

OMG's Software-Based Communications Workshop

Expanding the Vision

Workshop Program

TUESDAY – August 16, 2005

TUTORIALS

0900 - 1230 ***SCA Naming Service, Event Service, and Component Connections***
Track 1 Neli Hayes, Associate Technical Fellow & Principal Software Architect, The Boeing Company

Serving as a companion to the SCA Developer's Guide, this overview is of most interest to SCA Core Framework (CF) providers, application (e.g. waveforms, etc.) and component (e.g. service, device, and application component, etc.) developers, Domain Profile tool providers, testers, and developers of software standards inspired by and based on the SCA, such as the OMG PIM & PSM for Software Radio Components Specification. In addition to discussing each topic in detail, this overview provides insight to related information not covered in the SCA and often left open to interpretation. Additional discussions include topics such as bridging the gap between the SCA and the SCA Security Supplement on these topics.

- The CORBA Naming Service sub-topic covers the Naming Service-related roles and responsibilities for the SCA CF Device Manager and Domain Management interfaces and components instantiated and torn down by these interfaces.
- The CORBA Event Service sub-topic covers the responsibilities of the Domain Management interfaces for creation and destruction of the CF domain event channels, connecting and disconnecting components to/from these event channels, and responsibilities of components that act as suppliers or consumers for these event channels.
- Finally, the Connections sub-topic covers the architecture of the SCA Domain Profile XML files for expressing connections between components, responsibilities of the CF providers with respect to establishing these connections, and responsibilities of component implementations that play the user or provider role in a connection.

1030 - 1230 ***Overview of MDA and Its Application in SDR***
Track 2 Dr. Robert R. Wang, Embedded Software Engineer, The Boeing Company

Software-Defined Radio (SDR) software development is a complex and daunting task. Model Driven Architecture (MDA) facilitates the process by providing a model-based approach where both portability and reusability can be achieved via development of Platform-Independent Models (PIMs), Platform-Dependent Models (PSMs), and Model Mappings. This tutorial provides an overview of the MDA approach that is being adopted by the software industry, and then focuses on the PIM and PSM models for SDR that have recently been finalized by the OMG. It also touches on aspects of SDR relevant specifications that are still being worked on by the OMG. Audience will learn the concepts of MDA, Software Communication Architecture (SCA), UML Profiles, and benefits of this new direction in software development.

1015 - 1045 Morning Refreshments

1230 - 1315 Lunch

1330 – 1700 ***High Assurance Security and Safety for Software-Based Communications***
Track 1

Joseph M. Jacob, Senior Vice President, Objective Interface Systems
Gordon Uchenick, Mentor/Principal Engineer, Objective Interface Systems

Software-based communications systems offer highly flexible communications for both voice and data. However, these improved capabilities come with increased responsibilities for safety and security. These requirements are especially acute when multiple applications are integrated onto a single processor to conserve size, weight, and power consumption.

MILS (Multiple Independent Levels of Security/Safety) was developed to address the need for security in embedded real-time systems like software-defined radios. The MILS architecture classifies a system into three layers: Separation Kernel, Middleware, and Applications:

- The Separation Kernel's trustworthy data isolation and control of information flow makes certification of complex multi-function systems practical, achievable, and affordable.
- The Partitioning Communications System (PCS), high assurance MILS Middleware, extends the Separation Kernel's policy enforcement across network facilities. The PCS provides strong authentication, separation of data by sensitivity level and community of interest, secure network configuration, secure loading, and secure clock synchronization for covert channel suppression. The PCS is a middleware architecture that works as a transparent network component enabling traditional facilities such as CORBA to work in a highly secure system.
- Applications are empowered to implement their own specific security policies with confidence that their policy enforcement will be Nonbypassable, Evaluatable, Always-invoked and Tamper-proof (NEAT).

This half-day tutorial will describe threats to software-based communications systems and the MILS architecture which counters those threats, enabling system architects to create high performance, high assurance distributed communications systems.

