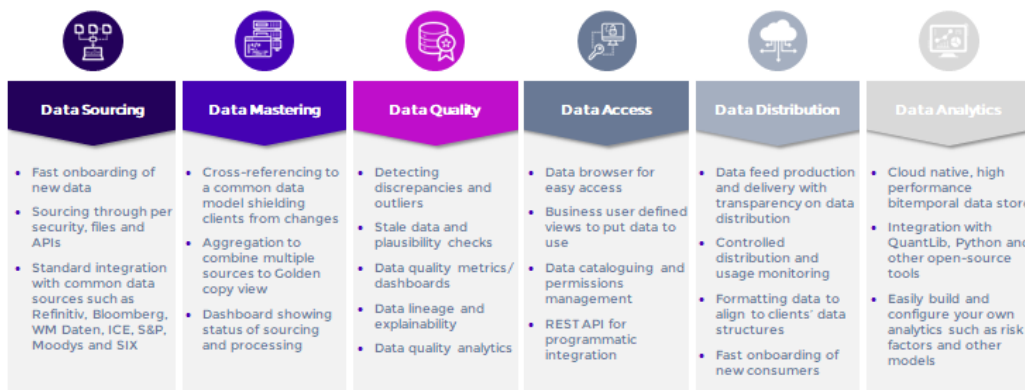


Market data and curve data management in Alveo's Ops360

The market data management challenge

Market data underpins all processes in capital markets. It is used for price discovery, risk analysis, valuation, investment decisions, collateral management and margin calculations and external reporting.

Effectively collecting, aggregating, quality-proofing and integrating this data into business workflows can be pretty complex. Data is coming from different brokers, exchanges, market makers and other sources and is delivered through different channels and at different frequencies. Instrument identifiers and data formats can differ causing a sometimes significant cross-referencing problem. After that, data needs to be verified and missing data points may need to be interpolated or otherwise proxied. Finally, additional data such as curves and surfaces need to be created for use in market risk management. Data also needs to be distributed to a range of consumers, needs to be incorporated into different decision-making workflows and will be used for external reporting. Effective distribution and access to market data will enable firms to get the most value out of their market data and will put the business on a common foundation.



Steps in Alveo's market data management solution

ALVEO'S OPS360

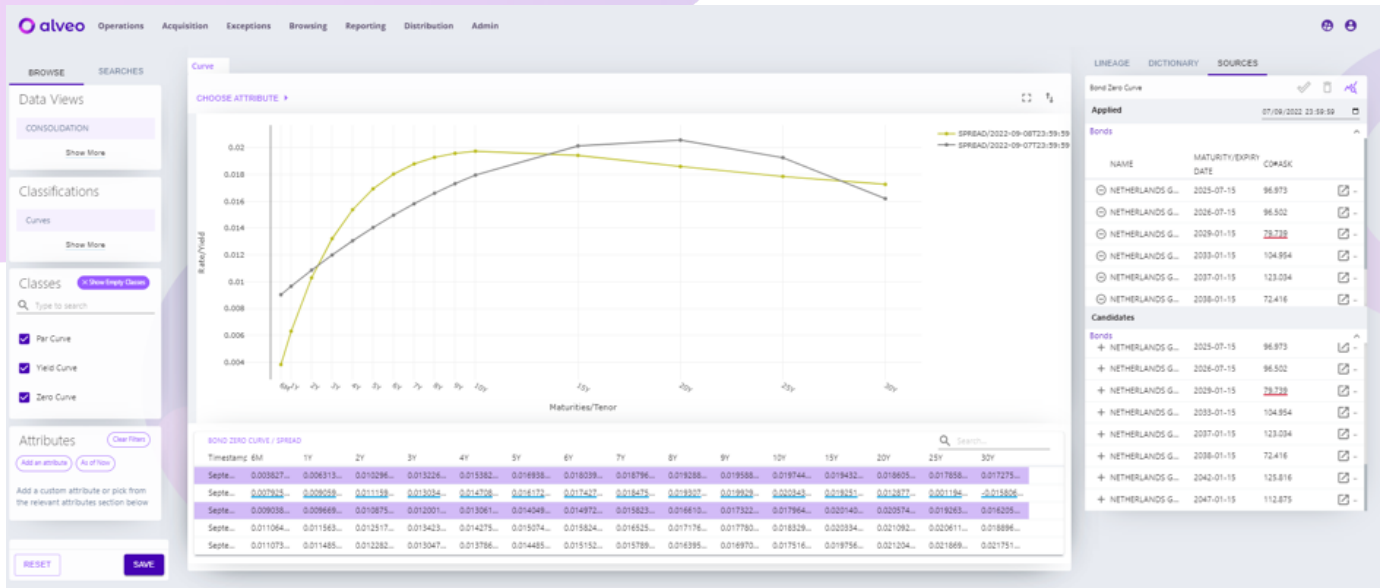
Ops360 is a web-based data operations solution offering full control over the data acquisition, mastering and data discovery process.

