Current

February, 2017 - SysML 2.0 Model Construction RFP Requirements

1. Model Construction Functional Requirements for the Systems Modeling Environment (SME)

- **1.1 Functional Requirements Overview**
  - Model construction is the ability to create, update, and delete individual model elements or collections of model elements including metadata elements.

  - Model construction applies to model patterns, queries, rules and expressions, transformations, links to external data elements, and any other constructs that are used to support the construction of the system model.

  - The goal is for the SysML v2 specification to enable efficient and intuitive model construction for a broad range of users. SysML v2 should not limit the use of current and future technologies that support model construction.

  - Model construction can be performed in complementary ways that include

    - interactively, using the graphical interface provided by the modeling environment

    - batch mode, by importing data from an external file, database or software application, and transforming it to the corresponding SysML model constructs.

  - The model may be constructed using different forms that include textual, graphical, or tabular entry or a combination.

  - The requirements for model construction have interdependencies with other requirements related to model visualization, model management, workflow and collaboration, and model analysis. Model construction uses services provided by these other capability areas, and the other capability areas use the model construction services.

- **1.2 Create**
  - SysML v2 shall provide the ability to create model elements and other model constructs interactively using textual, graphical, and/or tabular entry.
  - SysML v2 shall provide the ability to create model elements and other model constructs by batch import from an external source, and transforming the source data to the corresponding model elements or constructs.

- **1.3. Update**
  - SysML v2 shall provide the ability to update model elements and other model constructs interactively using textual, graphical, and/or tabular entry.
  - SysML v2 shall provide the ability to update model elements and other model constructs by batch import from an external source, and transforming the source data to the corresponding model elements or constructs.
- **1.4 Delete**
  - SysML v2 shall provide the ability to delete model elements and other model constructs interactively using textual, graphical, and/or tabular entry.
  - SysML v2 shall provide the ability to delete model elements and other model constructs by batch import from an external source, and transforming the source data to the corresponding model elements or constructs.

2. Model Construction Service Interface Requirements

- **2.1 Service Requirements Overview**
  - Model construction services further specify each of the functions defined by the functional requirements above and provide a definition of the signatures associated with each of the functions.
- **2.2 Create**
  - return value: Single UUID or collection of UUID's of the model elements that were created
  - Function Name: createModelElements
  - Function Parameters:
    - Collection of "Attribute", attribute type, name and value quadruplets
    - Collection of operations
      - "Operation" type
      - return type,
      - operation name and
      - operation parameter type and name pairs
    - 3) Collection of "Relationship", relationship type, relationship name and related element UUID quadruplets
  - Example: createModelElements({ {Attribute, String, Name, "MyName"}, {Attribute, String, Description, "My description"}, {Operation, Integer, Sum, {{myValue1, 10}, {myValue2, 20} } } }, {Relationship, Dependency, "my dependency", aUUID })
- **2.3 Update**
  - Return value: Single UUID or collection of UUID's of the model elements that were updated
  - Function Name: updateModelElements
  - Function Parameters:
    - Collection of UUID, Attribute Name, Value triplets
  - Example: updateModelElements({{MyUUID, MyAttributeName1, NewValue1}, {MyUUID, MyAttributeName2, NewValue2}})

- **2.4 Delete**
  - Return value: Boolean (true if deleted successfully, false if error condition)
  - Function Name: deleteModelElements
  - Function Parameters:
    - Collection of UUIDs
  - Example: first retrieve a collection of model element UUID's and then invoke the deleteModelElements service using the UUID collection as a parameter.

3. Standard Modeling Languages

- SysML v2 shall provide a platform independent modeling language and selected platform specific bindings to create, read, update, and delete model queries.
- SysML v2 shall provide a platform independent language and selected platform specific bindings to create, read, update, and delete model transformations.
- SysML v2 shall provide a platform independent language and selected platform specific bindings to create, read, update, and delete expressions.
- SysML v2 shall provide a platform independent language and selected platform specific bindings to create, read, update, and delete viewpoint methods.

4. Model Construction Concept Definitions

- **4.1 Concept Definitions Overview**
  - The concepts defined in this section clarify the meaning of terms used in the requirements sections above.
- **4.2 Core concepts related to model construction**
  - Model - (refers to existing definition)
  - Model Element – (refers to existing definition)
  - Model Construct – A model element or other entity used to construct a system model that includes model patterns, queries, rules and expressions, transformations, and links to external data elements
  - Model Collection - A collection of model elements and/or modeling constructs used to construct the system model
  - UUID (Universal Unique Identifier) - A globally unique identifier for each model element (refer to existing definition?)
  - Interactive - User initiated operations using the graphical interface of the SysML user interface
  - Batch Mode - User initiated operations using an external collection of model element properties, operations and/or relationships
  - External Collection - A file based or database or link based mechanism to persist descriptions of model elements