SCADE Architect is part of the ANSYS Embedded Software family of products and solutions, which gives you a design environment for systems with high dependability requirements. It provides full support of industrial systems engineering processes, such as ARP 4754A, ISO 26262 and EN 50126.

This product features functional and architectural system modeling and verification in a SysML-based environment. It provides a strong foundation to deploy Model-Based Systems Engineering (MBSE) processes and best practices. A key feature is the capability to generate consistent and comprehensive Interface Control Documents (ICD) as an important outcome of the MBSE processes.

SCADE Architect has been specifically developed for system engineers; the underlying SysML™ technology is hidden, making modeling more user-friendly and intuitive than standard SysML tools or plain databases. SCADE Architect also complies with the OMG XMI storage format.

By using SCADE Architect in conjunction with other ANSYS SCADE® tools, system and software engineers can work within the same framework. Developers can quickly synchronize the system model and the software subsystem components, ensuring consistency of the software architecture and modeling efficiency, for instance for the management of I/O definitions. When SCADE Architect is bundled with SCADE Suite, SCADE Architect provides an integrated software engineering solution combining software architecture and software design in a single comprehensive user interface. When SCADE Architect is bundled with medini analyze, SCADE Architect provides a powerful means to model the functional and physical architecture of a system for safety analysis objectives. When SCADE Architect is extended with SCADE Avionics Package, SCADE Architect provides AADL, FACE™, and IMA solutions.

**System Requirements Analysis**

**Analysis of System Use Cases**
- Representation of system use cases and actors interacting with the system in Use Case Diagrams
- Ability to refine uses cases with Sequence, Activity or State Machine Diagrams

**Analysis of System Scenario**
- Representation of operational system scenario in Sequence Diagrams
- Ability to link and navigate to actions in Activity Diagrams and states in State Machine Diagrams

**Analysis of System States**
- Representation of system states and transitions at any level of system decomposition in State Machine Diagrams
- Refinement of any state with referenced State Machine Diagrams
- Free text or signal usage on transitions
Analysis of System Activity

• Representation of the actions control flow within a subsystem at any level of system decomposition in Activity Diagrams
• Refinement of any action with referenced Activity or State Machine Diagrams

System Design

Functional and Architecture Design

• Functional and architecture decomposition through block diagrams
• Simple and intuitive definition of system architectures through the concept of reusable/unique blocks
• Component reuse managed with block replicas and ability to allocate items independently on each component replica
• Comprehensive visualization of component hierarchy within project tree
• Allocation of functions to components made locally to the functions or components, or through drag-and-drop in allocation tables
• Annotation mechanism to add custom properties on model objects

Data Management

• Definition of data dictionaries
• Import/export of data dictionaries in Microsoft® Excel® or Comma-Separated Value files
• Data propagation across block hierarchy
• Data propagation path visualization
• Data propagation consistency checks
• Tables of model objects (I/O ports, connectors, data, allocations) with unlimited hierarchical levels and customizable columns aimed at quickly and efficiently managing long lists of data
• Ability to search table contents

System Constraints Representation

• Representation of constraints between block data in Parametric Diagrams
• Refinement of constraints in Parametric Diagrams
• Free text in constraints expression

Model-Based Design Solution

• More user-friendly than plain databases
• Supports all standard drawing features such as alignment, line styles, fonts, etc.
• Styles management for better visual identification of components in diagrams
• Navigation capabilities within model content and definitions with Find and Browse

Support of Collaborative Work

• Import SysML models from IBM Rhapsody and NoMagic MagicDraw
• Extraction of system parts for third parties, ensuring IP protection of the system model
• Management of read-only model libraries and support for library re-organization, allowing multi-user collaboration
• Read/write access to SCADE Architect models through a Python OCL, TCL or Java model API
• Capability to develop specific import/export through the model API
Support for Requirements Traceability

- Traceability to requirements available with the integrated SCADE LifeCycle ALM Gateway

System Design Verification

Model Consistency Checking

- Automatic verification of modeling rules applicable to entire model or model parts
- Set of predefined rules for common usage patterns to quickly fix violated rules
- Live Checker mode for on-the-fly rule check
- Addition of custom rules through the API (in Python OCL, TCL, Java)
- Customizable verification configurations to be used for different parts of the model or at different stages of the design
- Report generation in RTF or HTML with direct hyperlinks on model elements to locate violations

