Military Scenario Definition and Battle Management Language

Dr. Robert Wittman

Discussion Topics

- Introduction
- SISO Activities
- SIMCI Activity
- BML Activity
- Questions
Need For Common MSDL Specification

MSDL Architectural Characteristics

• Separation of Code from Data
  - MSDL XML Schema explicitly defines allowable data types, constraints, enumerations, and hierarchical relationships

• Use of Industry Standards
  - World-Wide Web Consortium (WC3) XML

• Application Independence
  - Community wide access for tools to develop or modify military scenarios
  - Community wide access to use existing military scenarios

• Separation of Concerns
  - MSDL focuses on military scenario information not on application specific, exercise control specific, or other simulation initialization areas
OneSAF Product Line Architecture

Military Scenario Development Environment

Ease of Use in the MS Power Point environment

OneSAF Command and Control (C2) Systems Interoperability

- Unlike most legacy entity level simulations OneSAF models are "C2 Aware"
  - All C2 messages are purposely sent/received by individual models as a result of simulation events
- Two way C2 interface
  - Outbound: OneSAF provides the COP for C2 devices
  - Inbound: C2 Devices affect OneSAF models and provide information to the simulation operator
- The linkage between OneSAF and the C2 network is facilitated by the Common C4I Adapter

OneSAF 2.0 will feature the capability to create a COP on C2 systems using thousands of standard OneSAF entities

By pairing the C2 Aware entities with standard resolution wrap-around forces, a detailed BDE scenario can be simulated while accurately populating C2 systems
Simulation Interoperability Standards Organization (SISO) Activities

- MSDL SG approved by SISO in Spring, 2005
- Participants represent a wide body of interest, including:
  - Representatives from over 5 different nations
  - Over 100 participants at SG meetings
  - Industry, Academia, Government
  - 98 participants on MSDL SG reflector
- Active coordination with C-BML SG has brought about harmonization of plans for Product Development Group (PDG)
- Product Nomination approved by SAC 27 Feb. 2006 and EXCOM March 8, 2006

MSDL: The Study Group

- Mtg 1: Spring SIW, San Diego, CA, 6 April 2005
  - 56 Participants
- Mtg 2: Orlando, FL, 8-10 June 2005
  - 35 Participants
- Mtg 3: Euro-SIW, Toulouse, France, 29 June 2005
  - 27 Participants
- Mtg 4: George Mason Univ, VA, 3 Aug. 2005
  - 17 Participants
- Mtg 5: Fall SIW, Orlando, FL, 22 Sept. 2005
  - Product Development Group Kickoff, 5 April 2006
**MSDL:**

The Product Development Group

- **MSDL Product Development Group Officers**
  - Chairman: COL Buck Surdu
  - Co-Chair: Per Gustavsson
  - Vice-Chair: Rob Wittman
  - Secretary: Ken Peplow

- **Drafting Group Participation**
  - Jeff Abbott (Editor - Acusoft)
  - Rob Wittman (Editor - MITRE)
  - Francois Gagnon (CAE/Canada)
  - Jeff Covelli (General Dynamics/CTIA)
  - Mike Fraka (USA TRADOC)
  - Tram Chase (Simventions)
  - Kevin Gupton (ARL-UT)
  - Curtis Blais (NPS)
  - Beth Loftus (MITRE/MATREX)
  - Ghislain Giguere (CAE/Canada)
  - Dave Prochnow (MITRE/MATREX)
  - Charley Budde (MITRE/MATREX)
  - Chuck Turnitsa (ODU)
  - Jeff Covelli (General Dynamics/CTIA)
  - Per Gustavsson (Erickson/Sweden)
  - Erik Borgers (Netherlands)

- **PDG Teleconference 2nd Thursday of every month from 11:00-12:30 EST**

- **DG Teleconferences 1st and 3rd Thursday of every month from 11:00-12:30 EST**
  - **MSDL Standard Products**
    - Schema Files
    - Specification
    - Coding Standards
  - **JC3IEDM Comparative Analysis Report**
  - **Products – Data Analysis and Resolution (DAR) Reports**
    - 01-Sides and Forces
    - 02-Organization
    - 03-Overlays
    - 04-Tactical Graphics
    - 05-Environment
    - 06-Installations
    - 07-MOOTW

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**MSDL Road to Balloting (Evolving)**

