

cases along with the underlying argumentation supporting goals. Templates will provide support for defining and describing constraining conventions that a community may require for assurance cases within a particular domain due to regulatory requirements or accepted practices in that domain/industry/community.

- Improve the modularity and simplicity of SACM
- Provide for future concepts such as structured expressions and other formalisms

The SACM 1.1 was subsequently worked to attempt to meet these goals and a draft metamodel was created during the summer OMG 2013 Berlin meeting. However the magnitude of the changes necessary to actually integrate the two original metamodels into one cohesive approach and achieve some of the other goals turned out to be too big of a change for a point release. The final SACM 1.1, released in July 2015, was scaled back to address some of the issues and it cleaned up some terminology and logical issues but it did not substantially alter the underlying metamodel.

During this same timeframe other efforts in the OMG (the Dependability Assurance Framework for Safety-Sensitive Consumer Devices (DAF)) and in The Open Group (the Dependability Assurance Framework (O-DA)), as well as the work of the Food and Drug Administration (FDA) in the U.S. started making use of the assurance case concept and articulated implicit requirements/needs for tools that would work with assurance case models and their exchange.

Additionally, the Open Platform for Evolutionary Certification of Safety-critical Systems (OPENCOSS) effort in Europe was exploring different uses of assurance cases, including the creation of a Common Certification Language, and the OMG's Architecture Driven Modernization Task Force crafted a Structured Pattern Metamodel Standard (SPMS) that provided a method for describing patterns within models. Together these new needs and the new openly available capabilities represented in OPENCOSS and SPMS offer a way forward.

This version 2.0 of SACM has been created as a major version release since pursuing another point release revision of SACM would appear to be incompatible with achieving the integration and harmonization that is critical to obtain wide-spread adoption and implementation within the tooling market and allow that market to deliver on some of the potential capabilities they could provide to address the emerging and evolving need for assurance case tools, such as:

- Improving the Understandability of an Assurance Case to a 3rd Party
- Improving Rigor of Assurance Cases through Modeling
- Allowing for Reexamination of Assumptions, Argument Structuring, and the Appropriateness of Evidence
- Allowing for Reuse of Sub-Claim/Evidence Constructs That “Work”
- Authoring/Sharing Libraries of Sub-Claims/Supporting Evidence
- Providing for Assurance Case Analytics/Validation
- Providing for Exchange of Assurance Cases (Import/Export)
- Providing for Enforcing Community of Interest Norms of Practice

The resulting metamodel in version 2.0 of SACM came from the ideas in the 2013 Berlin metamodel, along with the approaches utilized for modeling artifact- and process-related concepts in OPENCOSS Common Certification Language and the pattern metamodel and concepts from the SPMS.

**Issue SACM22-4** | In SACM 2.1, the concrete syntax for the Argumentation metamodel <sup>was</sup> ~~is~~ defined. The concrete syntax is designed based on visual notation design theories such as semantic transparency and structure visual inheritance. Furthermore, the existing notations in the domain such as GSN and CAE are also considered in the design process.

**Issue SACM22-4** | **In SACM 2.2, minor clarifications, expanded explanations for enhanced readability and consistency have been incorporated along with a new annex to provide additional details about the concepts of package interfaces and bindings and their use within the standard.**