1330 – 1700 ***OMG PIM and PSM for Software Radio Components Specification Overview***
Track 2

Gerald Bickle, Engineering Fellow, Raytheon
Kevin Richardson, Software Systems Engineer, The MITRE Corporation
Tansu Demirbilek, Systems Engineer, Mercury Computer Systems

The intent of this tutorial is to provide an overview of the PIM and PSM for Software Radio Components specification to demonstrate how providers can use the specification and how it compares to the SCA. The specification is an OMG draft adopted specification and will be formalized this year. The PIM and PSM for Software Radio Components specification was developed using the OMG Model Driven Architecture (MDA) approach. The specification has three primary partitions:

- A UML Profile for Software Radio that provides a set of Software Radio domain specific UML extensions to define a modeling language
- A set of platform independent facilities that can be applied to components that are defined within the domain
- A CORBA/XML/POSIX Platform Specific Model that contains a set of artifacts that can be used to create products targeted for those technologies.

The UML profile and PIM identify a collection of Software Radio elements, behavior and associations. The MDA principles employed by this specification provide a foundation upon which the defined relationships and associations can be mapped to a different set of technologies and platforms as required by the implementer.

1500 - 1515 Afternoon Refreshments

WEDNESDAY – August 17, 2005

0900 - 1215 *Technical Overview of the Joint Tactical Radio System (JTRS) Software Communications Architecture*

Neli Hayes, Associate Technical Fellow & Principal Software Architect, The Boeing Company

As well as being the core standard for all DoD software-based communications programs involved with Network Centric Operations (NCO) and Network Centric Warfare (NCW) such as the JTRS Clusters, Family of Advanced Beyond-line-of-sight Terminals (FAB-T), and Future Combat Systems (FCS), the SCA specification forms the corner-stone basis that inspires many of today's emerging commercial standards such as the OMG Platform-Independent Model and Platform-Specific Model for Software Radio Components and the Deployment and Configuration of Component-based Distributed Applications specifications.

Starting with a brief history of the JTRS program, the reasons behind the inception of this architecture—maximization of portability and interoperability of waveforms on multiple communication platforms, and itemization of the complete set of SCA specifications, this overview provides a solid technical foundation of the SCA specification core architecture rule set including the Core Framework (CF) and the Domain Profile. The CF is the SCA essential “core” set of open software interfaces and profiles that provide for deployment, management, interconnection, and intercommunication of software application components in distributed embedded systems. The Domain Profile depicts the packaging and deployment of SCA-compliant hardware device and software component implementations into the CF domain through describing these components, their properties, and interconnections.

1030 - 1045 Morning Refreshments

1030 – 1230 *Demonstration Area Open*

1215 - 1300 Lunch

1315 – 1330 *Welcome & Opening Remarks – Program Committee Chair*

Fred Waskiewicz, Director of Standards, Object Management Group

1330 – 1530 *Session 1: Tools & Methodologies*

Chair: Dr. Jeffrey E. Smith, Director of Research Technology, Mercury Computer Systems

Dominick Paniscotti of PrismTech sets the session stage by first describing unique complexities in developing and deploying embedded software communication systems and how techniques and tools e.g. Model Driven Development, Generative and Agile Programming, can be used to reduce these complexities. Joseph Frisina of BAE Systems continues this thread with an experience report applying these tools and techniques to an SDR Project. John Hogg of Zeligsoft expands on the tools and methodologies thread by describing the lack of embedded software communication systems support for deployment visualization, validation and analysis techniques and presents modeling and validation based solutions and shortcomings.

Leveraging Model Driven Development (MDD), Generative Programming, and Agile Software Development Techniques to Develop Component Software, Frameworks and Tools for the SCA for SDR

Dominick Paniscotti, VP of Engineering-SDR Products & Bruce Trask, Lead Architect-SDR, PrismTech

SDRs are in a unique software domain within DRE systems. This domain is complicated and stands to gain from the recent advances in Model Driven Development, Generative Programming and Agile Programming techniques. Just as the domain is multi-faceted in nature, so too need be the solutions, tools and techniques applied to them to ensure success. This presentation will describe the application of these solutions, tools and techniques to the SDR domain. It will include detailed descriptions of not only how Model Driven Development and techniques and tools can be used, but also descriptions of Generative Programming and Model Driven Generative techniques that can be successfully leveraged including domain-specific languages as applied to the SCA and the Software Radio Domain.

