

Nordiasoft



eCoSuite

Nordiasoft Embedded Components Suite

Embedded Systems Development Made Easy



INNOVATION - LEADING EDGE
Nordiasoft is recognized worldwide for its leadership, expertise and contributions to the SCA ecosystem.

The Nordiasoft Team

Nordiasoft offers products and services for customers that need to create state of the art software-defined systems for use on embedded environments such as the military & commercial, aerospace, telecommunications, instrumentation, transportation, robotics, and consumer electronics industries.

Experts in software components, Nordiasoft offers proven solutions to developers creating next generation heterogeneous distributed embedded systems. The Embedded Components (eCo) Suite is the latest suite of tools provided by Nordiasoft to support the complete development cycle of products based on the open standard Software Communications Architecture (SCA). The Suite has been engineered by the most trusted team of SCA experts in the industry, influencing every release of the standard since 1999, and introducing many of the essential features of today's specification.

Nordiasoft's core team has led a long list of industry firsts in SCA technologies now embedded in thousands of hardware products. First to introduce an Integrated Development Environment (IDE) for the SCA to assist developers in every step of their work from modeling to deployment; pioneered source code generation from SCA models, real-time validation and re-factoring; first to demonstrate a commercial SCA application and to showcase application portability from very small platforms to large military high capacity radios; first to develop virtual panels for system control and the list continues. More recently, Nordiasoft innovated again by demonstrating SCA application components that use OpenCL™ to implement processor agnostic data processing algorithms.

Nordiasoft has teamed with the world's best-of-breed software and platform providers to offer the most comprehensive commercial-grade SCA development product specifically designed for embedded platforms. Several hundreds of engineers and researchers have been trained by Nordiasoft experts on SCA technologies for embedded systems and many companies have relied on Nordiasoft expertise for the development of their products.

The team's contribution to SDR/SCA was recognized multiple times with the International Achievement Award (2010) and the President's Award (2011) by the Wireless Innovation Forum. The team has been the recipient of the President Award (2015) for its stewardship in making the 4.1 version of the SCA specification backward compatible with the previous SCA 2.2.2 version, Technology of the Year (2015) and Best Technical Paper (2015) Awards also from the Wireless Innovation Forum.



Nordiasoft lets you leverage:

- Expertise in every aspect of Software Defined systems.
- Years of experience in performance optimizations.
- Hands-on expertise regarding SCA compliance.
- Largest support of operating environments to future-proof your investment.
- Wide range of professional services including training, mentoring and consulting.
- ITAR-free products.

About the SCA

The Software Communications Architecture (SCA) is a Component Based Development (CBD) architecture for the development of heterogeneous embedded distributed systems.

Originally created for the U.S. Joint Tactical Radio Systems (JTRS) for tactical military software defined radios (SDR), the SCA is now an open international standard that has benefited from the use and input of public and private organizations around the world.

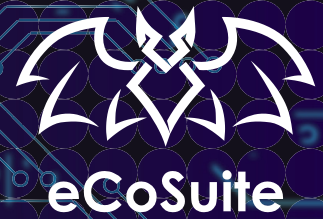
The SCA allows embedded applications to be portable across different hardware platforms. The SCA facilitates post manufacturing system updates and upgrades, minimizes development risk, and greatly simplifies development cycles by promoting software reuse.

Hundreds of thousands of SCA-based military radios have been deployed to battlefields. Thanks to its proven track record, SCA is now being considered in different domains such as radar, electronic signals intelligence and warfare, test and instrumentation, and robotics.

Speed up your SDR development and reduce risk. Adopt the eCo Suite and leverage Nordiasoft experience and expertise in SCA development, certification as well as professional services including training, technical support and consulting.

INTEGRATED SOLUTION

Reduce development risk, improve quality,
and reduce time to market.



The Embedded Components (eCo) Suite

Customers around the world have benefited from NordiaSoft's engineer's expertise in the development of embedded systems using the SCA. With years of experience obtained with the NordiaSoft SCARI Software Suite, in use in government and industry organizations around the world, the new eCo Suite for SCA 4.1 takes advantage of technological breakthroughs of the last decade.

