OMG’s MDA and Software Radio

Fred Waskiewicz
Director of Standards
Object Management Group
wask@omg.org

28 December 2006
What’s coming up …

- A brief word about OMG
- MDA – the elevator story
- OMG specifications supporting Software Radio (which we refer to as software-based communications (SBC) to differentiate from JTRS)

- Caveat: I’m not a SR domain expert
Background - MDA

What is MDA?

MDA := Model Driven Architecture

A model-based, standards-driven and tool-supported
software engineering approach to
application and software system development
Background - MDA

Abstraction \rightarrow MDA \rightarrow Automation

MDA

Open Standards
MDA – key concepts

Computer Independent Model (CIM)

Platform Independent Model (PIM)

Platform Specific Model (PSM)

code
code

28 December 2006
MDA – key concepts

- Computer Independent Model (CIM)
- Platform Independent Model (PIM)
- Platform Specific Model (PSM)

Validate & Verify

code
OMG SBC Specifications

- UML Profile for Software Radio
- PIM and PSM for Digital IF
- Software-Defined Radio Security Subsystem Core
- PIM and PSM for Key Management for Software Based Communications Security Subsystem
- PIM and PSM for Smart Antenna
UML Profile for Software Radio (1)

- Foundation. Defines a domain-specific (specification) language* for a product line of software radios. Conceptualizes:
  - Communication Channel and Equipment
  - Applications and Components
    - Base interfaces, properties, types, ports
  - Platform Service Components

* aka “UML profile”
UML Profile for Software Radio (2)

- Component Facilities (expressed in UML using this profile)
  - Radio Control
  - Common Layer (e.g., PDU, flow control)
  - Data Link Layer (e.g., MAC)
  - Physical Layer
    - A good start but more work is continuing.
    - This is being continued with OMG Smart Antenna API and Digital IF RFPs
    - Audio and Serial Components
UML Profile for Software Radio (3)

- Defines a Software Radio Architecture
  - An abstraction of SCA

28 December 2006
PIM and PSM for Digital IF

- This forthcoming platform service specification will define:
  - PIM for control interfaces of tuners and exciters in a high bandwidth digital streaming system
  - Data descriptors for the messages passed across the digital Intermediate Frequency (IF) platform
  - A UML 2.0 compliant profile that allows the modeling of system aspects, topology and data flow

- Utilizes UML Profile for Software Radio
Software-Defined Radio Security Subsystem Core

- The forthcoming platform service specification will provide the definition of the common capabilities of a secure communication subsystem.
- It will also provide management interfaces for the following:
  - The security subsystem
  - For authentication
  - For cryptology and bypass channel communication
- Utilizes UML Profile for Software Radio
PIM and PSM for Key Management for Software-Based Communications Security Subsystem

- This forthcoming platform service specification will define interfaces for key management in a secure communication subsystem.
- Utilizes UML Profile for Software Radio
- Examples of primary key management functions include:
  - Key Receipt and Identification
  - Key Allocation and Use
  - Key Storage
  - Key Accounting
  - Key Zeroization
  - Rekey
This forthcoming platform service specification will define a smart antenna interface specification to be implemented in OMG’s software radio architecture.

Utilizes UML Profile for Software Radio
Topics for collaboration

- Semantics
  - Model elements (e.g., comm channel) must accurately reflect industry usage
- Identify other PSMs for the OE
- Identify other services to be standardized
  - e.g., cognitive radio, adaptive technology, spectrum management
- Specification evolution
- Preventing redundancy !!!

28 December 2006
Other OMG Specifications

- Modeling
  - e.g., UML, Transformations
- Middleware
  - Minimum CORBA
  - Lightweight Services
  - ...

28 December 2006
References

- [http://www.omg.org/mda](http://www.omg.org/mda)
- [http://sbc.omg.org](http://sbc.omg.org)
Thank you.

Questions ???