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Webinar #15: SDR 4.1 Draft Specification Release

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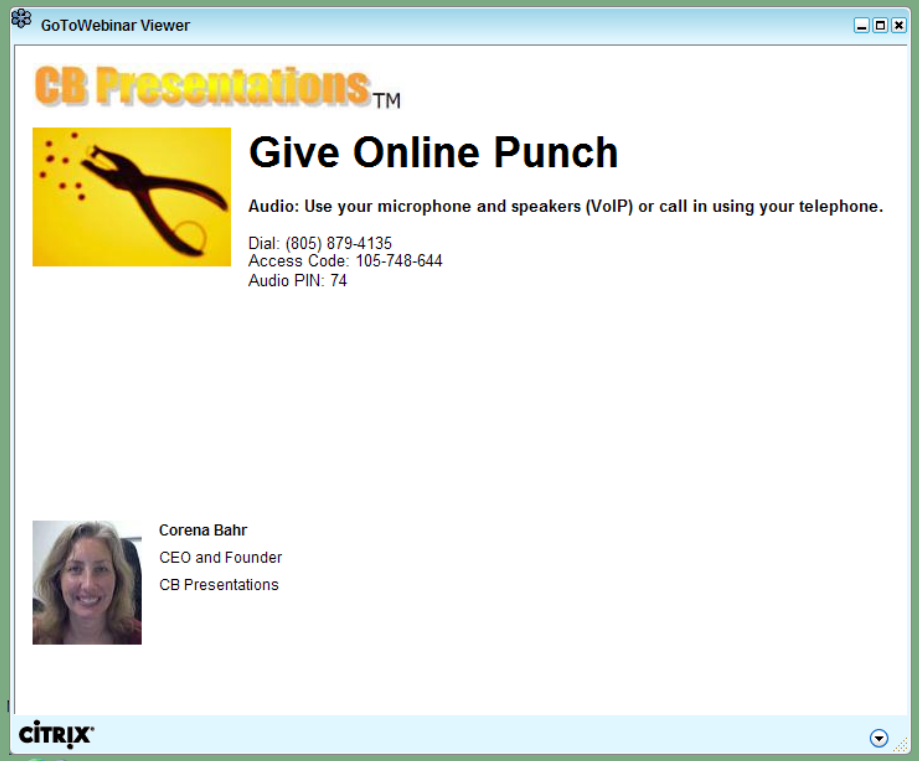
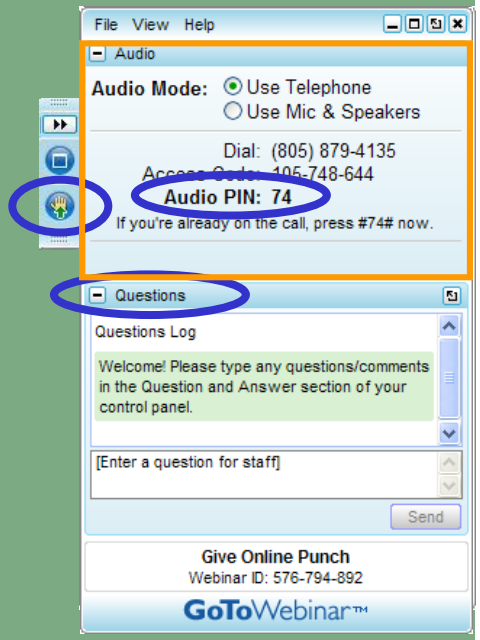


2. Control Panel



Today's Agenda

SCA 4.1 Value Proposition

- Presented by Eric Nicollet, Thales

Overview of the SCA 4.1

- Presented by Kevin Richardson, MITRE, JTNC SCA 4.1 Project Lead

How to Submit a Comment/Issues

- Presented by Ken Dingman, Harris

SCA 4.1 OVERVIEW HIGHER BENEFITS FOR SDR STAKEHOLDERS

SCA 4.1 Draft Release

Webinar 18th February 2015

SCA – Global Adoption, Proven Performance

Global Adoption, Proven Performance

Drivers of SDR Adoption

- Enhanced communications interoperability
  - Common waveform application base across multinational coalitions
- Simplified insertion of new communications capabilities in deployed radios
  - E.g. next generation MANET, dynamic spectrum allocation…

