Testing
  - ❑ Rules Drill back and Audit Tracing
  - ❑ Adjustments functionality
  
- ❑ Vertiv's RQUEST provides:
  - ❑ Real-time configuration of rules and reports
  - ❑ Real-time trace-back and lineage support
  - ❑ Robust stress testing support

# Appendix

Dimension	Traditional Rule Engines	Vertiv REQUEST
Methodology	Processed one row at a time - slow	Many rows can be processed at a time
Execution	Java/C++ Based	SQL, CCL based
Processing Mechanism	Out of procedure <ul style="list-style-type: none"> <li>• Longer Times (Latency)</li> <li>• Resource intensive</li> </ul>	In place data processing <ul style="list-style-type: none"> <li>• No data hops</li> <li>• Faster processing</li> </ul>
Rule Storage	File based	DB based
Suitability Scenarios	Broadly varying rules <ul style="list-style-type: none"> <li>• Retail Industry</li> <li>• Insurance Sector</li> </ul>	Rules of similar nature <ul style="list-style-type: none"> <li>• Aggregations</li> <li>• Summaries</li> <li>• Roll-ups</li> </ul>
Processing Capacity	Few hundreds row transformations / sec	500K to 1 Million row transformations / sec

Dimension	Traditional Rule Engines	Vertiv RQUEST
Infrastructure Scalability	Low-medium <ul style="list-style-type: none"> <li>• Clustering</li> <li>• Grid / Cloud</li> </ul>	Highly Scalable <ul style="list-style-type: none"> <li>• Vertical</li> <li>• Horizontal</li> </ul>
Processing choice	Possible Limitations	Diverse <ul style="list-style-type: none"> <li>• Real-time (CEP)</li> <li>• Intra-day (Cache)</li> <li>• End-of-day (DB)</li> </ul>
Utilities	Standard <ul style="list-style-type: none"> <li>• Scheduler</li> <li>• Entitlements</li> <li>• Design/Debug and Production modes</li> </ul>	Standard <ul style="list-style-type: none"> <li>• Scheduler</li> <li>• Entitlements</li> <li>• Design/Debug and Production modes</li> </ul> Advanced <ul style="list-style-type: none"> <li>• Tree Manager</li> <li>• Business Object Repository</li> </ul>

## □ Definition Phase

- Define Liquidity Reporting Requirements
- Define and Build Liquidity Reporting Business Case
- Define solution architecture
- Define implementation delivery architecture
- Define Liquidity Reporting data architecture
- Define Integration architecture
- Define technical architecture
- Define test approach

## □ Design/Development Phase

- Design Liquidity Reporting Requirements Mapping
- Conduct Fit Gap Analysis
- Design Complete Solution Including Gaps
- Design information delivery solution
- Build and unit test information delivery solution
- Design and build data stores
- Design Integration solution
- Build and unit test Integration solution
- Develop test cases (integration, system and UAT)

## □ Testing Phase

- Execute integration test cycle
- Execute system test cycle
- Execute UAT test cycle
- Dry run with External organizations FSA, and ECB

## □ Deployment Phase

- Migrate code and Data to Production instance
- Configure and Deliver Production processes
- Transfer control over the system to Operational and Business Teams
- Prepare for Product Readiness
- Integrate and Activate DR Instance
- Move to Production

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