NordiaSoft

NordiaSoft SCARI
Software Suite

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

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

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/aerospace, telecommunications, instrumentation, transportation, robotics, and consumer electronics industries.

Founded as a spin-off from the Communications Research Centre Canada (CRC), NordiaSoft's core team has led a decade-long list of industry firsts in SCA technologies now embedded in thousands of hardware products. As experts in software components, NordiaSoft offers proven solutions to developers creating next generation heterogeneous distributed embedded systems, .

The SCARI Software Suite has been engineered by the most trusted team of SCA Core Framework experts in the industry, influencing every release of the SCA specification since 1999, and introducing many of the essential features of today's specification. While at CRC, the NordiaSoft team developed the first open-source, and most popular SCA Core Framework: SCARI Open was developed as the SCA Reference Implementation (SCA RI) for the Wireless Innovation Forum (then called SDR Forum) with support from the US DoD JTRS Joint Program Office (JPO).

The NordiaSoft team was also first to demonstrate a commercial SCA application, and to introduce an Integrated Development Environment (IDE) for the SCA, to assist developers in every step of their work from modeling to deployment. Pioneers of source code generation from SCA models, real-time validation and re-factoring, NordiaSoft has teamed up 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.

The team has over a decade-long track record of innovations. While still at CRC, the team's contribution to SDR/SCA was recognized and awarded the International Achievement Award (2010) and the President's Award (2011) by the Wireless Innovation Forum. Following NordiaSoft creation in 2013, the team has been the recipient of the President (2015), Technology of the Year (2015) and Best Technical Paper (2015) Awards also from the Wireless Innovation Forum.

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 with the use and input from public and private organizations around the world.

The SCA provides developers with a high level abstraction between software applications and hardware platforms, greatly simplifying development cycles, promoting software reuse and facilitating system updates and upgrades. The SCA as well minimizes development risk, and improves overall quality of complex heterogeneous embedded systems.

With a proven track record through hundreds of thousands of military tactical radios deployed in the battlefield, the SCA is now being sought after within the radar, electronic warfare, signal intelligence, test and instrumentation and robotics domains.

Partnerships

When it comes to partnerships, NordiaSoft has a "Best in Breed" philosophy. By dealing with all the key industry 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 players. Fruitful partnerships allows NordiaSoft to provide a wide range of domain-specific expertise.

EXTENDED INTROSPECTION
The NordiaSoft Radio Manager provides two different views for displaying the deployed software components. The hierarchical view uses a tree-like structure, where each node represents a deployed component. The block diagram view uses a block for each deployed component. When connected to the NordiaSoft core framework, the NordiaSoft Radio Manager can even show which components have been deployed onto other components and graphically displays how components have been inter-connected.

SPECIALIZED HCIs
The NordiaSoft Radio Manager allows the system integrator to launch its own specialized Human Control Interface (HCI) to control the application. This becomes particularly interesting when specific APIs are required to control the radio. Using NordiaSoft SCA Architect, an SCA application can be packaged with a specialized HCI that will be installed with the application on the target SCA platform. After instantiation of the application, the NordiaSoft Radio Manager searches for the existence of the specialized HCI, downloads it, and launches it.

4. Component Development Libraries

The NordiaSoft Component Development Libraries (CDL) accelerate the creation of SCA-compliant components. The CDL lowers the learning curve of the SCA (and speeds up development) by providing generic SCA components, designed to shield developers from the intricacies of the SCA and CORBA.

Using the CDL generic components drastically reduces the number of lines of code required to create compliant SCA components, simplifying the generated code and associated testing, thereby reducing the development cycles. Also available as shared libraries, the CDL enables the creation of very small footprint SCA components.

The CDL is core framework independent and is available for the most popular operating environments.

GENERIC PropertySet
The CDL generic components provide a framework for implementing properties, which shields developers from the intricacies of the SCA and CORBA. Using the CDL Generic PropertySet, configuration requests are transformed into simple invocations

to C++ member functions. Component property values are kept as simple C/C++ native data types. The CDL Generic PropertySet implements all of the SCA required behavior for configuration requests, increasing SCA compliance.