Model Diff/Merge

- Analysis of differences between system model versions
- Filters for the display of model differences
- Merge capabilities to copy changes selectively or in bulk, or to ignore changes selectively
- Tree view of differences allowing for easy understanding of removals, insertions and changes on SCADE Architect model objects
- Comprehensive report about merge actions and differences before and after merge sessions

ICD Generation and Synchronization with Software Design

Automated Production of Interface Control Documents (ICDs)

- Production of tables from propagated data representing interfaces of blocks
- Custom query columns (Python OCL, TCL, Java) allowing automated extraction of related information from the model, for example data producer and consumers, properties from the communication data path, etc.
- Import/export of table in Microsoft Excel and Comma-Separated Value files
- Customization of data to represent messages with dedicated communication protocol properties, allowing tables to represent comprehensive ICDs.
**Synchronization with Software Components**
SCADE Architect allows for the refinement of software components in the SCADE Suite model-based software development environment through:

- Evolution of system design and software components in parallel and resynchronization upon request at chosen project milestones
- Bi-directional synchronization between system structural models and software behavioral models
- Consistent and efficient management of I/Os and data definitions and changes
- Eliminated duplication of efforts in synchronizing interfaces defined at system level and refined at software level

For information on the SCADE Suite product line, see the SCADE Suite technical data sheet.

**System Design Environment Configuration**

**SCADE Architect Configurator**
SCADE Architect Configurator allows methods and tools engineers to configure SCADE Architect Advanced Editor to specific needs of a group of users. Domain-specific configuration relates to the use of industry standards like IMA, AADL, FACE and AUTOSAR, or to company or project standards.

- Definition of domain-specific objects derived from SCADE Architect design elements
- Definition of domain-specific objects, properties and inter-objects constraints in simplified class diagram
- Customization of domain-specific modeler with dedicated user interface palettes, property pages and menus
- Customization of objects icon, graphical styles and tables from Configurator preview for immediate reuse in configured SCADE Architect
- Automatic generation of configuration plug-ins for deployment of domain-specific modelers
- Capability to apply predefined or custom rules on meta-models with SCADE Architect Checker
SCADE Architect Companion Products

SCADE Avionics Package
Comprehensive solution for designing embedded avionics system with respect to a clean separation of concerns into functional, software and platform levels.

This package allows system engineers to handle ARINC 429, ARINC 664-P7/AFDX or CAN communication protocols, Integrated Modular Avionics architecture, and ARINC 653 specific properties. Verification of AFDX communication bandwidth, and generation of ARINC 653 configuration files are automated. SCADE Architect Configurator is a prerequisite for using the Avionics Package.

The SCADE Avionics Package also includes comprehensive solutions for the AADL standard and the FACE standard.

For information on the package, see the SCADE Avionics Package technical data sheet.

ANSYS medini analyze
medini® analyze supports analysis of functional safety of electronic and software based systems. Originally developed to support the automotive ISO 26262 standard, it is also applicable in other application domains.

SCADE Architect comes with a dedicated configuration, named EmbeddedSystem, that allows to distinguish the nature of model objects such as Function, Sensor, Actuator, Processor, SWComponent, HWComponent. ANSYS medini analyze allows for importing selected blocks and diagrams from a SCADE Architect model, creating automatically in medini analyze a mirror model with the same kind of objects and diagrams to perform functional safety analysis.

Application Lifecycle Management

The life cycle management of systems designed with SCADE Architect can be supported by SCADE LifeCycle® by:

• Connecting Application Lifecycle Management (ALM) tools and setting requirements traceability from models
• Generating documentation automatically from models

For information on the SCADE LifeCycle product line, see the SCADE LifeCycle technical data sheet.
SCADE Architect Product Line

**SCADE Architect Advanced Modeler:**
- SysML Editor
- Import SysML models from IBM Rhapsody and NoMagic Magic Draw
- Diff/Merge
- Checker
- Model API
- Synchronizer with SCADE Suite

**SCADE Architect Configurator**
- Application Lifecycle Management Gateway
- User documentation and online help

- Graphical edition of configurations
- Configuration plug-in generation