Ops360 provides easy access for data analysts, supervisors and other stakeholders to monitor the status of arrival and processing of data feeds, distribution of vetted data sets, and overall insights into data preparation processes. Ops360 dynamically sources the required market data through a range of prebuilt connectors to data sources. It provides users with intuitive access to validated data sets with full lineage capabilities to research anomalies and answer inquiries from users, auditors or regulators. Ops360 provides a bird's eye view of data flows, from acquisition through mastering and enrichment through to distribution. Starting with an overview dashboard, users can drill down into a historical overview of processes, pick a time slice and zoom in on any date range.

Ops360 provides a controlled and transparent market data management process. Through dashboards everyone can see the status of data sourcing, processing and distribution. In addition, Ops360 provides extensive capabilities for data derivation such as curves. High quality risk factor data will make risk systems perform a lot better and data lineage will help with any root cause analysis should that be needed. Central banks increasingly focus on the quality of the data that feeds into risk models.

CONTROLLED CURVE CREATION IN OPS360

Ops360 includes integration with Quantlib and the ability to bring your own Python code or use custom Java plugins. Other external libraries such as Matlab can typically also be used in combination with Python.



Risk factor creation in Ops360 showing source instruments and the resulting curve

With Ops360 is it easy to configure the curves you need exactly as per your requirements. You can

- Control which sources are used for calculations
- Put the calculation on any vendor data sets or a composite set of prices
- Pick the set of tenor points you need in the curve
- Control parameters such as interpolation, fitting methods and daycount conventions. You can directly enter a value for a parameter or point to the attribute of source instruments you want to use.
- Set validation rules on the results, for example to check unusual shapes or movements

Full data lineage will allow you to always explain any risk factor. Use of sources and parameter values are tracked.

After calculation, resulting data sets can be exported to risk engines, valuation systems, collateral management solutions and so on. This can be done in the shapes and at the times required by downstream consumers.