Leveraging Agile Software Design Techniques in the Implementation of Software Defined Radios

Joseph N. Frisina, Manager-Advanced Software Technology & Vincent Rivas, MTS, BAE Systems CNIR

This presentation is an experience report outlining the development activities associated with the application of Agile software design methods to a Software Defined Radio project. It will be shown how key Agile software design activities such as test driven design, refactoring and automated regression testing, used in conjunction with sound object oriented design principles and patterns, enabled the creation of a set of superior software products. The integrated development environment and key set of customized software processes used to support these Agile activities will also be presented.

Deployment: the SCA Twain Shall Meet

John Hogg, CTO & Francis Bordeleau, CEO, Zeligsoft Inc.

The SCA includes Software Profiles describing waveforms and Platform Profiles describing hardware. The Core Framework is responsible for dynamically determining the deployment of the software onto the hardware. This is appealing in principle but doesn't reflect current radio development. Static understanding of deployments is essential. This session describes how developers' and architects' critical questions about their radio deployments can be answered. It explains deployment modeling which permits deployment validation. This enables analysis of a platform and a set of applications to determine all possible deployments. There are theoretical and practical problems of analysis and these will be described. Finally, the possibilities and limitations of deployment control will be explained.

1530 – 1900 *Demonstration Area Open*

1530 – 1600 Afternoon Refreshments

1600 – 1800 **Session 2: Standards Enabling the SDR Dream**

Chair: Tansu Demirebilek, Systems Engineer, Mercury Computer Systems

As in the case of OMG's CORBA or IEEE's 802.11, some standards can turn out to be changing our lives and creating industries by themselves. In order to have actual SDR sets deployed in commercial and military fields, many companies and organizations need to focus on merging their efforts to create synergy. This session will focus on various standards enabling the Software Defined Radio (SDR) technology. We will listen to three speakers describe three SDR related standards that can easily end up changing the way the SDR-World turns in the near future. Neli Hayes will set the stage by talking about the JTRS Software Communications Architecture (SCA) specification, and Joseph Schlesselman will discuss the OMG's Data Distribution Service (DDS) and its relationship to the Software Based Communications. Finally, Christos Anagnostopoulos will describe the End-to-End Reconfigurability (E2R) project's Reconfiguration Metamodel.

The JTRS SCA Specification...The Past, the Present and the Future ...

Neli Hayes, Associate Technical Fellow & Principal Software Architect, The Boeing Company

This presentation traces the evolution of the SCA specification to support a family of Software Defined Radios that meet one important goal of the JTRS program—portability of waveforms. This evolution is examined from the conception of the SCA, to what the SCA is today, where it is headed in the future, and what it enables for the military and the commercial communications industries. The past, present and future standardization efforts for this specification are discussed, as well as the importance of the involvement of all stake holders in related military and commercial standardization efforts such as those ongoing in the JTRS JPO SCA Technical Architecture Group, the OMG, and the SDR Forum.

OMG Data Distribution Service (DDS) and Software-Based Communications (SBC)

Joseph Schlesselman, Director-Aerospace & Defense Technologies and
Gerardo Pardo-Castellote, CTO, Real-Time Innovations

SDR vendors and customers are increasingly interested in the applicability of the OMG DDS specification for their software development efforts. DDS specifically targets high-performance delivery of time-critical data. DDS became a DISA-mandated net-centric enterprise service (NCES) and is the critical infrastructure technology in many DRE systems. This presentation will provide a concise overview of DDS and begin to answer many key questions, such as: What are the main advantages and disadvantages of DDS for SBC? What are the network Quality of Service (QoS) policies that make DDS valuable for SBC? How does DDS complement other standard middleware technologies such as CORBA, and address shortcomings of existing CORBA services? How does DDS fit within the design tenets of the SCA?

