

1.2 - Analyze Artifacts

Analyze Artifacts defines profiles supporting the analysis of artifacts utilizing semantic queries, reasoning, rules, and data mediation.

In a diverse information environment, semantics must be used to clearly indicate the meaning of data. This requirement is expected to be addressed by the Semantic Infrastructure, although there will be a touchpoint between the caGrid 2.0 platform and the Semantic Infrastructure to annotate data with semantics. Data semantics are captured in the Semantic Infrastructure and the platform will leverage the Semantic Infrastructure for reasoning and analysis.

A Rule is a prescribed guide for carrying out activities and processes leading to desired results, for example, the operational realization of policies. A Regulation is a mandated process or the specific details that derive from the interpretation of Rules and lead to measurable quantities against which compliance can be measured. Policy is made operational through the promulgating and implementing of Rules and Regulations

Information and behavioral models, in conjunction with discovery mechanisms, mediation, classification, traceability from requirement to operation, and interaction logs, enable comprehensive **analysis** to be performed through-out the life-cycle of artifacts, from design through run-time implementation.

The semantic models managed by the Semantic Infrastructure enable enhanced **reasoning**.

Two families of rules have been identified by stakeholders. Rules related to workflow and business processes that would be executed by a general purpose rules engine (such as Drools or JESS) and rules specific to semantic reasoning (such as SWRL and SPARQL) that would be used within semantic technologies.

For general purpose rules:

- Develop a translation into formal semantics and computable abstraction and representation of policies and regulations imposed on a federal, state, organizational and institutional level. caBIG® standards, tools, best practices should make it easy or at least easier to be compliant. It should therefore aid the community in acknowledging, interpreting and applying the relevant regulations, inform the legislators on the success and value of the regulations and foster constant improvement.
- Incorporate a rules engine.
- Adopt a common syntax and a structure for rules which utilize data elements as their facts and conclusions. Adoption of a shared syntax and structure by all members of the caBIG® community will facilitate exchange of executable knowledge and diminish the need for extensive or resource intensive learning efforts on the part of adopters of such a system.
- Adopt a common model for rule structure. The proposed structure for rules should support the rule as an object. This has significance in caBIG® as it will allow the rules to be accessed via an interface and this will also allow the different components of rules to be treated as data elements.
- Maintain a rules repository.

For semantic services:

- Support a semantic rules capability, such as SWRL or rules expressed in SPARQL
- Support a semantic reasoner that can use those rules in reasoning and inferencing

Link to use case satisfied from caGRID 2.0 Roadmap: The oncologist accesses The Cancer Genome Atlas (TCGA) database to search for de-identified glioblastoma tumor data that is similar to the patient data exported from the hospital medical record. During this search, the semantics of the data fields are leveraged to indicate matches between TCGA data fields and the hospital medical record data fields.

Functional Profile

- [1.2.1 - Analysis](#) Information and behavioral models, in conjunction with discovery mechanisms, mediation, classification, traceability from requirement to operation, and interaction logs, enable comprehensive **analysis** to be performed through-out the life-cycle of artifacts , from design through run-time implementation.
- [1.2.2 - Reasoning](#) The semantic models managed by the Semantic Infrastructure enable enhanced **reasoning**.
- [1.2.3 - Rules](#) A Rule is a prescribed guide for carrying out activities and processes leading to desired results, e.g. the operational realization of policies. A Regulation is a mandated process or the specific details that derive from the interpretation of Rules and lead to measurable quantities against which compliance can be measured. Policy is made operational through the promulgating and implementing of Rules and Regulations