



## HCL IMPLEMENTED A ROBUST BIG DATA PLATFORM FOR EXHAUSTIVE RISK SCENARIO TESTING

BIG DATA &  
BUSINESS  
ANALYTICS

### CLIENT BACKGROUND

The client is one of the largest global banking and financial services company, headquartered in Europe.

### BUSINESS REQUIREMENTS

The client's critical risk valuation engine fed multiple downstream applications with risk information on trades. Any change in the risk rules or addition of new functionality to the existing system took a lengthy 4-6 months of end-to-end testing before the roll-out. Testing had to be comprehensive, covering business scenarios with extensive simulations, and involving high data volume. The test results had to be presented to different user communities for review. Hence, the right visualization to provide a rich user experience was critical.

The client wanted to set up an automated regression testing platform capable of handling high volume and multiple sources, and simulate different business processes. The client wanted to ensure that the engine's functions are predictable and conforms to expected outcomes with addition of new functionalities or changes in underlying valuation dictionary.

### HCL SOLUTION

HCL implemented an Automated Numbers Regression (ANR) Tool based on big data technologies for regression testing of the Core Risk Valuation Platform as and when new features are implemented or known defects are fixed, to ensure that these changes are not causing any "breaks" in the existing and running functionality in the production environment. The tool consumes data continuously from the production environment and from a second environment (e.g. UAT, SIT etc.) for a specific COB (Close of Business) date. Then the Number Validation Engine (a workflow of Map Reduce jobs) is run on these two datasets to find out any discrepancies:

- a) Missing Trades – Ideally both the runs would have happened on the same Trade Population (volume) and hence there should not be any missing trades. The tool finds out mismatched trades (missing from either of the environments)

- b) Missing Measures – Each trade can have multiple measures. For example, HSVAR will have each trade having around 25 Risk Types and Sensitivities with multiple currencies and each of these will have 260 (VAR) or 520 (Stressed VAR) historical simulation time points. A combination of Risk Type, Sensitivity, Currency and Time Point becomes a measure for the trade. The tool matches these measures between the two datasets and finds out if measures are mismatched (missing from either dataset).
- c) Numerical Mismatch – Final stage of validation actually compares the risk values (measure values) between the two datasets and reports mismatches (numerical differences)

Highlights of the HCL solution:

- a) Automated Regression Testing platform which saves time
- b) State of the Art Visual Design – the design was done at HCL Innovation Lab
- c) Modern technology stack – Use of Spark Streaming, Spark Micro Batches, Cloudera Search which are robust and scalable
- d) Agile model with 2 week Sprints

## BUSINESS BENEFITS

There are multiple Business Streams (Valuation Types) such as HSVAR (Historical Simulation Value at Risk) or CPX (Counter Party Exposure). Each valuation run covers the entire trade population which is around 1.5 million trades. Each trade has multiple measures and each measure has a value. So for each Business Stream, there are billions of measure values to be matched and differences to be reported. A manual regression testing would have taken months. ANR runs take less than a day e.g. 20 hours for CPX, 17 hours for HSVAR etc. and results are published on the UI the next day itself.



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