The “**IAOA Summer Institute on Upper Ontologies 2017[[1]](#footnote-1)**” asked some interesting questions about ontologies (upper or not). We have filled out their list of questions for the “Semantic Modeling for Information Federation” core model. Many of the questions are more specific than covered in SMIF (as SMIF is intended for a broad range of theories). So, these more specific questions are answered in relation to the “Concept Library” which is defined in the SMIF language and specializes core SMIF concepts.

Information on both can be found here: <https://github.com/ModelDriven/ConceptLibraries/tree/master/Libraries/FederatedConceptLibrary>

Note: This is a quick, preliminary treatment!

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| IAOA Question | SMIF & Concept Library Answer | Discussion |
| 1    Relation to time and space |  |  |
| * How do the entities represented in the ontology exist in relation to time? | Actual entities have a relationship to a timeframe in which they do or may exist. | Note that this includes relationships and characteristics such that a relationship between things and characteristics of things may (usually) exist for a time period. |
| * Does it take a 3-dimensionalist view allowing only entities extended in space? | SMIF allows 3d or 4d models. The fundamental architecture is 4D. |  |
| * Does it take a 4-dimensionalist view allowing only entities extended in spacetime? | It takes (supports) a 4d view. It does not restrict entities to only existing in space/time. | In “Locations” There is a type “Spatial Entity” (subtype of “Actual Entity”) representing things existing in space/time. |
| * How does the ontology deal with (one-, two- and three-dimensional) spatial regions and with (four-dimensional) spatiotemporal regions? | The SMIF model does not include spatial concepts.  The concept library package “Locations” has a concept of “physical location” and is not specific to any number of dimensions. |  |
| * EXAMPLES: Spatial boundaries such as the Equator and the North Pole are examples of two- and one-dimensional spatial regions, respectively. The latitude-longitude system and WGS 84 are examples of frames of reference. | In “Locations” “Equator and the North Pole” are a “Topology”.  WGS-84 is a “Coordinate System”. |  |
| 2    Actuality and possibility |  |  |
| * How does the ontology deal with what might be the case, rather than what is the case, with what might happen rather than what has happened? | The “Case” would be considered a situation. Actual vs. possible would be represented as assertions about that situation. | The concept library package “Situations” further refines this to identify past, current and potential situations. |
| * Does it support both possible and actual entities? | Yes. |  |
| * Does it have a treatment of dispositions or tendencies? | No |  |
| * Does it have a way of dealing with plans or designs that relate to merely potential entities? | Yes, these would be “Patterns”. |  |
| Realism vs. nominalism |  |  |
| * How does the ontology deal with issues of classification? | All things may have any number of types. |  |
| * Does classification involve merely the existence of certain relations of similarity between certain entities, or is there a relation of instantiation between entities and corresponding classes or types? | There a relation “Extent of Type” of instantiation between entities and corresponding types |  |
| * Are classes of classes allowed? | Yes. | Everything has types, including types. |
| * Are types or universals instantiated by the same individuals identical? | Not necessarily. | There can be different intentions for the same extensions. |
| Eternalism vs. presentism and change over time |  |  |
| * How does the ontology deal with time and change? | For the most part, by the time duration of relationship and characteristic instances. Entities can also have “Phases”. |  |
| * Is the ontology eternalist (so that the past and the future exist as well as the present), or is it presentist (so that only the present moment exists), or something else? | Eternalist. However, “Snapshot in time” models can also be represented. |  |
| * How does the ontology deal with location, and with change of location? | The location of a physical entity is a relationship. That relationship exists for a time period. |  |
| * Does the ontology allow for more than one object to occupy exactly the same spatial location at the same time? | No commitment. |  |
| * How does the ontology deal with changes in attributes? | Characteristic (instances) exist for a time period. |  |
| * Does the ontology recognize a distinction between universals that necessarily apply to a particular for the whole of its existence, and universals that apply only temporarily. | Yes, there is a classification “Phase” for temporality. |  |
| * EXAMPLE 1: Mammal is an example of a universal that applies to a particular for the whole of its existence. | Yes, an entity type |  |