Benefits of SCA Adoption

- Proven cost and delivery time advantages
  - Reuse of waveform application software
  - Within a radio family and across radio vendors
- Reduced development risk and time-to-market
  - Established ecosystem of SCA vendors

SCA standard evolutions for benefits for the Value Chain

Proven Performance in Deployed Systems

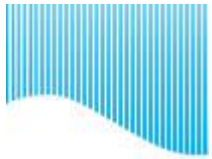
Status of deliveries for US Market

- First Generation: NB capabilities: 350,000+
  - Mainly AN/PRC-152 and AN/PRC148 product familie
- Second Generation: WB capabilities: 80 000+
  - AN/ PRC-154 and AN/PRC-155: Near 25000
  - AN/PRC-117G and AN/PRC-152A product families : Near 55000

Status of SDR Platforms and SDR Waveforms

- Near 40 Waveforms developed and ported in US and International Markets
  - More than 50% are actively developed or deployed into forces
- More than 40 Platforms identified in US and International markets
  - 15 international vendors proposing , developping and deploying SDR paltforms inc. SCA capabilities to support Multi-Waveforms

A Rich and Evolving Ecosystem



SCA 4.1 Overview & Benefits

SCA 4.1 Introduction

SCA 4.1 leverages the success of SCA 2.2.2, largely deployed and used in US and International markets

SCA 4.1 incorporates new technology advances to enhance

- Waveform Interoperability
- Waveform Portability
- Information Assurance
- Affordability

While preserving investments in SCA 2.2.2 Waveform Applications, SCA 4.1 introduces key benefits for all SCA Value chain stekeholders

SCA 4.1 Highlights

1. **Support Wide variety of SDR Platforms type**
   - Better Applicability for dismounted & lower cost platforms ; Longer Battery Life
   - Improve architectural scalability to address the size, weight, power and cost requirements
     - Profiling and architecture improvements
   - Improved support for devices such as DSPs and FPGAs
2. **Enhance Information Assurance**
3. **Performance improvements**
   - Start Up time Enhancements : Boot & WF deployment
   - Improved realtime performance
4. **Reduce Development Lifecycle costs**
   - Testing cost Enhancements
   - Requirements cleanup
5. **WF Portability Enhancements**
6. **Easy Introduction with Backwards Compatibility features**
   - SCA 4.1 protects SCA 2.2.2 Waveform Application Investment

SCA 4.1 provides real benefits to warfighter, radio vendors and the complete SDR ecosystem

SCA Benefits for SDR Value Chain

- Interoperability
- Support Wide variety of SDR Platforms type
- Information Assurance
- Performances

- WF Portability
- Diversity & Flexibility in procurement options
- SDR Market Place

- Development Lifecycle
- WF Portability
- TTM

- Larger application for standard

SCA 4.1 Preview Event – Testimonials

***Aeroflex**: "SCA 4.1 – it's not just for tactical radio..."*

***DGA**: "DGA is investigating the potential for SCA4.1 for its French SDR roadmap"*

***ESSOR PD**: "ESSOR Community congratulates the joint multinational efforts performed in the framework of the WINNF SCA 4.1 WGs, integrating positively significant contributions provided by ESSOR."*

***Fraunhofer FKIE**: "The new SCA 4.1 provides a crucial edge over SCA 2.2.2"*

***Harris**: "SCA 4.1 will be a useable specification"; "SCA 4.1 is essential for a broad commercial adoption"*

***NordiaSoft:** "NordiaSoft has implemented many features that are now present in SCA 4.1"*

***PrismTech:** "PrismTech anticipates that SCA 4.1 enhancements will help to accelerate the adoption of SCA going forward"*

Raytheon: "The SCA 4.1 specifies a scalable technology neutral architecture" ;"Raytheon utilizes the SCA in our Communications and Electronic Warfare (EW) business areas.".