The eCo Suite is a comprehensive Integrated Development Environment (IDE) for heterogeneous embedded distributed systems. NordiaSoft solution embraces the concepts of Component-Based Development (CBD) and Model-Driven Engineering (MDE).

The eCo Suite allows developers to model, create, deploy and test software components that run in real time and are independent from the underlying operating environment. It simplifies architectural design, reduces development costs and time to market, optimizes software performance, and improves overall system quality.

The eCo Suite is composed of three main products.



eCo Hub implements the SCA 4.1 Core Framework (CF) that deploys, configures and controls software applications on the target embedded system platform. It supports the largest combination of operating systems, object request brokers, and processors. Not being subject to ITAR restrictions, eCo Hub is based on the knowledge and optimization techniques acquired with the former SCARI CF that runs in thousands of battlefield deployed radios from different international radio manufacturers.



Eclipse-based development tool that lets you create, validate, and debug SCA software components and applications. Utilizes a visual modeling language that allows developers to unambiguously express every concept of the SCA graphically. Generates behavioral and structural source code that builds for all supported operating environments. Provides a Zero-Merge functionality to simplify business logic insertion.

FEATURES

eCo HUB CORE FRAMEWORK

- SCA 4.1 Full Profile
- Boot time optimizations
- Small footprint
- Support for all major RTOS
- Support for ORBexpress RT®
- Support complete backward compatibility with SCA 2.2.2
- Not ITAR restricted

eCo ARCHITECT

- Zero-merge SCA behavioral and structural code generation
- Real-time validation and re-factoring
- Generates source code that builds for multiple operating environments without regenerating
- Unambiguous graphical modeling

eCo INSPECTOR

- Install, control, and debug applications
- Introspect SCA systems
- Graphical representation of deployed SCA components
- Full control over deployed components
- Use device assignments to deploy components
- Use core affinities to deploy components



Eclipse-based run-time monitoring tool that lets you install and control applications as well as visualize the structure of the running software. The NordiaSoft eCo Inspector is an essential tool for debugging and testing during SCA development.



PORTABLE

Abstract the operating environment to increase source code portability



Built from the ground up for embedded platforms, the eCo Hub is the fourth-generation Core Framework implemented by the Nordiasoft team. It was designed for optimum boot time performances and implements the Full Profile of the SCA 4.1 specification with support for nearly all Units of Functionality.

Nordiasoft eCo Hub is the ideal software deployment and configuration engine for R&D and industry organizations that want to take advantage of modern embedded systems advanced features. eCo Hub is the only commercial Core Framework that supports a complete backward compatibility with the former SCA 2.2.2 standard. This allows you to continue to capitalize on your previous investment made in the SCA and to proceed with a seamless migration at your own pace.

Built on the know-how experience gathered with the battle proven commercial off-the-shelf (COTS) SCARI GT product, including lessons learned from the JTRS-tested SCARI-Open Core Framework, and interactions with leading industry and R&D labs, the eCo Hub is a complete and robust solution for your present and future development. It is available pre-integrated with generic COTS SCA platforms, ready to be used for development. As its SCARI GT predecessor for SCA 2.2.2, the eCo Hub Core Framework aims to be the most widely-adopted commercial SCA 4.1 Core Framework. eCo Hub represents another milestone in the Nordiasoft's SCA development solution. Not being subject to ITAR restrictions, the eCo Hub is available for licensing worldwide.

OPERATING ENVIRONMENTS

Designed with portability in mind, and like its SCARI GT predecessor, the eCo Hub will be available for a number of operating environments: INTEGRITY, VxWorks, different desktop Linux distributions, QNX, and new portable platforms such as Android. eCo Hub can also be ported to other operating systems with single or multiple address spaces, with or without a dynamic loader. It will be used with a number of processors families such as x86, PPC, and ARM.

