Analysis Exchange Model 2.0

Terms of Reference (TOR)

October 30, 2017

Background: The Analytic Technology Industry Roundtable designed and co-created the Analysis Exchange Model 1.0, and open sourced the technology in November 2017. The Analysis Exchange is a hub of collaborative activity across government and industry, featuring a client-server architecture for storing shareable results, an ontology spanning multiple domains, software for parsing and adapting analytic results, and a query engine for retrieval. The Exchange allows and enables industry partners to achieve their shared goal of working together while still maintaining the independence that protects their core intellectual property. The work gives government access to varied tools' results without the requirement of complete immersion in a single company's solution. In the Analysis Exchange Model 1.0, the Roundtable used multiple use cases to demonstrate the Analysis Exchange: fraud, waste, and abuse; physical threat assessment; and cybercrime, such as ransomware.

Proposed Scope:

The Analysis Exchange 2.0 work will entail the following activities, and expand upon the work of the first model:

- Broaden use cases from Analysis Exchange Model 1.0.
- Discover and advance toward government provided goals.
- Add support for other industry partner capabilities and needs such as data streaming or scalability.
- Add new internal Analysis Exchange functionalities to handle security, provenance, and inference.

The initial three use cases in Model 1.0 provide a roadmap to expand and included additional use cases. This expansion can be horizontal or vertical, depending on government guidance and partner capabilities and interests. Horizontal growth entails enlarging the library of specific use cases to include a greater variety, requiring the expansion of the supporting ontology into brand new domains. Vertical growth entails exploring domains of existing use cases (e.g., fraud, threat assessment, and cyber) more generally, attempting to map analytic capabilities and expand the Analysis Exchange Ontology so that there is a greater capability on related, but more

general, topics. Which use cases are selected for development should be those that address government provided goals and should be worked towards evaluation in a government facility or environment. Importantly, the use cases should also be ones that serve the government interest, but are not part of an existing RFI or RFP so as not to create conflict.

The initial capabilities contributing to Model 1.0 use cases will be expanded as we scope Model 2.0. This includes support for industry needs and capabilities that have not been utilized yet, such as data streaming or the ability to scale to "big data." In addition, new internal functionalities and competencies will be explored. These functionalities include 1) provenance, which tracks the history of knowledge in the Analysis Exchange throughout the workflow, 2) security, which encompasses all methods for assuring data is protected and access to specific knowledge is available to appropriate parties, and 3) reasoning and inference rules, which allow the Analysis Exchange Ontology to go beyond serving as a taxonomy and semantic roadmap for adaptation to providing the capability to perform rule-based analysis on knowledge from different sources to discover new facts.

Products

The deliverables for Model 2.0 may include:

- An evaluation of an Analysis Exchange example for a use case in a government facility or environment and a report on these results.
- A report on new analytic capabilities and needs supported for the first time in Model 2.0.
- An updated, and continually maintained, ontology.
- Code (parsers and adapters) and documentation on all new supported use cases in Model 2.0.
- Code and documentation on all new internal Analysis Exchange functionalities, describing:
    - Solutions for data and knowledge security.
    - Solutions for provenance of data, knowledge, and workflow.
    - Included inference and reasoning capabilities.