DEBUGGING SUPPORT
The CDL 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 tracing messages of varying levels that can be selectively turned on or off.

GENERIC LOG AND EVENT PORTS
The CDL provides generic implementations of a Log port and an Event Channel port. These are used to report logging messages or to produce events that may be consumed by other components. They are implemented as generic ports that transparently handle all the requirements of the SCA. Developers only need to worry about producing messages; they don't need to worry about levels or connections. In fact, the CDL offers much more than the SCA required behavior, allowing components to save the logging messages produced before a Log service becomes available. This unique feature provides precious debugging information that is otherwise lost.

GENERIC COMPONENTS
The CDL provides a generic implementation of the two types of components SCA developers must create: the Resource and the Device. CDL components will automatically generate the SCA required log messages and events preventing developers from making costly compliance mistakes. They also implement the SCA and CORBA life-cycle, avoiding other potential compliance issues. The implementation of the state behavior for an SCA Device is notoriously difficult, being one of the major sources of compliance issues. The CDL generic device takes that burden off the developer's shoulders by handling capacity allocation requests. This further contributes to the reduction in quantity of source code required for implementing a new SCA Device. The CDL Device automatically handles the three state machines required for all SCA Devices, which, when combined, lead to 25 states and close to 70 transitions.

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

INTEGRATED SOLUTION
Reduce development risk, improve time to
market and simplify system design.

3. Radio Manager

The Radio Manager is the essential tool for platform integrators and application testers. Through a block diagram representation, the integrator and tester can quickly visualize the SCA platform composition and see where each application resource has been deployed. The Radio Manager offers a runtime view of how the connections between the SCA Resources and Devices have been established.

In real-time, the Radio Manager introspects the SCA platform and reports the status of the SCA Devices and Resources, refreshing the block diagram if needed. Any new waveform being added, device failing, or connection broken will be shown which provides valuable information to the integrators and testers to reduce debugging time.

The Radio Manager is to the SCA what a debugger is to source code. In fact, the Radio Manager can be connected to any embedded SCA platform, just like source code debuggers.

INSTALLING AND CONTROLLING APPLICATIONS

Built into the NordiaSoft Radio Manager is an application installer used to upload the required application artifacts onto the platform. Once done, the NordiaSoft Radio Manager can instantiate the application, start, configure, and stop it, and finally terminate and remove the application. The NordiaSoft Radio Manager provides a generic property browser which can render every type of SCA property and can change values dynamically or in batch mode.

DEBUGGING FEATURES

The NordiaSoft Radio Manager is a very useful tool to test performance of the platform and applications. It offers full control over the deployed components. It can therefore be used to modify the values of the application parameters when testing the application under different conditions; it can shut down a complete node while applications are running to analyze how the platform reacts in specific scenarios.

3. Radio Manager (runs on desktop)

2. SCA Architect (runs on desktop)

Controls Components

Generates Components

1. SCARI Core Framework (runs on target)

SCA Core Framework

SCA Applications

SCA Devices

Radio HW

Runs Components

The SCARI Software Suite

The SCARI Software 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 SCARI Software Suite allows developers to model and create software components that run in real time and are independent from the underlying operating environment.

Used internationally by platform and radio manufacturers, as well as application providers, the NordiaSoft SCARI Software Suite reduces development risk and time-to-market, creating top-quality software defined products.

1. SCARI Core Framework

The battle proven Core Framework (CF) of choice for COTS platform providers and radio manufacturers, supporting the largest combination of operating systems, object request brokers, and processors. Not being subject to ITAR restrictions, the SCARI CF runs in thousands of battlefield deployed radios from different international radio manufacturers.

2. SCA Architect

Eclipse-based IDE that lets you create, validate, and debug SCA software components and applications. Provides a Zero-Merge source code generator. Offers SCA behavioral source code generation. Generated source code builds for all supported operating environments without regenerating. Utilizes a visual modeling language that allows developers to unambiguously express every concept of the SCA graphically.