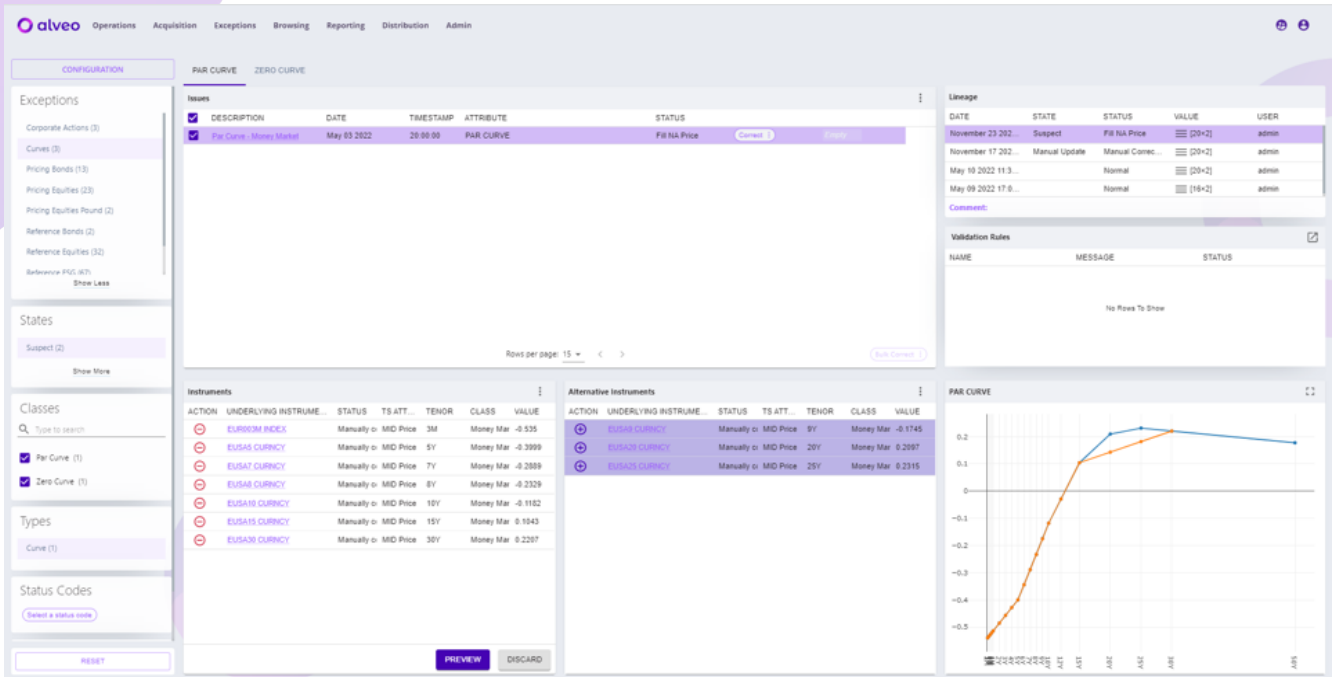
The screenshot shows the 'Curve creation configuration' page in Ops360. The top section has a table with columns: CURVE NAME (Piecewise Curve), CURVE ID (Empty), CURVE TYPE (Credit Curve), and DATE GENERATION (Backward). Below this are tabs for SUMMARY, REFERENCE, PRICING, SOURCES, and CURVES. The 'CURVE' tab is active, showing a table with columns: Name, Value, and Date. The table lists various parameters and their values, such as CURVE NAME (Piecewise Curve), BUSSINESS CONVENTION (ModifiedFollowing), CALENDAR (United Kingdom), COMPOUNDING (Compounded), CURVE TYPE (Credit Curve), DATE GENERATION (Backward), DAYCOUNT (ActualActual), EFFECTIVE DATE QL (January 11 2022), FITTING METHOD (NelsonSiegelFitting), INTERPOLATION (BackwardFlatInterpolation), ITERATIONS (20), MONTHEND (FALSE), SETTLEMENTS DAYS (2), TENOR POINTS (1M, 2M, 3M), and TODAY'S DATE (January 11 2022).

Curve creation configuration

CURVE DATA CLEANSING AND DATA QUALITY MANAGEMENT

Curves that are marked suspect by the validation rules can be cleansed from the Ops360 Cleansing UI. Curves can be corrected by adding and removing Source Instruments that have gone into the calculation. A preview of the curve is then calculated on the fly and shown to the user. When the user is satisfied with the new shape, the corrected curve is stored.

The Ops360 Browsing UI also shows the set of source Instruments used to build the Curve.