Evolution of Reconfiguration Metamodel

Christos Anagnostopoulos, Nancy Alonistioti & Gerasimos Stamatelatos
Communications Network Laboratory, Department of Informatics and Telecommunications, University of Athens

We present the Reconfiguration Metamodel evolution, within the IST Project E2R, in terms of three reconfiguration scenarios that have been employed in a Platform Specific Model: 1. Patch-upgrade Scenario - The patch-upgrade scenario considers the case of a malfunctioning user terminal. 2. Protocol Reconfiguration Scenario - describes the downloading and composition of a new protocol that has been developed in a component oriented way and clarifies the necessary interactions between the modules of the equipment architecture for the realization of the dynamic binding between the protocol components. 3. Radio Access Technology Discovery Scenario - In the RAT discovery scenario, the Monitor and Discovery Manager discovers a WLAN network and notifies Policy Manager.

1800 – 1900 ***Demonstration Area Reception*** hosted by 

THURSDAY, August 18, 2005

0900 – 0930 ***Keynote Presentation – JPEO JTRS Overview***
Dr. Richard North, JPEO JTRS Technical Director

0930 – 1200 ***Session 3: Security***
Chair: Dominick Paniscotti, VP of Engineering - SDR Products, PrismTech

The complexities of SBC systems warrant a re-examination of the traditional security architectures used in non-SBC systems. The security architectures of these highly programmable systems must not only support secure communications at varying security levels but also protect the very communication system itself from malicious attacks and security breaches while simultaneously maintaining their flexibility. This session examines in detail the mechanisms required to secure SBC systems and presents architectural and middleware solutions to protect the data carried by these communication systems.

Security API Developments in JTRS Cluster 1

Lee Monahan, Member of Technical Staff, BAE Systems CNIR Division
Dan Retotar, Member of Technical Staff, BAE Systems CNIR Division

In Cluster 1 the open, distributed architecture of an SCA defined radio collided with the traditional, static, crypto-centric military networking communications device. The APIs in the Security API Service Definition attached to the MSRC-5000SEC were the desired interface to the cryptographic device of the radio, but did not always fit snugly with the standard services of that component. Accommodations were made to adapt MSRC-5000SEC to the crypto device. Some APIs were not used, some were modified and some new ones were added. This presentation will describe the modifications and extensions made to the SCA Security API as part of the Cluster 1 effort.

1000 - 1600 ***Demonstration Area Open***

1010 - 1040 Morning Refreshments

High-Assurance CORBA for Software-Based Communications

Kevin Buesing, Senior Mentoring Engineer, Objective Interface Systems

This presentation will describe the efforts to develop a high assurance profile for the Common Object Request Broker Architecture (CORBA). The constraints on the languages, tools and operating systems used in creating high-assurance distributed systems will be described. In particular, the language profiles, the consequent IDL mapping profiles, and the CORBA profiles will be discussed. As a result of the creation of high-assurance CORBA, developers will have the tools available to create software-defined radios which can meet the most stringent requirements of certification, including DO-178B Level A certification.

INFOSEC Boundary Control for Middleware based Telco Systems and SDR Systems - A Comparison

Sebastian M. Staamann, Director-Security Solutions, PrismTech

Developing methods for the security enforcement for application systems based on middleware, such as CORBA, and service component architectures has been an important task for telecom operators in recent years. Valuable experience in implementing and managing fine grained security controls for component based systems has been gained; several approaches for the security enforcement have materialized as reusable patterns, e.g., middleware security gateways or the use of server-side integrated security interceptors. We present results potentially useful for the security enforcement in SDR systems and analyze commonalities and differences.