3. Radio Manager

A run-time monitoring tool that allows installation and control of applications, as well as visualization of component deployment. The NordiaSoft Radio Manager is an essential tool for debugging and testing during SCA development.

4. Component Development Libraries

Generic Functionality that greatly simplifies code generation and reduces the number of lines of code a developer must write to create SCA components. Facilitates compliance testing by making every SCA component rely on reusable functionality that only needs to be tested once.

FEATURES

SCARI GT CORE FRAMEWORK
- Boot time optimizations
- Small footprint
- Support for all major RTOS
- Support for ORBexpress RT®
- Used in thousands of radios currently deployed in the battlefield
- Not ITAR controlled

SCA ARCHITECT
- Unambiguous graphical modeling
- Zero-merge SCA behavioral and structural code generation
- Real-time validation and re-factoring
- Integration with R-Check SCA

RADIO MANAGER
- Install, control, and debug applications
- Introspect SCA radios
- Graphical representation of deployed
- SCA components
- Launch specialized Human Control Interfaces (HCI)
- Full control over deployed components

COMPONENT DEVELOPMENT LIBRARIES
- Generic component libraries
- Reduces lines of code and memory footprint
- Simplifies and speeds up development
- Core framework independent
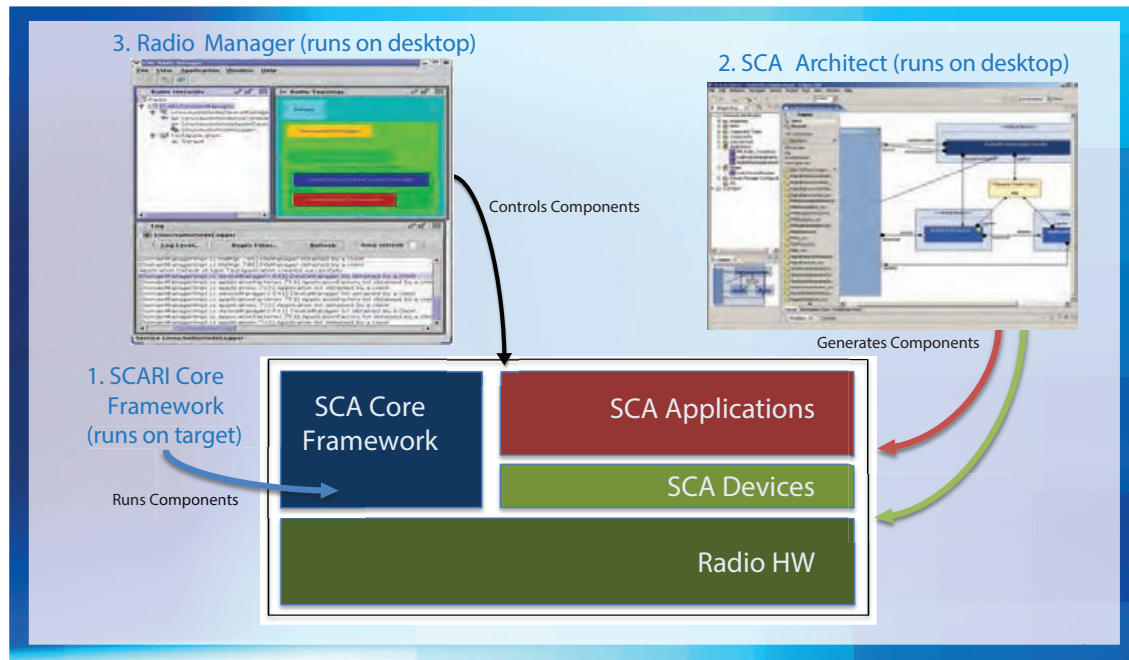
Support And Consulting Services

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 SCARI Software Suite, the most complete commercial integrated development environment for SCA 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.

