# Spectra Core Framework

## Competitive Advantages



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# 1. Introduction

The Spectra Core Framework (CF) is a high-performance, ultra low footprint, COTS implementation of the Software Communications Architecture (SCA) standard's Framework Control and Service Interfaces and is part of ADLINK's rapidly growing family of advanced Software Defined Radio (SDR) technologies. Spectra CF is designed specifically to support the implementation and deployment of the next-generation of complex SCA-compliant networking waveforms required for military, homeland security and commercial SDRs. Spectra CF supports the deployment of waveform components on any mix of General Purpose Processor (GPP), Digital Signal Processor (DSP) and Field Programmable Gate Array (FPGA) processing elements.

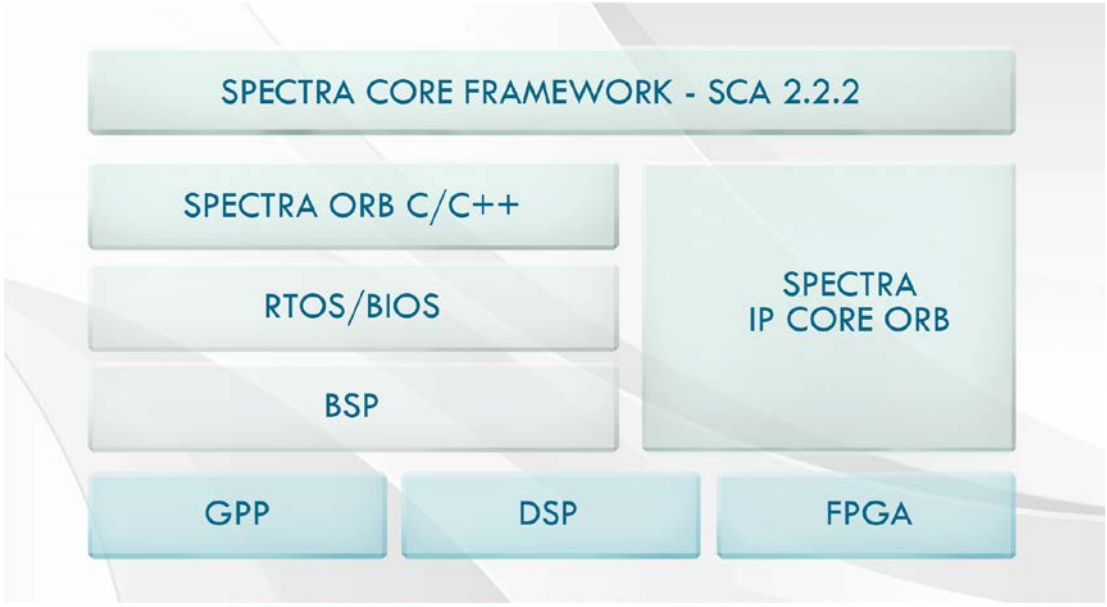



*Figure 1 – Spectra CF the smallest, fastest most advanced CF*

Spectra CF is a fully integrated combination of SCA Framework Control and Service component implementations, Spectra Common Data Bus (CDB) embedded middleware and communication transports optimized for the leading Real-time Operating Systems (RTOS) and supplied by a single vendor. ADLINK has a unique advantage in being the only company that develops both the CF and middleware components of an SCA Operating Environment (OE). This has enabled us to create a CF that has the highest performance and best Size, Weight, and Power (SWaP) characteristics available. The C language CF has a static footprint of under 2MB, which can be as much as 10x smaller than either in-house developed or other Commercial Off-The-Shelf (COTS) CFs. The small memory footprint and optimized processing translates directly into SWaP requirements, making it suitable for ultra small form factor SDRs. The combination of advanced parsing technology, low latency middleware and multithreaded CF architecture enables rapid radio startup and shutdown, waveform applications to be started, stopped and swapped more quickly, plus support for a broader range of waveforms, particularly where data path latency is critical.



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# 2 Key Advantages

## 2.1 Complete SCA Solution from a Single Vendor

ADLINK is the only company that develops all the key components of an SCA stack, including: Modeling Tools, Radio Devices and Services, Core Framework and the ORB middleware, and then fully integrates them to produce the most complete, best performing, and most highly optimized SCA software infrastructure and development tools solution. Other SCA infrastructure implementations, whether they use COTS SCA software products and/or develop their own (in-house, custom) Core Framework, only provide part of the required solution and suffer from difficult product integration and poor (or no) tooling support. This piecemeal approach obviously also limits the optimization of performance, requires more resources (e.g. greater memory overhead) and can create time-to-market and maintenance problems (e.g. integration issues and release synchronization). In addition, ADLINK partners closely with the leading RTOS vendors to produce an SCA implementation optimized for overall RTOS/ORB/COS/CF stack performance as a single embedded system, not just a collection of parts.