***Reservoir Labs:** "Reservoir Labs anticipates continuing to support the evolution of the SCA with an upgrade of R-Check SCA for SCA 4.1 in 2015"*

***Selex:** "SCA 4.1 includes essential features which maximize investments and ease maintenance, allowing for a smooth transition toward the next SCA implementations and for a wider spread of this technology on commercial products.*

***Thales:** "Thales is highly interested by SCA 4.1, and has actively contributed to its development ; Thales is positive regarding adoption of SCA 4.1 Core Spec"*

SCA 4.1 Overview & Benefits

1 Reduce Radio Size and Cost

Different Platforms, Different Profiles: Decreasing SWAP, Cost & Complexity

Introducing Profiles

- **SCA Lightweight Profile:** for radio platforms where the hardware modules have a static configuration.
  - Provides a minimum set of functionality which is applicable for resource (e.g. SWAP) constrained platforms.
- **SCA Medium Profile:** for radio platforms with plug-and-play but not removable hardware modules.
  - Still rather lightweight but it introduces a configurable, dynamic aspect.
  - The most flexible platform in that it provides the lightest weight implementation that supports the legacy SCA deployment model.
- **SCA Full Profile:** for radio platforms with removable, plug-and-play hardware modules.
  - Provides the full breadth of SCA deployment and management capabilities
  - Aligned to support prime power, multi-channel sets

SCA 4.1 allows vendors to select which features are supported to meet their program's mission without impacting portability or interoperability

Slide 16

1 Reduce Radio Size and Cost

Component scalability

- Allow component developers to choose whether or not to implement some of the standard sub-component interface. The scalability will also be used to support the different profiles of the specification.

Scalability of the manager components

- Allow developers to choose whether or not to implement all of the manager interfaces. The manager scalability will also be used to support the different profiles of the specification

Minimal ultra-Lightweight AEP definition

- Provides minimal uLw specification with optional grouping to extend capability

Remove requirement for CORBA middleware

- SCA 4.1 permits other middleware, including simply using C++ pointers where distributed processing is not required.

SCA 4.1 allows vendors to 'right size' the radio to the mission

1 Resource Constrained Processors

Component Scalability

- SCAv4.0 introduced component scalability
  - Supports components of smaller sizes but uses "conditional inheritance" which is not UML compliant
- SCAv4.1 revisited component scalability
  - Replaced conditional inheritance with "optional composition" which is UML compliant
  - Allows a mixture of components with different levels of scalability in a same radio.

Specification of Lw and ULw AEPs

Better enforcement of POSIX conformance

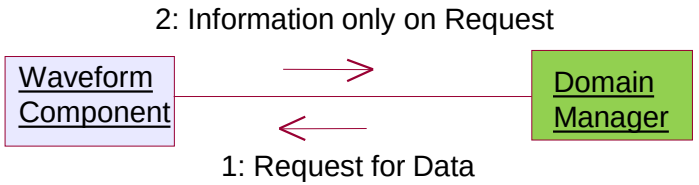
Support of, typically, DSP Operating Environments

International convergence is at hand

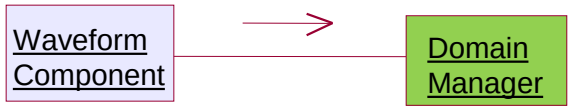
Enhanced Information Assurance

- **Design patterns and strategies incorporate security awareness**
- **Remove ability for a component to query information that could be inappropriately used**
- **Possibility of clients requesting information they should not have removed by utilizing a 'push' model**
- **Harder to get an object reference to the DomainManager and learn about the system**
- **Naming Service deleted**

SCA 2.2.2



SCA 4.1



Improved Performance

Faster Boot Times

- Port Connection improvements
- Allows faster connections, reducing waveform startup boot time
- Permits connections to be defined at build time

Improved real-time performance

- Independence from middleware / connectivity (PIM/PSM approach)
- CORBA is not mandatory any more
  - Can be chosen or not depending on platform design choices
- This considerably broadens potential adoption
  - Possibility to use any connectivity standard
  - Solutions with proprietary middleware / connectivity (e.g. very small / emerging processors)

4 Reduced Development Costs

Static analysis tools will have more prominence

- Test all paths in the code
- Find errors much earlier in the development process.
- Provide immediate assistance by linking errors directly to the specification - this is a good way to “teach” the spec as code is being written.