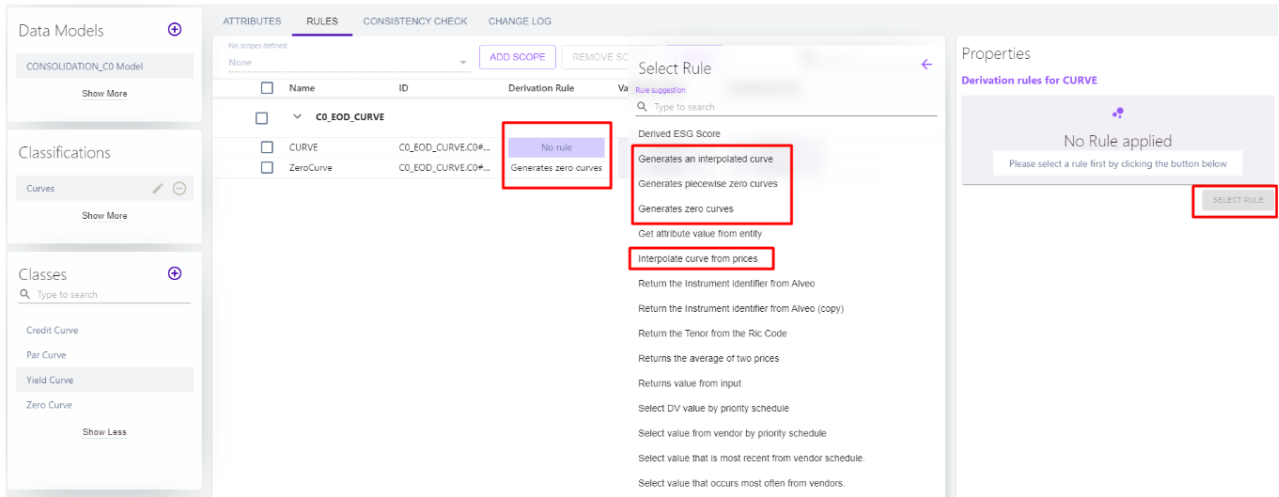


Curve Data Cleansing

APPLICATIONS OF DATA DERIVATION

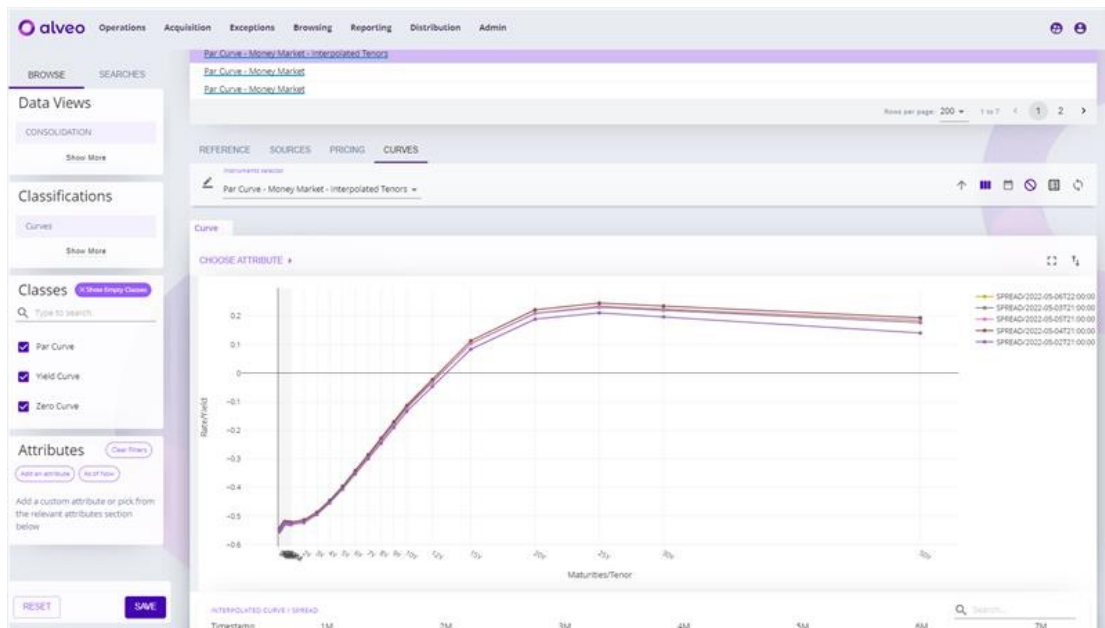
The data derivation capabilities of Ops360 can be applied to cater to a range of use cases that stretch beyond the curve examples presented here. These include:

- Define and manage stress tests (regulatory and internal)
- Instrument curves visualization and historical curve spreads
- Analyze risk factors and their relations (e.g. betas, correlations, volatilities)
- Define and manage proxies to increase your data coverage
- Creation of custom scores, e.g. on credit or ESG
- Complete your time series via gap filling to backfill history
- Do comparisons with sources of your choice to get an independent data view



Rule selection for derived data

Setting up, testing and deploy additions and modifications can be done by all appropriately permissioned users immediately without the need for IT support. Ops360 empowers business users to make the most of a firm's market data. All configurations of data derivation are in one single place for easy reference.



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