Furthermore, we currently believe an OEM's only realistic choice is to either develop a SCA Core Framework themselves or license Spectra Core Framework. No alternative COTS implementations appear viable at the moment.

## 2.2 Ultra Lightweight, Highly Optimized Core Framework

Spectra CF uses ADLINK's Spectra ORB C Edition as the underlying communication middleware. Spectra ORB's low latency and tiny footprint has enabled us to produce the smallest and most-efficient COTS CF implementation available on the market. Our CF benchmark data (that can be made available on request) show that Spectra CF can be configured to support a static memory footprint as small as 1.5MB and also, with its multithreaded architecture and optimized XML parsing, it has excellent performance characteristics when deploying and managing SCA platforms and waveform applications. Only ADLINK has a C-language-based Core Framework allowing us to optimize the implementation for SWaP (Size, Weight and Power) and making it the best choice for advanced small form-factor SDR applications. There are no restrictions on the programming language (C, C++, Ada, Java, VHDL) of the platform or waveform components that Spectra CF will deploy and manage.

## 2.3 SCA Everywhere

Spectra CF and Spectra CDB embedded middleware (which includes Spectra ORB and Spectra ICO) provide the only SCA-compliant solution that is available across not only GPP, but also DSP and FPGA processing environments. This complete processor coverage has been made possible through the development of specialized CORBA middleware technology designed to support DSPs and FPGAs. ADLINK has pioneered the use of lightweight ORB technology for DSPs and advanced hardware (VHDL) ORB technology for FPGAs. The Spectra 'SCA Everywhere' approach helps decouple SDR applications from the underlying hardware, making hardware upgrades much more straightforward as well as maximizing waveform application portability (and thus reuse).

Spectra CF and Spectra CDB support multiple SCA architecture options to satisfy and accelerate any platform and waveform development goals. With their ability to support 'SCA Everywhere', the SCA's Modem Hardware Abstraction Layer (MHAL) specification, or even native communication mechanisms, Spectra CF and Spectra CDB provide the SDR developer with maximum flexibility when it comes to building their SDR applications.

## 2.4 World-class SCA and Embedded Middleware Experts

Spectra CF and Spectra CDB embedded middleware were developed by a world renowned team of SCA and embedded experts. This expertise gained over many years of developing commercially successful COTS software technologies has helped to ensure the most optimal design and implementation.

## 2.5 SCA Compliance

Spectra CF and Spectra CDB embedded middleware are compliant with SCA 2.2.2 and also support key elements from the SCA 2.2.2 Extensions specification. ADLINK is a member of the Wireless Innovation Forum (WINNF) and has actively contributed to the new and recently adopted SCAv4 standard. ADLINK plans to release new versions of the Spectra ORB and ICO middleware that support the new SCAv4 CORBA profiles by the end of the year 2012 with a 2013 product roadmap to SCAv4 compliance at the Core Framework level.

## 2.6 Broad Platform Coverage

Spectra CF is supported on the widest range of the very latest RTOS/ hardware configurations available, including:

- RTOS: Linux, Integrity, VxWorks, LynxOS, TI BIOS, others
- CPU: ARM, PowerPC, x86, DSP, FPGA

Platform coverage is constantly evolving and ADLINK actively adds support for new platforms as part of the Spectra CF product roadmap.



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## 2.7 Multi Language Component Development

Spectra CF and Spectra CDB middleware can support the deployment of SCA platform components written in multiple programming languages and targeting different processing environments, including:

- C and C++ on a GPP
- C on a DSP
- VHDL on an FPGA

## 2.8 Flexible Deployment Configurations

Spectra CF has been designed to offer a number of flexible configurations to suit the needs of specific target radio architectures. This includes providing support for multiple memory and processor configurations. Spectra CF can run on either single or multiple address space kernels and is available in either static or shared library build configurations.

## 2.9 No Export Restrictions

Spectra CF is not subject to ITAR or any other export restrictions, making it suitable to be deployed on radios for international radio markets.

## 2.10 Complementary SCA Tooling

ADLINK's Spectra CX is the leading SCA Model Driven Development tool on the market and can be used to simplify, accelerate, and validate a significant proportion of the SCA development process. Spectra CX validates SCA compliance at the architectural and unit test level, and generates correct-by-construction SCA compliant artifacts, such as: XML descriptor files, compliance test reports, and validation documentation. Spectra CX offers broad target platform (RTOS/hardware) coverage and can support SCA waveform, platform and test code generation in C++ (for GPP targets), C (for GPP and DSP targets) and shortly will support VHDL code generation (for FPGA targets).

Spectra CX also supports reverse engineering of SCA waveforms, including full XML and IDL validation and reporting for SCA compliance porting and testing purposes.



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## Notices

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