Requirements cleanup

- Introduce common requirements tags (form: “SCAXXXX”)
  - Can be used for both US Govt and commercial/international markets
- Reduced number of requirements
- Removal of some redundant requirements

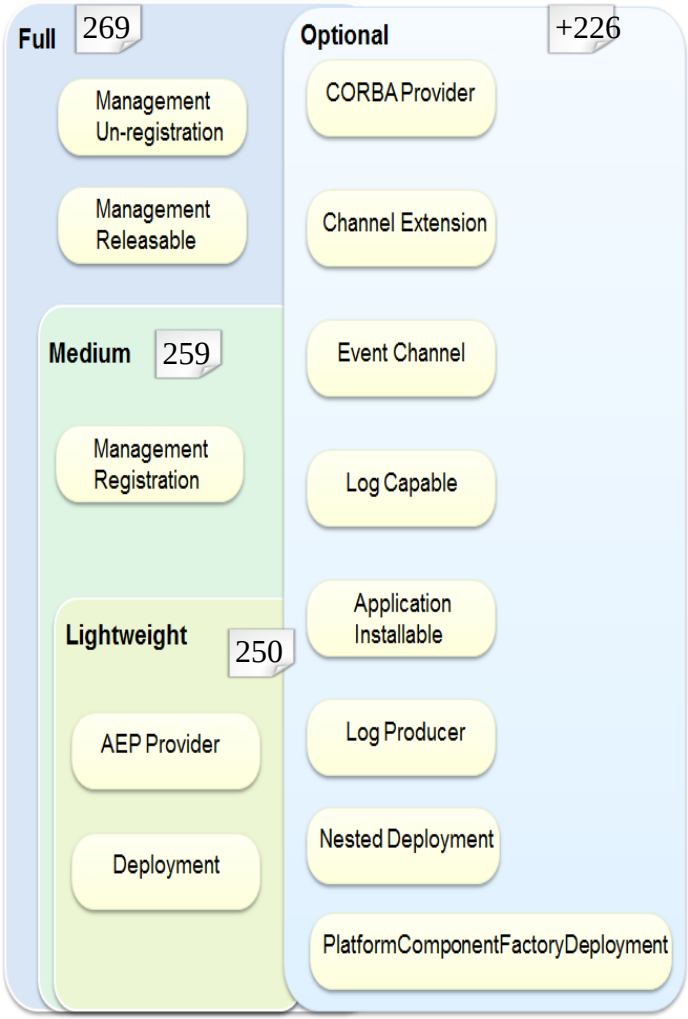
Testability Improvements

Total test time reduced based on profile implemented

- Cost of increase test coverage complexity

Units of functionality and multiple base AEP profiles with optional function groups allow crisper test definitions

The backwards compatibility UOF added to 4.1 done in a test-friendly way



Improved Portability of WF designs

Specification of PIM (Platform Independent Modelling) IDL Profiles

- Full Profile: corresponding to existing SCA
- ULw Profile: targetted for most embedded processing needs and environments (e.g. Physical Layers, DSP / FPGA)

Rationalization of PSM IDL Profiles

- CORBA PSM
- Extensible approach for other PSMs

Definition of Full and ULw POSIX AEPs

- Expands applicablility towards DSP/Constained processors

International convergence

- Same content as WInnF Full & ULw PIM IDL Profiles
- Similar content to WInnF Lw & Ulw POSIX AEPs

Investment Protection

SCA 4.1 ensures investment in SCA 2.2.2 applications can be reused in SCA 4.1 environment

- Re-introduce the DomainManager to obtain the proper allocation properties that are associated to a Device
  - Allows the ApplicationFactory to use a Device for deployment

Support for applications composed of a mixture of SCA 4.1 and SCA 2.2.2 components.

- Allow developers to perform a more incremental transition from SCA 2.2.2 to SCA 4.1

