Abstract. The draft standard for ontology, ISO/IEC 21838 Part 1, requires considerably more work. The critical definitions are vague, its conformance criteria are unclear or nonexistent, and it does not show any evidence that a conforming ontology would meet the stated requirements. This review contains five recommendations for resolving these issues.

The draft of ISO/IEC 2138 Part 1 is so vague that (a) it’s not clear what is being specified; (b) there are no clear criteria for determining what would conform to whatever is supposed to be specified; and (c) there is no evidence that it responds to the requirements stated in the opening sentence of the introduction: “This standard was developed in response to worldwide demand for ontology-based solutions to the problem of semantic interoperability across networks of information systems.”

An ISO standard is supposed to specify something, and it must state criteria for conformance. This document recommends Common Logic and OWL for specifying an ontology, but it doesn’t contain criteria for determining how and whether a text written in CL or OWL does or does not conform to the proposed standard.

Section 3 contains a list of definitions stated in vague English. They begin with the hopelessly vague “entity: Any concrete or abstract thing of interest.” And they end with the inscrutably vague “downward population: A method for ontology creation whereby terms and relational expressions from an existing ontology at a given level of generality are reused in a second ontology at a lower level of generality.”

Recommendation 1. The terms in Section 3 are too vague for any conformance test. To be precise, they should be stated in a version of logic. Since Common Logic is a superset of FOL and OWL, those terms could and should be defined in CL. For ease of reading, every CL definition should be accompanied by an English paraphrase. If any question arises, the CL definition shall be normative, and the English paraphrase shall be informative.

Recommendation 2. Formal definitions of the terms in Section 3 would not only be normative, they would also be a highly informative example for any users of the proposed ISO standard. Since both CL and OWL are normative, all the definitions should also be stated in OWL. Since CL is more expressive than OWL, it’s not clear whether all the CL definitions could be completely expressed in OWL. The issues about expressive power and the methods for mapping OWL to CL shall be stated in a normative annex to the proposed standard.

Section 5 on requirements is also vague. Subsection 5.4 is more detailed, but it’s called “Supplementary documentation.” Is that supplement supposed to be normative or informative? It seems to be a collection of questions that were designed to be answered by the BFO ontology.

But BFO is a very narrow, idiosyncratic ontology. It ignores so many fundamental issues of ontology that it’s not clear that BFO could be used to answer those questions.
**Recommendation 3.** Section 5.4 should state how and whether a conforming ontology shall answer those questions (or any others that may be proposed). Are the answers required to demonstrate conformance? What kinds of answers are expected? Vague English? Formal definitions in CL and/or OWL? If formal definitions are required, shall a formal proof of conformance be required?

**Recommendation 4.** For Part 2, every proposed ontology shall be required to show conformance to whatever criteria are stated in Part 1. In fact, the exercise of showing that BFO conforms to the more precise criteria of Part 1 would improve the normative and informative content of both Part 1 and Part 2.

Finally, Part 1 mentions semantic interoperability in the opening paragraph. That critical issue is ignored in the remainder of the standard. For an overview and history of semantic interoperability from the database systems of the 1970s, to the expert systems of the 1980s, to the networks of the 1990s, and to today’s linked data, see [http://jfsowa.com/ikl](http://jfsowa.com/ikl).

**Recommendation 5.** Part 1 should specify criteria and tests for different levels of semantic interoperability: sharing data, sharing software, passing messages, updating systems, integrating heterogeneous systems, replacing legacy systems, etc. The most serious challenges involve interoperability among systems with different ontologies and with legacy systems that have no explicit ontologies. Part 1 shall specify different levels of interoperability and the conformance criteria for each level.

**Summary.** The current proposal is an early stage draft that needs much more work before it could be adopted as an ISO standard.