

# NextAngles: A Semantic Platform Reimagining Compliance

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**Abstract.** Financial compliance requires banks to maintain sophisticated customer screening and transaction surveillance systems that pose data quality and data availability challenges. Effort is concentrated on data collection and data consolidation, leaving less time for higher-level analysis. NA platform leverages the power of semantic technologies in three different areas (Domain, Regulation, Process) creating a cognitive system that is aware of the controls, assessments, and approvals needed in each case, which data to integrate and share and what surveillance, monitoring and reporting to perform.

**Keywords:** Semantic, Compliance, Cognitive.

## 1 NextAngles (NA) Platform

Estimates place money laundering transactions at \$1.4 – \$3.5 trillion annually [1]. Financial compliance requires banks to maintain sophisticated customer screening and transaction surveillance systems. Compliance efforts are heavily concentrated on data collection and consolidation, leaving less time for higher-level analysis. Data required for alert assessment are often not available to the system and around 95% of generated alerts are estimated to be false positives. International trade is a major channel to transfer illegal and illicit funds and is “among the most challenging and pernicious forms of money laundering to investigate” [2]. Investigation of such transactions remains labor-intensive due to the disparity of required data and the lack of live data integration.

Various efforts to address compliance have employed semantic technologies. The Financial Industry Business Ontology (FIBO) was developed to address the necessity for “common, shared meaning across data sources and message feeds in the financial services industry” [3]. More recently, the Financial Regulation Ontology (FRO) formalized laws and regulations for Insurance, Banking, Funds & Hedge Funds [4]. Previous efforts focused on compliance sub-domains (e.g. AML) or specific functionalities (e.g. annotation). To our knowledge NextAngles (NA) platform is the only holistic approach/system to support the end-to-end operations of regulatory compliance.

NextAngles utilizes the benefits of semantic technologies to address the challenges of financial compliance: its large conditional rulesets are encoded as sets of inference rules; the false positives generated by its surveillance systems are reduced by machine

learning algorithms; and ontologies drive efficient data alignment, curation and validation processes across sources, on and off the web, to meet its data demands. Linked data provides a single unified view of the customer for analysis and enables the automation of the compliance officials' data gathering and assessment process. The flexible design of NA platform allows for the modular implementation of various solutions. NA platform leverages the power of semantic technologies in the areas described below.

Domain ontologies; whilst FIBO provides a comprehensive abstract layer for the financial domain, using these models in a practical application at the enterprise level requires extended and more granular models. NextAngles builds on FIBO and provides in-depth ontology models of the compliance domain.

Regulation Ontologies; all compliance regulations are modeled using a combination of OWL modeling and SPARQL/SPIN rules. The combination of regulation and domain models allows the system to understand the nature of the alerts that are being generated, identify the relevant sources and extract the relevant data from those sources. The extracted data is then mapped to the existing models, thus providing an interlinked and integrated view of the data for the investigators. Semantic modelling enables a "rules to data approach" where only relevant rules are triggered, hence optimizing rule processing. Regulation models are also linked with structural models of the financial institutions enabling an agile and speedy response to any regulatory changes.

Process Ontologies; besides the domain knowledge, NA also models the investigation processes, compliance policies and controls, capturing, e.g., workflows for investigation, reporting and information sharing. This allows the creation of an automatic audit trail while increasing the cognitive capability of the overall system regarding the tasks that need to be performed and the data required to complete them.

## **2 NextAngles in Use – The Trade Based Anti-Money Laundering (TBAML) Solution**

TBAML is one of the solutions built on top of NA platform. Challenges lie mainly in the process being manual, required data residing in various sources in different formats both internal and external to the bank, lack of live data integration (i.e. ship routes) and difficulty benchmarking market prices, specifically for non-commodities [5]. In NA, ontologies have been created for the trade domain, trade investigation process and the reporting/information sharing process. Further, trade regulations (i.e. FINCEN and UCP rules) are semantically encoded. Data from various internal, third-party, and web service sources are pulled into the system and mapped to RDF models, allowing comprehensive analysis of each trade transaction, automatic alert generation in anomalous cases and creation of smart datasets for investigation and reporting. By automating this lower end of the knowledge work NextAngles is proving to reduce the effort for trade transaction monitoring and investigation by at least 40% and overall time by about 70%. NextAngles platform was initially implemented to increase the productivity of Mphasis internal team and was later developed as a product. The metrics provided were measured by our offshore team over an 8-month period of testing with NA; they performed operations in parallel to the core bank who have requested their name not be disclosed.

## References

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