Enhance the ability to migrate legacy waveforms to an SCA model

- Naming convention changes

SCA 4.1 OVERVIEW

SCA 4.1 Draft Comment Handling

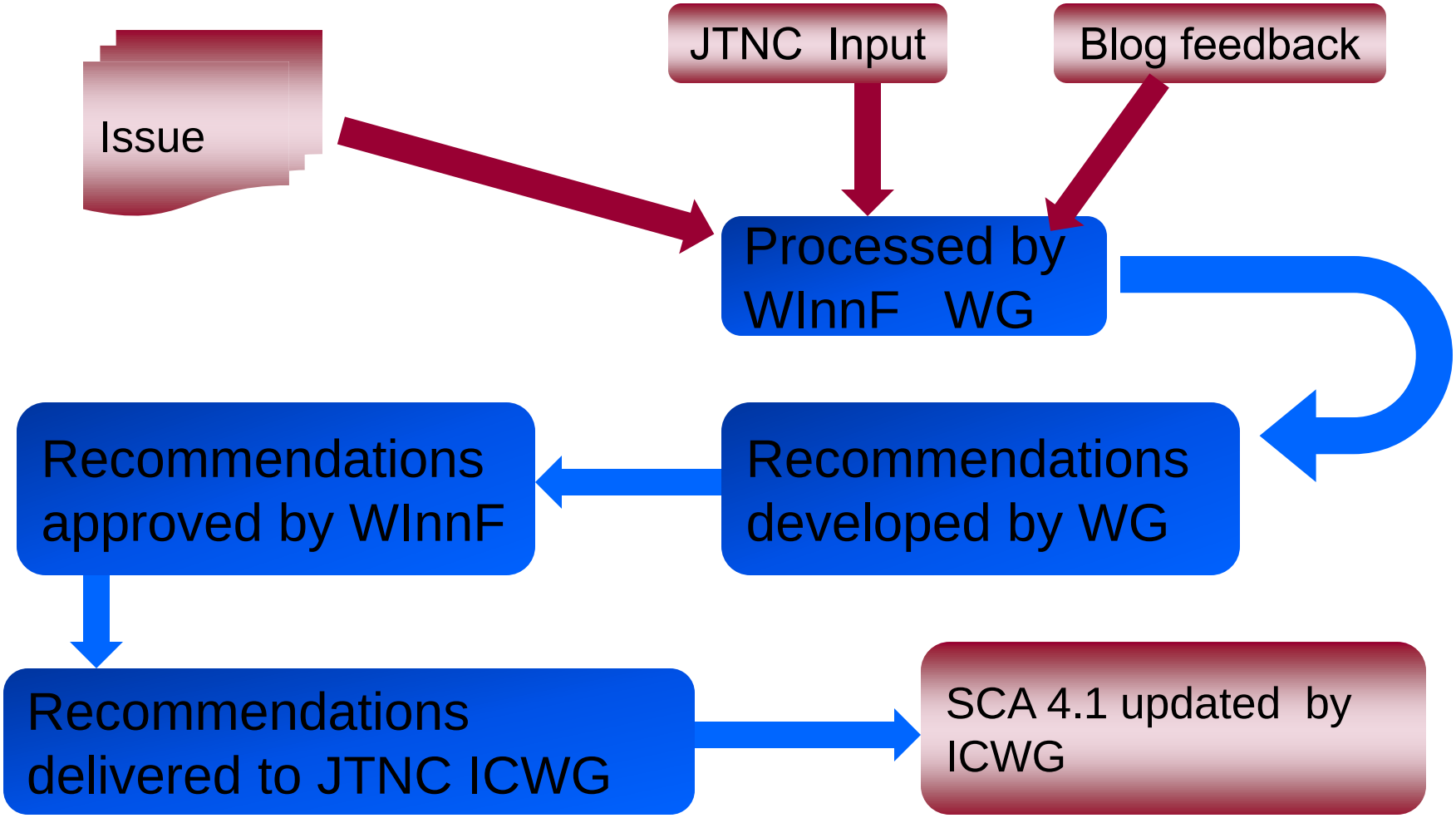
SCA 4.1 Webinar

18 February 2015

Comment Submission

- **Submit comments using the WInnF Specification Issue Reporting Form**
  - https://winnf.memberclicks.net/index.php?option=com_mc&view=mc&mcid=form_176912
- **Comment adjudication will be performed by a WInnF Work Group**
- **JTNC will participate in the comment adjudication as SME's**
- **Comment period will close March 20, 2015**

Adjudication Workflow



SCA 4.1 Comment Adjudication Process

1 –Collect issues submitted via the WInnF Specification Issue Reporting Form

2 – Each submitted issue adjudicated by the WInnF

- **Submitted comments will either be accepted or rejected.**
- **Accepted comments will result in a detailed analysis of the comment and its impact to the specification culminating with a proposed resolution to the comment.**
  - Accepted comments are posted to a blog hosted on the WInnF website.
    - http://groups.winnforum.org/p/bl/et/blogid=43
  - Public able to supply comments to the issue on the blog
  - The proposed resolution to each issue will be posted on the associated blog article for public discussion
- **Rejected comments are those that are not deemed as relevant to the draft specification.**
- **Comments received as well as working and recommended adjudications will be available on the blog**