- **Balloting to Start ~16 Oct.**

  - Balloting Invitation ~ 10 Sept 07
  - Balloting Announcement ~ 4 weeks

  - PDG Spec Review 28 June 07
  - PDG Review Period ~ 2 weeks
  - Update Specification
  - Update Period ~ 2 weeks

  - SAC Review ~ 9 Aug 07
  - SAC Review Period ~ 4 weeks

  - Balloting Begins ~ 16 Oct 07
    - Balloting Period ~ 4 Weeks
    - Revise & Publish

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The MSDL Standard: What’s Included

Primary Elements

- 9 Primary Elements including reuse schema components from
  - Base Object Model SISO Standard and
  - JC3IEDM MIP Standard
- OneSAF-Based Elements not being consider for balloting
  - Plan
  - Course of Action
  - Threats
  - Units and equipment Enumerations
- XML Representation allows for
  - Structure and type Validation
  - Business rule validation (under investigation) using assertion-based tools such as Schematron
Technical Specification

- Defines/Specifies
  - MSDL data structure
  - Cardinality of data elements
  - Mandatory and optional data elements
  - Valid data types (simple and complex)
  - Valid data boundaries
  - Valid domain values (enumerations)
  - Relationship among data elements
- XML Representation allows for
  - Structure and type Validation
  - Business rule validation (under investigation) using assertion-based tools such as Schematron

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Business Rules

- Defines
  - Dependencies between elements within the data model i.e.
    - Units are associated with a single force or directly to a single side
    - Forces are associated with other forces or directly to a single side
  - Other use-based constraints associated with the data elements i.e.
    - A time period can be associated with environmental conditions (wind, rate of precipitation, etc.) to provide scenario-based evolving environmental conditions

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**Coding Standards**

- Defines/Specifies
  - XML specific data modeling rules
  - XML element and type naming rules
  - XML element and Attribute usage rules
  - XML global and local definition rules
  - Data model extension rules
  - Under consideration - Data model translation instantiation rules (i.e. going from UML to XML)
  - Parser specific rules (SAX/DOM)

**Documents**

- MSDL Technical Specification
  - Version 1.0
- MSDL Business Rules
  - Version 1.0
- MSDL Coding Standards
  - Version 1.0

**XML Representation**

**References**

- United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) XML Naming and Design Rules Version 2.0
  - Available at http://www.disa.org/cefact-groups/atg/downloads/index.cfm
- Department of the Navy XML Naming and Design Rules, final Version 2.0 January 2005
  - Available at http://www.doncio.navy.mil/qsfyem55oy4eup45vvgeu555/POLICYMATRIX/download.aspx?id=e90e8a0b-3b39-4706-ab69-5b41378df6f7
Other Interesting Rules (1/2)

- Lower-Camel-Case (Capitalizes first letter of each word, except the first and compounds the name) for attribute names objectHandle
- Upper-Camel-Case (Capitalizes first letter of each word and compounds the name) for Elements and Types (Unit, ForceRelationship)
- Types declared for all elements
  - Allows extensions to be managed using Type-based restrictions and extensions
- Elements are used to declare class attributes xsd:Attributes are not used
- Xsd:all compositor precluded from use
  - Allows elements to occur in any order
  - Elements are always optional
  - Compositor not allowed to occur more than once thus cannot be repeated

Other Interesting Rules 2/2

- Major Version Definitions
  - Removing or changing values in enumerations
  - Changing element or type names
  - Changing structure so as to break polymorphic processing capability
  - Delete or add mandatory elements or attributes
  - Changing cardinality from mandatory to optional
- Minor Version Definitions
  - Adding enumeration values
  - Optional-based extensions
  - Adding optional elements
- Root schema versus subschemas – must import root schemas to access their internal structures
  - Import (external root)
  - Include (internal to root)
- Section 9 using code lists within XML schemas
  - Type definitions add a lot of flexibility in how to handle domain values
  - Xsd:choice or union mechanisms
UML to XML Relationship

- All Classes are declared as xsd:complexType
- All attributes are declared as a local xsd:element within an xsd:complexType
- Composition associations are locally declared as an xsd:element within an xsd:complexType
- Associations that are not defined as compositions are globally declared as an xsd:element. (These should be typed and then locally declared as xsd:element ref=)
- Falls under UN/CEFACT XML NDR V2.0 Section 5.4 Reusability Scheme (described a hybrid element & type approach)