1200 - 1245 Lunch

1300 – 1330 ***Sponsor Presentation – BOEING -***

Alejandro M. Lopez, Director - Network Communication Systems, BMC3 & Strategic Systems, Integrated Defense Systems, The Boeing Company

1330 – 1600 ***Session 4: Commercial SDR***

Chair: Joseph N. Frisina, Manager-Advanced Software Technology, BAE Systems CNIR

Commercial SDR has additional challenges over the P²SRP PIM, such as the definition of relevant PSM for Terminal and Base Stations equipment. Commercialization of the SDR implies that component based design has the need to make embedded real-time systems less dedicated, more flexible, and more international in behavior. Competing with the standard SCA model, there are alternatives such as those of GNU Radio that also aim to implement a runtime platform to support soft-radio activities on COTS hardware. We will examine some of the economic drivers behind the possible models of use of these alternative models and mechanisms and contrast them with the SCA architecture with a view to highlighting areas where SCA-like technologies may be applicable in a reduced, modified, or hybridized form, and benefits gained as a result.

E²R and P²SRP: Some Fruitful Research Opportunities?

Eric Nicollet, THALES - Didier Bourse, Motorola - Jörg Brakensiek, Nokia - Siegfried Walter, Alcatel - Craig Dolwin, Toshiba - Mirsad Halimic, Panasonic

Standardization of OMG PIM and PSM for Software Radio Components (P²SRP) leverages in a significant fashion what was achieved by JTRS SCA (Software Communications Architecture). In the meantime, the European Programme E2R is boosting innovation on End-to-End Reconfigurability technologies in the Commercial Wireless Domain, thus including Software Defined Radio. After a comparative overview of the respectively addressed areas, this presentation makes a more detailed analysis of the respective achievements. Finally, the question of articulating parts of future Commercial Industry research with P²SRP achievements will be discussed.

Component Based Approach for Real-time and Embedded Systems (COMPARE Project): Application on SDR

Vincent Seignole, Embedded SW Research Engineer & Virginie Watine, Sr. Software Expert, THALES
Dr. Ansgar Radermacher & Sylvain Robert, Embedded SW Research Engineers, CEA
Colin Wigham, Consultant, PrismTech

We focus on the development of a component technology for real-time systems that also have constrained resources. Our approach is to enforce separation of the component code from the QoS aspects via container mechanisms as well as to provide separately reusable interaction patterns via the connector concept. Putting all these aspects together at runtime is orchestrated by the container, which is configured based on application description. We will present how these container techniques are realized on top of real-time CORBA. The presentation will be illustrated by some software radio waveform considerations: tackling adequate component breakdown, identifying and realizing the interactions present in the system, and configuring the container in order to handle the real-time constraints and adequate interactions.

On a Low Profile Mapping of the OMG Based SBC Models for Achieving Aspects of Commercial SDR

Dr. Shahzad Aslam-Mir, CTO, PrismTech

There are alternative models, including the SCA as mapped to OMG's CORBA specification, that aim to implement a runtime environment or platform to support software radio activities on COTS hardware. This presentation will serve to examine some of the economic drivers behind the use these alternative models and mechanisms. It will contrast them with the SCA with a view to highlighting areas where SCA-like technologies may be applicable in a reduced, modified, or hybridized form. Issues relating to language of implementation, OE characteristics, characteristic models for the modem, and finally the complexities involved in developing soft waveforms for these alternates will be discussed.

1450 – 1520 Afternoon Refreshments

1600 – 1730 **Panel: *SDR: The Next Generation***

Moderator: Fred Waskiewicz, Director of Standards, Object Management Group

This diversified panel of experts, from both military and commercial fields, will explore the future of SDR. With full audience participation, we will assess foreseen technical mergers and deviations, as well as the importance of the involvement of all stakeholders in related military and commercial standardization efforts, to envision software-based communications of tomorrow.