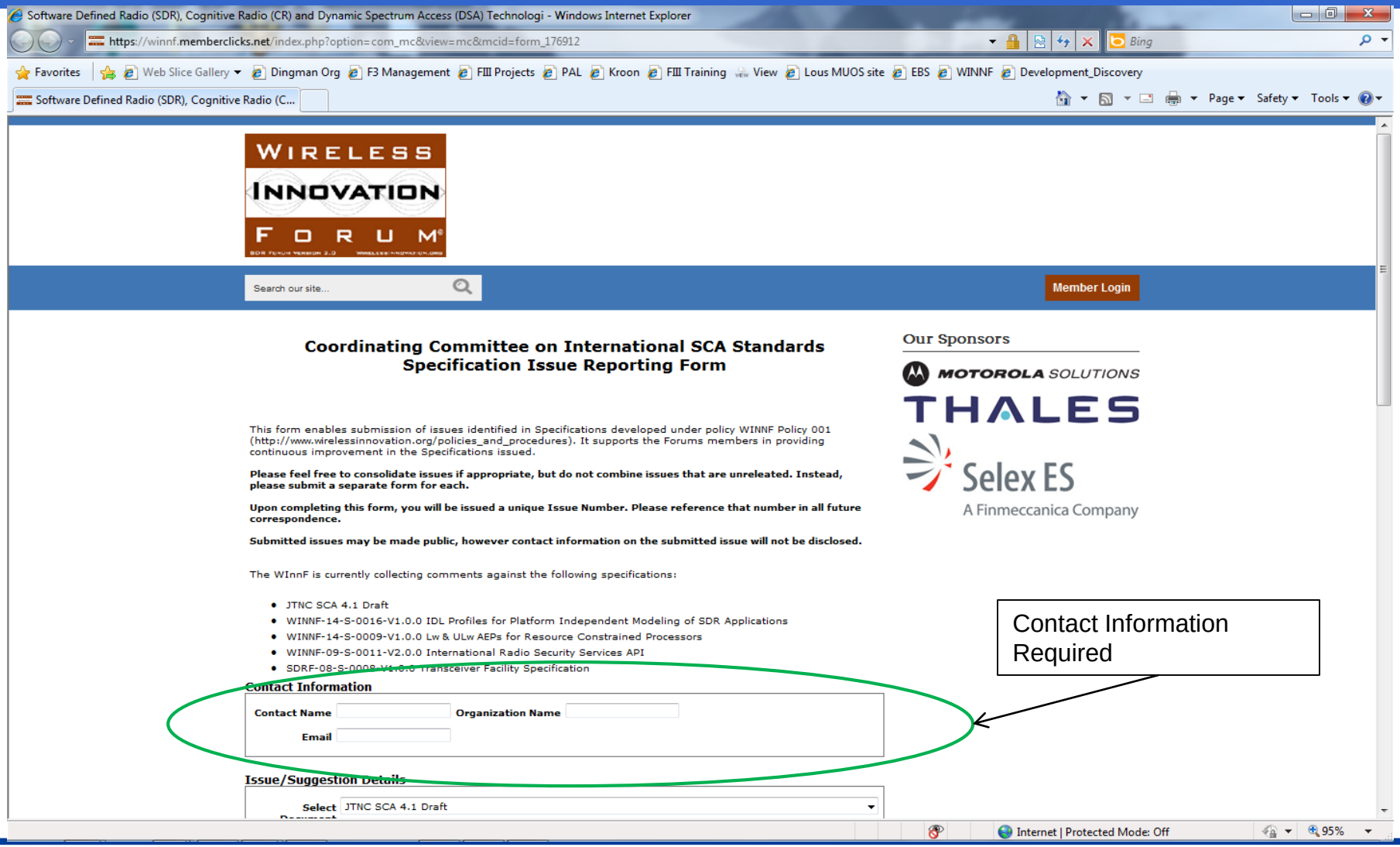
SCA 4.1 Comment Adjudication Process

3 – Resolution of all comments, whether rejected or resulting in a recommended resolution will be included in the project output work product(s).