1. SCARI GT Core Famework

Customers around the world have benefited from NordiaSoft's engineer's expertise in SCA. Used for research projects, for development purposes, and for actual fielded radios, SCARI GT is an SCA Core Framework you can always rely on.

An SCA Core Framework allows developers to create software components that can be deployed in a large combination of operating environments.

Built from the ground up for embedded platforms, the SCARI GT Core Framework is a third generation core framework. It was designed for optimum boot time performances.

With the lessons learned from the JTRS-tested SCARI-Open core framework, SCARI GT is a commercial product available for a large number of operating environments and has been used with several System-on-Chips solutions.

It is the most widely-adopted Commercial Core Framework, and is available pre-integrated with a number of generic SCA platform providers. SCARI GT is the cornerstone of NordiaSoft's SCA development solution and is the only battle-proven commercial off-the-shelf (COTS) core framework. Not being subject to ITAR restrictions, the SCARI CF runs in thousands of radios deployed by different international radio manufacturers. The SCARI CF was developed hand-in-hand with the JTAP; the US DoD official compliance-testing tool.

OPERATING ENVIRONMENTS
Designed with portability in mind, the SCARI GT Core Framework is used on a number of operating environments: INTEGRITY, VxWorks, different desktop Linux distributions, QNX, TimeSys and MontaVista embedded Linux, and new portable platforms such as Android. SCARI GT can also be ported to operating systems with single or multiple address spaces, with or without a dynamic loader. It has been used for a number of processors from the following families: XScale, x86, PPC, and ARM.

SCARI GT 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
The SCARI GT Core Framework provides a full implementation of all the SCA framework interfaces. It implements exceptional real-time features to minimize the boot time of an SCA system. It transparently transforms indirect connections into faster direct connections. It uses a unique cashing system to avoid long delays required for finding deployed components. The SCARI GT Device Manager even allows SCA Devices to be collocated into a single address space, which is significant for accelerating the boot sequence of a node. In fact, SCARI GT components can all be linked into a single address space to further accelerate the boot sequence.

EXTENDED INTROSPECTION FEATURES
SCARI GT supports extended introspection features used by NordiaSoft's RadioManager monitoring tool. Using SCARI GT, developers can obtain detailed deployment information which allows them to determine where components have been deployed and how they have been interconnected.

DEBUGGING SUPPORT
SCARI GT 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. SCARI GT can also save to a file the logging messages produced before a Log service becomes available.

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

2. SCA Architect

SCA Architect is the Integrated Development Environment (IDE) of the SCARI Software Suite. It covers the complete SDR development life cycle including modeling and validation of components, full behavioral generation of SCA compliant C++ source code, as well as certification testing and component assembly into applications or nodes.

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

SCA Compliance

SCA Architect's R-Check SCA Adapter plugin tool provides a seamless integration with Reservoir Labs R-Check SCA, to automatically validate source code of SCA components against the requirements of the SCA specification when the source code of an SCA Architect generated component is modified by developers. The tool accelerates SCA development by supporting integrated testing across file types, ensuring completeness and consistency.

REUSABLE MODELING ELEMENTS
No need to repeat every step when creating components. NordiaSoft SCA 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 NordiaSoft SCA 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 NordiaSoft SCA Architect with the largest set of validation rules in the industry.

IMPORTING AND REFACTORING
NordiaSoft SCA 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. NordiaSoft SCA Architect's unique re-factoring feature can also automatically correct errors from a number of suggested fixes.

UNAMBIGUOUS GRAPHICAL MODELING
NordiaSoft SCA 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. NordiaSoft SCA Architect's modeling capabilities provides a deterministic graphical representation of assemblies.

ZERO-MERGE CODE GENERATION
NordiaSoft SCA 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, NordiaSoft SCA Architect could be tailored to support other programming languages or code conventions. SCA 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 remodel existing components, and regenerate code without having to merge two versions of the source code.

CONFIGURATION MANAGEMENT
NordiaSoft SCA 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
NordiaSoft SCA Architect provides a way to reuse common modeling elements without having to duplicate them. NordiaSoft SCA 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.