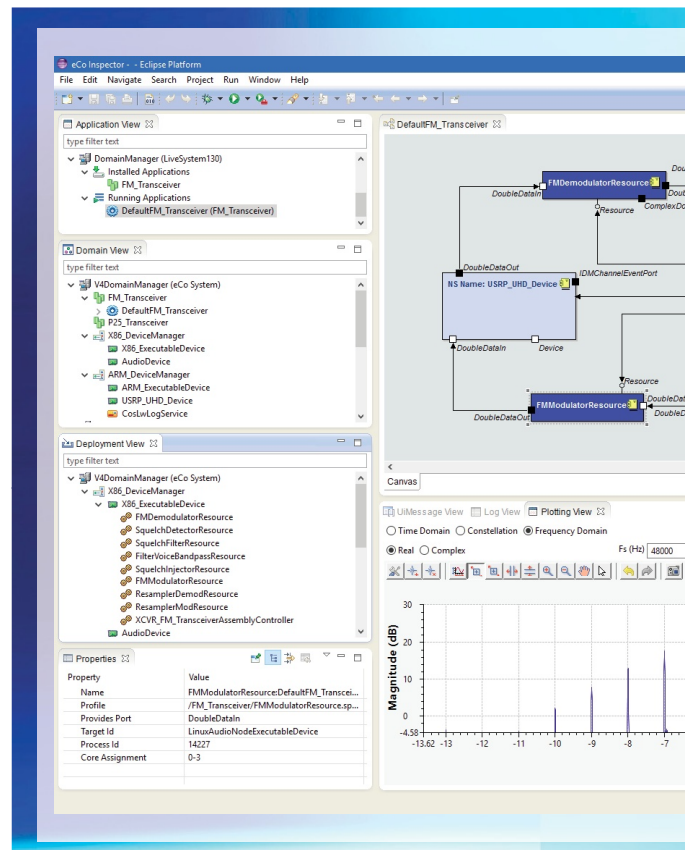
eCo Hub supports a number of different ORBs including ORBexpress RT, the most widely used real-time, secure, and high performance ORB in the military radio platforms. The Nordiasoft team has the required expertise to add support for any new operating environment.

HIGH-SPEED CORE FRAMEWORK

eCo Hub provides an implementation of SCA 4.1 Full Profile with support for nearly all Units of Functionality. It implements exceptional real-time features to minimize the boot time of an SCA system. The eCo Hub even allows SCA node and application components to dynamically be collocated in a single address space, which is significant for accelerating the boot sequence of a node.

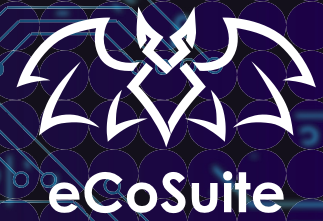
DEBUGGING SUPPORT

eCo Hub is provided in two binary forms: Release and Tracer. The Release version is compact and ready for embedded deployment. The Tracer version is instrumented with debugging code that produces several levels of tracing messages that can be selectively turned on or off. eCo Hub can also save to a file the



MODEL DRIVEN

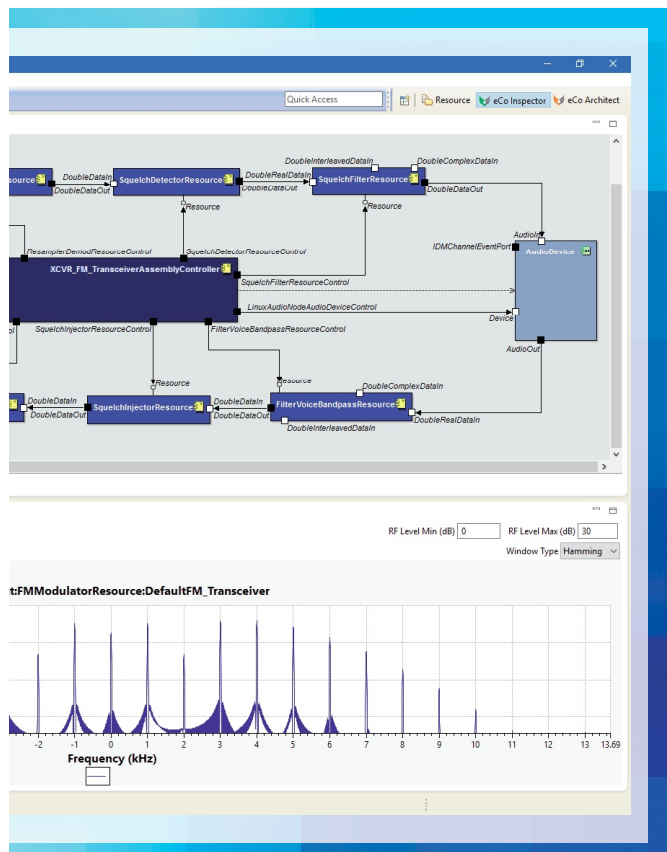
Generate source code from models and assemble applications using intuitive drag-and-drop functionality



logging messages produced before a Log service becomes available. This feature makes the difference when debugging early-crash problems.

