

# ASCE

## The Assurance and Safety Case Environment

ASCE 5.1 datasheet

Around the world defence agencies, transportation, housing, nuclear energy and medical device providers are using Adelard's ASCE software to produce high integrity, defensible, safety and assurance cases.

Using a combination of graphical representation with a supporting narrative, the safety or assurance argument is constructed using industry standard notations such as CAE and GSN.

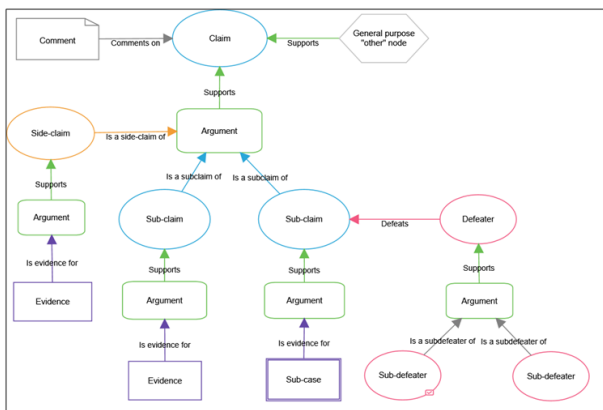


Figure 1. Summary of ASCAD 2.0 graphical notation

### Assurance 2.0

Assurance 2.0 is a modernised framework developed in response to the new challenges facing traditional system assurance such as those of autonomous systems with functions driven by machine learning and artificial intelligence. It makes assurance more rigorous, with increased focus on the reasoning and evidence employed, and explicit identification of defeaters and counterevidence. Assurance 2.0 advocates the use of CAE Blocks, which provide mechanisms for separating inductive and deductive lines of reasoning, and for managing the side conditions necessary to justify argument steps.

### ASCAD 2.0 and CAE Blocks

ASCAD 2.0 is a new schema released with ASCE 5.1 to support the Assurance 2.0 framework. It incorporates the new node types and links necessary for the use of CAE Blocks, as well as managing defeaters and comments in assurance cases.

### Product summary

#### New for ASCE 5.1

- ASCAD 2.0 schema and CAE Blocks methodology support
- GSN Version 3 support, with Modular GSN 3.0 available as a cost option
- Defeater management and comments management features
- Support for Windows 11
- Support for MS Office 365 and Office 2021
- Support for different regional settings, locales and date formats
- Improved performance and technical optimisations
- Full transition to the 64-bit architecture
- Schema upgrade capabilities
- Usability and GUI improvements
- Updates to the plugins and documentation

#### Key features of ASCE

- Visualisation of the structured argument, including support for CAE and GSN methodologies
- Node editor to add context and a narrative to the argument
- Document management capabilities, with rich traceability and automatic detection of changes
- Easy report preparation into various formats such as MS Word, PDF, HTML
- Viewing tools to simplify presentation and navigation, including User Views, Table View, Bird's Eye View
- Content protection
- Modular GSN support (cost option)
- IBM Rational DOORS integration (cost option)

#### Licensing options

- Floating licence to meet the needs of a pool of users
- Node-locked for use by a single user

CAE Blocks provide a series of archetypal CAE fragments derived from an empirical analysis of real cases in various domains. CAE blocks increase the precision and efficiency of the claims in arguments because each claim instantiated from a block inherits a formal CAE structure as part of the block. This can turn blocks into reusable, self-contained components that could become the main building blocks of formal and semi-formal assurance cases.

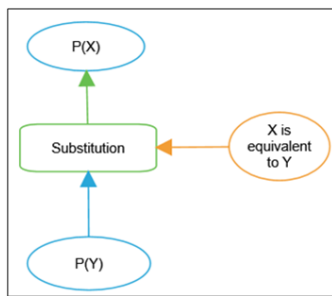


Figure 2. Substitution block

## Defeater management

Defeater management is used to increase confidence in the assurance case. When using defeaters, authors and reviewers challenge the assurance case. In ASCAD 2.0, this can be done by adding defeater nodes to the ASCE canvas and using ASCE's editing tools to provide the challenge narrative. The defeaters can then be addressed by adjusting the assurance case or analysing and disputing the challenge, with the aim of addressing all defeaters. Defeaters are most helpful when they are used to capture the journey of development, as they help to document the issues flagged up and discussions held while creating the case, serving to increase the rigour and confidence in the case.

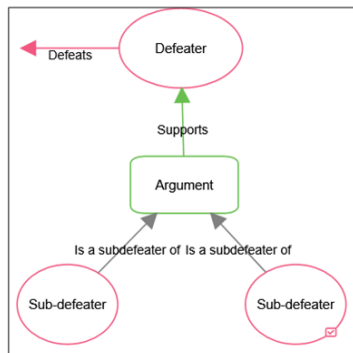


Figure 3. Defeater structure

Implementation of defeater management in ASCAD 2.0 includes the following functionalities: hide/show all defeaters, hide/show addressed defeaters, and Table view with filter and export capabilities. In GSN 3.0, a new link type and decorator have been implemented to indicate that a relationship or GSN element have been challenged and/or defeated in the assurance case.

Additionally, a new “defeater” item type is now available in the Embedded issues plugin to add defeaters directly into the node narrative content.

## Comments management

A new comments management feature is available in ASCE 5.1 for CAE (ASCAD 2.0) assurance cases. The comment node is linked to existing nodes to communicate additional

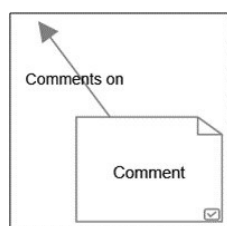


Figure 4. Comment element

comments or notes within the assurance case. The response to each comment is typically documented in the node narration and is preserved as part of the case to assist further revisions and reviews. A fully addressed comment node can be marked as ‘addressed’ and can be hidden from the canvas if so desired. All comments, whether hidden or not are fully preserved within the assurance case.

## GSN v3

ASCE 5.1 introduces support for the new version 3 of the GSN community standard. All of the GSN v3 extensions, Argument Pattern, Confidence Argument, Dialectic Extensions and Modular GSN are supported in ASCE 5.1 using the GSN 3.0 schema. Modular GSN has also been updated to support the latest GSN 3.0 features and is available as a cost option.

## General updates

- Support for Windows 11, Office 365 and Office 2021, discontinued support for Windows 7
- Updates to the existing plugins (e.g. Status field editor, Resource manager, Embedded issues)
- Improved support for different regional settings, locales and date formats
- Schema upgrade environment
- Improved error reporting throughout the product
- Improved ASCE Help documentation and plugin manuals
- Improved performance
- Full transition to the 64-bit architecture

ASCE is fully backward compatible but forward compatibility is limited when using new features of ASCE. New encoding for forward compatibility informs the user when reverting to a previous release of ASCE.

## About Adelard

Adelard, part of NCC Group, provides independent and technically sound advice on how to engineer and assure high integrity computer-based systems.

We are an influential consultancy and product practice working in nuclear energy, medical, defence, finance, housing, air traffic control, rail and critical infrastructure protection.

We have defined and developed best practice in a range of critical applications and have several important strategic relationships with industry, government and regulators.

Further insight on Assurance 2.0 and defeater methodology can be found in the following paper, Bloomfield, R. E. and Rushby, J., “Assurance 2.0: A Manifesto”, 2020. <https://openaccess.city.ac.uk/id/eprint/24093/1/2004.10474v2.pdf>

An introduction to CAE Blocks can be found at <https://openaccess.city.ac.uk/id/eprint/5121/1/BuildingBlocksforAssuranceCases.pdf>