4 – All SCA 4.1 issue recommendations will be included in a WInnF work product that will go through the WInnF approval process.

5 –Final project work products (including all comments and recommended adjudications) will be made available publicly on the WInnF site and submitted to JTNC for consideration and final adjudication.

Comment Submission



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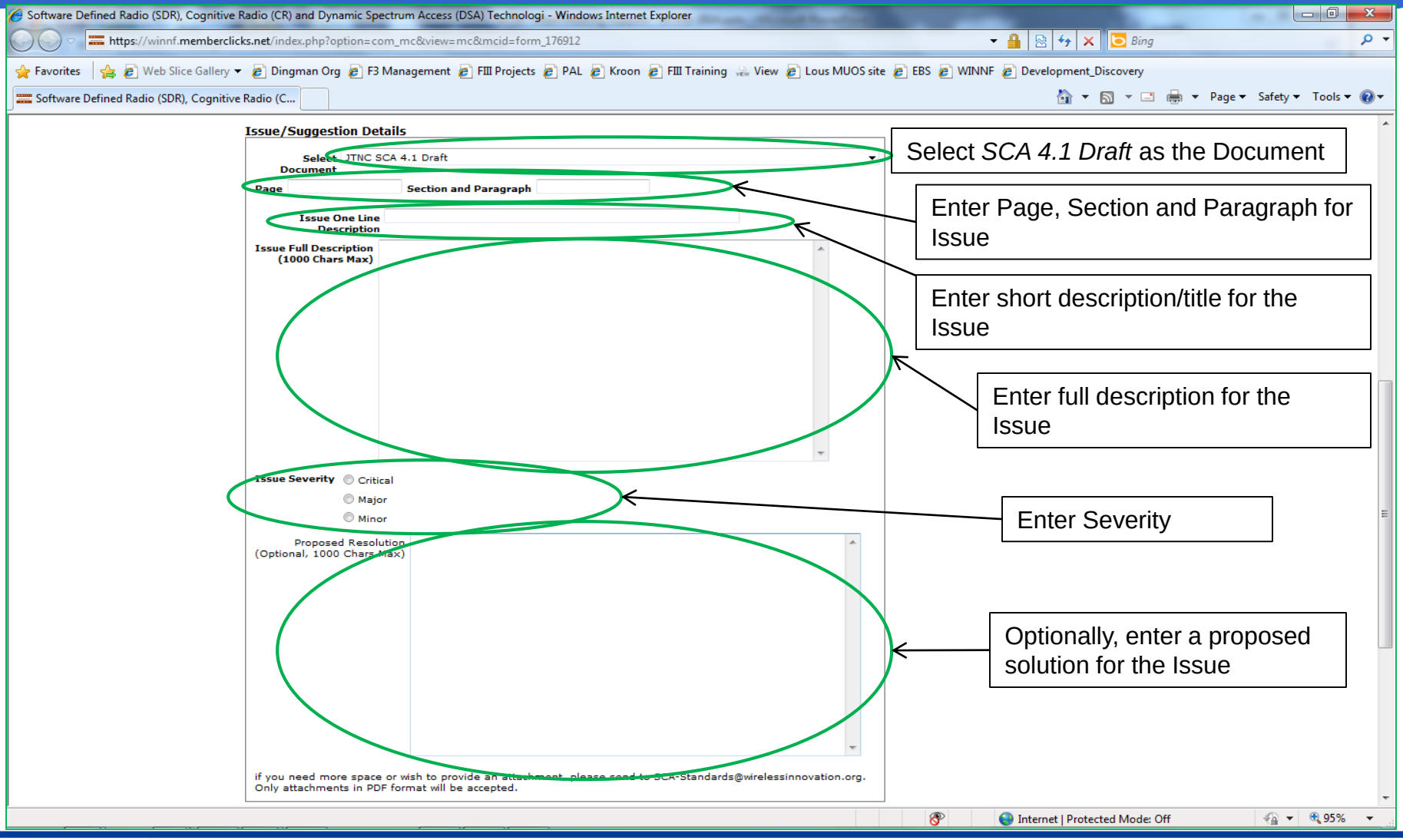

Comment Submission