BACKWARD COMPATIBLE

eCo Hub goes beyond supporting the Application Backward Compatible Unit of Functionality of SCA 4.1, which allows SCA 2.2.2 applications to be deployed. eCo Hub also supports applications made of a mixture of SCA 2.2.2 and SCA 4.1 components. This feature allows you to convert your existing applications by doing a step by step migration and test your changes as you go. Moreover, eCo Hub also supports backward compatibility at the platform level by supporting launching of a complete SCA 2.2.2 node, or a node made of a mixture of SCA 2.2.2 and SCA 4.1 Devices and Services.



PARTNERSHIPS

NordiaSoft has a “Best in Breed” philosophy. By dealing with all the key industry and government players, NordiaSoft ensures its products are open and compliant. NordiaSoft simply does not believe in vendor lock-in solutions. Instead, it partners and works closely with many industry and government players. Fruitful partnerships allow NordiaSoft to provide a wide range of domain-specific expertise.

SUPPORT & CONSULTING SERVICES

NordiaSoft Engineering Service Team is dedicated to provide you the support needed for the design and implementation of your SCA-based projects. Building on our eCo Suite, the most complete commercial integrated development environment for SCA 4.1 based products, we can accompany you in every step of your development process, from the initial training into the SCA development concepts and techniques, to the final system integration. Contact us to find out how we can help you.



FULL DEVELOPMENT LIFE-CYCLE SUPPORT
Modeling, validation, introspection,
debugging and testing.



Nordiasoft eCo Architect is the Component-Based Development tool of the eCo Suite. It covers the complete development life cycle including modeling, real-time model validation, full behavioral generation of SCA compliant C++ source code, as well as component assembly into applications or nodes.

eCo Architect is provided as a plug-in for the universally adopted, platform independent, Eclipse Integrated Development Environment (IDE). Embedded system developers will benefit from a well-known interface, making it easy to navigate between the different development phases of their project.

REUSABLE MODELING ELEMENTS

No need to repeat every step when creating components. eCo Architect lets you create reusable component properties and ports, allowing you to assemble them into component types to create similar components much more quickly. This feature is also extremely useful when applying design modifications to many components. A modification in one place is automatically reflected in every component of similar type - a precious time-saving feature.

REAL-TIME MODEL VALIDATION

The real-time model validation feature of eCo Architect eliminates time-consuming retrofits to correct early errors, greatly accelerating the creation of SCA components. In-depth experience and expertise with the SCA has provided eCo Architect with the largest set of validation rules in the industry.

IMPORTING AND REFACTORING

eCo Architect can also be used to model and validate pre-existing SCA domain profiles. Its powerful import capabilities will import and repair legacy domain profiles. eCo Architect's unique refactoring feature can also automatically correct errors from a number of suggested fixes.

UNAMBIGUOUS GRAPHICAL MODELING

eCo Architect's superior modeling capabilities allows unambiguous graphical representations of assemblies, capturing containment relationship between deployed components and their target - a key concept to enable the graphical representation of all types of indirect connections and host collocation relationships.

ZERO-MERGE CODE GENERATION

eCo Architect generates fully functional SCA components using C++/POSIX/CORBA that can be built and used in applications without writing a single line of code. Being template based, eCo Architect could be tailored to support other programming languages or code conventions. eCo Architect breaks new ground by introducing "zero-merge" code generation capabilities. Developers specialize the behavior of a component, instead of modifying it. Developers can at last change the model of existing components, and regenerate code without having to merge two versions of the source code.