Panelists: Michael Browne, Software Architect, Northrup Grumman
Alden Fuchs, SDR Project Leader, Samsung Information Systems America
Alan Gatherer, CTO Communications Infrastructure, Texas Instruments
Eric Nicollet, Software Architect, Thales Communications
Brian Salisbury, Manager, SCA Standards, JTRS JPEO
Vern Slonaker, Software Architect, Boeing

1730 - 1930 **Workshop Reception** hosted by



FRIDAY, August 19, 2005

0830 - 1030 **Session 5: *Interfacing with the Hardware Abstraction Layer (HAL)***

Chair: Mark Scoville, Software Architect, L-3 Communications

Pluggable Solutions for an FPGA.... Communications Middleware in DSPs.....Modeling to the Physical Layer. Taglines for upcoming SCI-FI or Fantasy thrillers or digging in to solve the complex HAL challenge? These presentations will focus on infrastructures, methodologies and approaches to HAL. Presenters will then assemble as a panel to address your questions.

Using CORBA on DSPs, FPGAs & Microcontrollers – Synthesizing an Ubiquitous SCA Machine in Software Radio Devices

Dr. Shahzad Aslam-Mir, CTO, PrismTech

The SCA today is one of the more powerful models being used to define the canonical structure of the software radio device. However in terms of implementation SCA makes little stipulation about the use of CORBA on the more exotic elements and platforms in the radios signal processing chain – viz. the DSP and, even more controversial from the ORB point of view, the FPGA. This presentation will detail the latest advances in high performance real-time ORB technology based on MIPS normalized design methodologies, meaning that it is now possible to extend CORBA support to hitherto non-CORBA platforms, with the resultant benefits being available not only directly to the radio platform but also waveform developers.

Middleware for DSPs and FPGAs

Bill Beckwith, CEO/CTO, Objective Interface Systems, Inc.

Communications middleware is traditionally designed to execute on general-purpose processors (GPP). However, many modern embedded devices contain more specialized processors such as DSPs, FPGAs, and ASICs. Communications middleware must be carefully designed for these specialized processors to meet space and performance requirements for those environments. The appropriate communications middleware allows system designers to construct flexible, maintainable systems that can accommodate the widest possible range of waveform computing loads while maintaining economic goals for a target platform cost profile. This presentation will compare and contrast multiple approaches to using communications middleware on specialized devices such as DSPs, FPGAs and ASICs.

A PIM and PSM for Physical Layer on DSPs

Eric Nicollet, Software Architect, THALES Communications

Standardization of OMG PIM and PSM for Software Radio Components (P²SRC) provides a solid baseline to solve the challenges of Waveform portability across Platforms on which CORBA is available. This limitation makes it necessary to find solutions for non-CORBA platforms. This presentation will describe a global PIM for Physical Layers, then a derived PSM component model compliant with cost-efficient DSP solutions. Details about how real-time interactions captured in PIM are mapped into PSM containers are provided. Final discussion addresses how the proposed vision can complement P²SRC, with potential application to SCA extension for the embedded world.

1030 - 1045 Morning Refreshments

1045 - 1245 ***Session 6: Engineering High Performance Software Radio Solutions***

Chair: Kevin Richardson, Software Systems Engineer, The MITRE Corporation

You've made the decision to design and implement a Software Based Communication system, now the pertinent question becomes - Can the system that you plan on designing meet the demands of your high performance applications? This session explores tools, techniques and approaches that can be utilized to answer the question affirmatively.

CORBA Transport Considerations in Embedded Hardware / Software Co-design

Sean Bentley, Embedded Software Engineer, The Boeing Company

Software-Based Communication Systems built on top of the SCA require a unique mix of CORBA Software and Embedded Hardware platforms. This pairing offers many complex design challenges. One of the most fundamental challenges is meeting deterministic hard real time and throughput requirements. One way to help alleviate this is the use of different CORBA Transport Layers that can allow for greater throughput than the standard "out-of-the-box" IOP Transport. However, the benefits of using a CORBA Transport can be maximized if certain considerations are made early on in the low-level Embedded Hardware and Software design. This presentation explains those considerations.