| * EXAMPLE 2: Lawyer is an example of a universal that applies to a particular temporarily. * How does the ontology deal with identity and change of objects over time? | This is a “Role”.  Identity would be the one thing that does not change (by definition).  Change in those things is represented by the (temporal) relationships and characteristics. |  |
| * EXAMPLE 3: Persons are an example of objects that can undergo change over time, such as by losing hair, without changing identity. | Yup. |  |
| 5    Mereology |  |  |
| * How does the ontology deal with relations of parthood? | SMIF does not specify Mereology.  Concept library “Parthood” is first-class relationship between a part and a composite. | Concept library Mereology is simplistic but should not conflict with more developed theories. |
| * Does it define parthood as a reflexive, transitive, antisymmetric relation, or does it have an alternative formal treatment of parthood? | No commitment. |  |
| * How does it treat the issue of supplementation: if a is a part of b but not identical to b, then there is some part (or some unique maximal part) of b that has no parts in common with a? | No commitment. |  |
| * How does it deal with wholes formed through the summation of parts? | No commitment. |  |
| * How does it deal with relations of continuity where an object has parts between which there is no natural boundary? | No commitment. |  |
| * How does it deal with relations of contact where two objects touch, but are not fixed in place? | No commitment. |  |
| 6    Levels of reality |  |  |
| * How does the ontology deal with granularity and levels of reality (where grains at one level are parts of grains at higher levels)? | Anything may play the role of a composite. |  |
| * Does the ontology treat the material world as being made up of distinguished levels? If yes, what is the relation between such entities and the material of which, at any given time, they are made? | No |  |
| 7    Attributes |  |  |
| * How does the ontology deal with attributes? NOTE: ‘Attribute’ here is meant to include what are sometimes referred to as properties, features or characteristics. | I think this is what we call “Characteristics”. Characteristics are “first class” and may be temporal. |  |
| * How do qualitative attributes such as colour or temperature relate to quantities? | SMIF has a “Value” ontology. Color and temperature are “Quantity Kinds”. |  |
| * How do attributes relate to the entities that have or bear them? | The characteristic instance “binds” a value that is “bound to” the subject. |  |
| * Does the ontology recognize attributes of attributes? | This is possible |  |
| 8    Processes and events |  |  |
| * How does the ontology deal with processes? | SMIF does not commit to processes. The concept library package “Processes” defines the concept. A process is a pattern of occurrences. |  |
| * Are processes identical to changes? | No |  |
| * What kinds of processes exist? | Any kind the modeler defines. | Not sure I understand this question. |
| * Does the ontology allow attributes of processes? | Yes |  |
| * How does the ontology deal with roles? | Roles are a first-class concept not specific to processes |  |
| * EXAMPLE: The lawyer role and the agent role are examples of roles. | Yup |  |
| * How does the ontology deal with causality? | Cause is a first class relationship between situations (a supertype of process) |  |
| * Does the ontology recognize a distinction between processes and states? | Yes, these are subtypes of “Situation” |  |
| 9    Abstracta |  |  |
| * Does the ontology recognize immaterial entities | Yes |  |
| * EXAMPLE: Cavities are an example of immaterial entities. Numbers and other abstracta. | Terminology: Numbers are considered “Values”, not entities. |  |
| 10    Information and reference |  |  |
| * How does the ontology deal with information entities? | The concept library package “Information” defines information entities. |  |
| * Does it incorporate a relation of aboutness between information entities and what they are about? | Yes “Representation Rule”. This is most important is SMIF as it is focused on defining how information entities represent concepts. |  |
| * If yes, how does the ontology deal with the phenomenon of aboutness in cases where there is no actual entity which a given information entity is about? Does the ontology deal with cases of this sort by recognizing possible worlds? | Possible worlds are possible. |  |
| * EXAMPLE: An example of aboutness arising where no actual entity to refer to is where plans for the future are being made. | Would not look at it this way, it is “about” something, it just does not happen to exist at the moment. |  |
| 11    Artefacts and socially constructed entities |  |  |
| 1. Which categories in the ontology would be used to deal with artefacts |  | That question needs to be unpacked a bit. |
| 1. EXAMPLE: Engineered items are examples of artefacts. | In the concept library “Information” it would be an “Information Object”. |  |
| 1. Which categories in the ontology would be used to deal with agreements, responsibilities, or permissions? | In general, these are kinds of situations. |  |

1. https://docs.google.com/document/d/1O73ec\_KQopxGNFTOjRiVY01LU8vonYuT5S1hPXQh4Fw/edit# [↑](#footnote-ref-1)