SCA 2.2.2 TO SCA 4.1 MIGRATION

eCo Architect provides unavoidable capability to help transitioning applications and nodes from SCA 2.2.2 to SCA 4.1. Whether it is to migrate a complete assembly or a single component, eCo Architect can convert existing models to comply with the new standard and refactor source code that has been generated with Nordiasoft's SCA 2.2.2. tool.

CONFIGURATION MANAGEMENT

eCo Architect pioneers model level configuration management. Developers no longer have to manually track each individual artifact of a model element. It allows developers to save model elements directly to a repository. Developers don't have to save incoherent versions of those models. This feature radically simplifies configuration management.

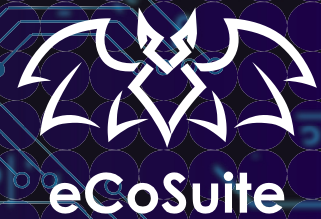
SHARED PROJECTS

eCo Architect provides a way to reuse common modeling elements without having to duplicate them. eCo Architect supports the Eclipse concept of shared projects. Rather than duplicating a modeling element, developers can reference projects containing shared elements. After all, "Reuse" is the SCA philosophy.

MULTI DEVELOPMENT AND OPERATING ENVIRONMENT SUPPORT

eCo Architect supports multi development and operating environments by providing the possibility to define different sets (or version) of tool chains, libraries, paths, and ORBs for a component by using different definition of build specifications, IDL profiles, macros, environment variables, and system variables. This makes it possible to not only support different environments, but it also allows developers to share models that use a build specification that can be customized for their specific computer without affecting the configuration management. eCo Architect can also generate different build artifacts, such as make files or cmake files, according to the developer preference. Both, make and cmake files are fully integrated with the popular C/C++ Development Tools (CDT) Eclipse's plug-in.

SOURCE CODE GENERATION AND VALIDATION
Developers focus on business logic rather than system integration, speeding up development and improving team performance.



eCo Inspector

The eCo Inspector offers a runtime view of the SCA system design. This introspection tool provides multiple views to allow developers to visualize the software structure of any SCA compliant platform. Using tree views and block diagrams, engineers can see where each application component is running. It also represents the relationships between application and platform components.

MULTIPLE DOMAIN CONTROL

eCo Inspector can connect to more than one platform or domain simultaneously. Engineers can control several systems from a same tool which facilitates debugging. Supporting more than one domain (e.g. a radio with Red and Black Domains). The eCo Inspector is to the SCA what a debugger is to source code. In fact, the eCo Inspector can be connected to any embedded SCA platform, just like source code debuggers.

INSTALLING AND CONTROLLING APPLICATIONS

The eCo Inspector comes with a built-in application installer used to copy the required artifacts into the file system of an SCA platform. The tool can also instantiate, configure, start, stop, terminate, and uninstall applications. eCo Inspector provides a generic property browser that can render every type of SCA property and can change values dynamically or in batch mode.

INFLUENCE DEPLOYMENT

eCo Inspector can be used to deploy any application component to a specific processor using device assignments. It can also be used to assign application components to specific processor cores via the new core affinity feature of SCAv4.1. It can assign different application components to specific devices, an essential feature to assess performance.

DEBUGGING FEATURES

In real-time, eCo Inspector introspects the platform and reports the status of every component, refreshing the views and block diagrams when needed. Any new application being added, device failing, or connection broken will be shown, providing valuable information to the integrators and testers to resolve issues.

eCo Inspector can be used to test applications under different conditions. It can be used to lock/unlock specific device components to create different deployment scenarios. eCo Inspector can shut down a complete node or individual components. It can even do so, while applications are running to analyze the impact on the system. In short, eCo Inspector provides full control over the life-cycle of any SCA component.

EXTENDED INTROSPECTION

eCo Inspector provides different types of views for displaying the deployed software components and related information. The Domain View, Application View, and Deployment View use a tree-like structure, where each node represents a component. The block diagram views use a block for each deployed component. eCo Inspector can even show which components have been deployed onto other components and graphically displays how components have been inter-connected.

PLOTTING

eCo Inspector includes real-time, peak and average value plotting capabilities that allows visualization in three types of graphs: Time Domain (time / amplitude), Frequency Domain (frequency / magnitude), and Constellation (phase / quadrature).



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