A Performance Modeling and Simulation Approach to Software-Defined Radio

Dr. Shawkang Wu, Scientist, The Boeing Company

Long Ho, Senior Software Engineer, The Boeing Company

An important aspect in the development of software-intensive systems, such as software-defined radios, is a design tradeoff between flexibility and performance. System flexibility is mostly driven by software capabilities while system performance relies on hardware capabilities. To minimize risks and maximize the chance of successful completion of the development, we apply Performance Modeling and Simulation to analyze and evaluate the co-design approach. PM&S enables us to verify hardware capability, analyze system performance, and validate system portability. The radio software model is compliant to the Software Communications Architecture specification, and the hardware model is based on the Joint Tactical Radio architecture.

High Capacity SCA Systems, Challenges and Insights

Mark Scoville, Software Architect, Dr. Osama Haddadin & DeLon Jones, L-3 Communications

In moving toward SCA compliance with higher performance systems, special challenges are encountered: 1) Hardware Component Technology Limitations, 2) Software Tools Limitations, and 3) Increasing Performance Requirements. This presentation addresses problems, recommendations, and potential solutions associated with high capacity radio system demands.

1245 - 1330 Lunch

1345 - 1545 **Session 7: SBC Case Studies and Experience Reports**

Chair: John Hogg, CTO, Zeligsoft

This session presents hands-on lessons gained from actual SBC development. There is no teacher like actual experience. The speakers will deliver hard-won knowledge of what works, what doesn't and how to build a software-defined radio that delivers on its requirements.

An Example of a Network-Centric Software Radio

Glenn Fogarty, Embedded Software Engineer, The Boeing Company

This presentation will show basic concepts of a network-centric software radio implementation. Topics that will be covered are networking capabilities, inter-operability for the Global-Information-Grid (GIG) and APIs for interconnecting to other waveforms.

Practical Experiences using the OMG'S Extensible Transport Framework (ETF) Under a Real-time CORBA ORB to Implement QoS Sensitive Custom Transports for SDR

Dr. Shahzad Aslam-Mir, CTO, PrismTech

The practice of using custom low latency transports in a software radio environment under a real-time middleware is widespread. However, an open, extensible and commonly agreed upon standard to actually perform this was lacking until recently. The OMG's Extensible Transports Framework (ETF) specification aims to do just that. Based on practical experiences this presentation discusses (i) Appropriate use of the specified plug-in interfaces between the ORB and the transport plug-in provide or imply semantics of connection initiation, activation/use, and teardown; (ii) The impact of threading and the imposition of QoS requirements on transports whose semantics may not lend them to a request-reply model; (iii) The rationalization of the relative latency ratio between time spent in the ORB and that in the transport.

Bootstrapping the OE in a Multi-Channel, Multi-Processor SDR Environment

Dr. Robert R. Wang & Sean Bentley, Embedded Software Engineers, The Boeing Company

SDR Operating Environment (OE) includes the RTOS, the ORB, the CF, and potentially various Services and Devices which provide a common platform upon which SCA-compliant applications can be instantiated. Bootstrapping the OE in such a heterogeneous environment can be challenging, considering the various constraints imposed on the system, such as timing, security, robustness, memory limitations, and bandwidth of inter-processor communications, to name a few. Yet there is to date no established standard for such a process. In this presentation, we describe a practical approach to this process, in the hope of providing a baseline approach to such a standard, which should prove useful to field practitioners and the evolution of future radio clusters.

Program Committee

Joseph Frisina	<i>BAE Systems</i>
David Haverkamp	<i>Rockwell Collins</i>
Neli Hayes	<i>The Boeing Company</i>
Eric Held	<i>Harris Corporation</i>
John Hogg	<i>Zeligsoft</i>
Kevin Loughry	<i>Object Management Group</i>
Allan Margulies	<i>SDR Forum</i>
Jimmie T. Marks	<i>Raytheon</i>
Eric Nicollet	<i>THALES</i>
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Kevin Richardson	<i>The MITRE Corporation</i>
Mark Scoville	<i>L-3 Communications</i>
Jeffrey Smith	<i>Mercury Computer Systems</i>
Fred Waskiewicz	<i>Object Management Group (PC Chair)</i>