JC3IEDM’s Impact
Joint Consultation, Command and Control Information Exchange Data Model (JC3IEDM)

- Comprehensive Information Exchange Data Model
  - Coordinated with 26 countries
  - Defines entities, organizations, actions, reporting data, etc.
  - Provides XML Schema and Relational Data Model representations

http://www.mip-site.org/040_Public_Documents.htm

Drafting Group Product

MSDL Drafting Group
JC3IEDM Alignment Report

2006-11-16

François Gagnon (tiger team lead) – Environment
Rob Wittman Jr. – Forces, Sides and Associations
Kevin Gupton – Tasking Org. and Installations
Mike Fraka – Tactical Graphics and Overlay
Curtis Blais – Military Operation Other Than War

Report and Presentation available at
Sides & Forces, and Associations

- JC3IEDM Objects and Affiliations Overview
- MSDL SideForces and Associations Elements
- JC3IEDM (Objects and Affiliations) and MSDL (Sides, Forces, and Associations) Alignment

Simulation to C2 Interoperability (SIMCI)
Simulation-to-C4I Interoperability (SIMCI)

**Description**

An organization and process for improving interoperability between the Modeling and Simulation (M&S) and Command, Control, Communications, Computers, and Intelligence (C4I) Systems.

**Objectives**

- Identification of requirements for simulations and C4I to support interoperability
- Implementation of seamless cost effective interoperability between M&S and C4I systems.

**Improved operational capability in a JIM environment**

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**SIMCI Mission**

- M&S
- Battle Command
- Scenario Generation
- Data Collection

Reasons to link Simulation-to-BC:
- Tools and Test as you fight
- Embedded Training (individual & collective)
- Course of Action Analysis
- Mission Planning / Rehearsal
- Decision Support Tools
- Operational AAR
Software Evolution Due to the Alignment

Aligning MSDL with the JC3IEDM

Areas of Interest
Ownership – Who (what organization) does the network belong to?
Addressing – How do I reach a user on the network?
Network Structure – Are there subnets, multicast groups, or broadcast groups
Services – What services are provided and accessible on the networks.
Role Access – Are access privileges role based? What are the roles?
BML Activity

C-BML Components

+06F-SIW-008 (Tolk, Diallo, Turnitsa)
BML – Unambiguous Language for Tasking and Reporting

C2 System

C-BML tasking: Command and Control Forces and Equipment

C-BML reporting: Provide for Situational Awareness

Simulation System

Robotic System

BML & MSDL Initialization

C2 System

C-BML tasking: Command and Control Forces and Equipment

C-BML reporting: Provide for Situational Awareness

C-BML Embedded in MSDL for system of systems Initialization
Potential BML & MSDL Schema Integration for Initialization

```xml
<MSDL>…
<!-- JBML DCS OrderType -->
<xsd:annotation>
<xsd:documentation>Provides basic information that applies to all Tasks in the order</xsd:documentation>
</xsd:annotation>
<xsd:complexType name="OrderType">
<xsd:sequence>
  <xsd:element name="OrderMode" type="OrderModeType" default="SINGLE" minOccurs="0"/>
  <xsd:element name="TaskersIntent" type="FreeTextType" minOccurs="0"/>
  <xsd:element name="Task" type="TaskType" minOccurs="unbounded"/>
  <xsd:element name="OrderIssuedWhen" type="WhenType"/>
  <xsd:element name="OrderID" type="OrderIDType"/>
  <xsd:element name="TaskerWho" type="WhoType" minOccurs="0"/>
  <xsd:element name="TaskOrganization" type="msdl:TaskOrgType" minOccurs="0"/>
  <xsd:element name="ControlMeasures" type="MultipleControlMeasuresType" minOccurs="0"/>
  <xsd:element name="TargetList" type="TargetListType" minOccurs="0"/>
</xsd:sequence>
</xsd:complexType>
</MSDL>

•JBML DCS OrderType briefed at NATO MSG 056 (Dr. Mark Pullen)

BML & C2 Adapter Runtime

C-BML as part of system of systems runtime execution

- C-BML tasking:
  Command and Control Forces and Equipment
- C-BML reporting:
  Provide for Situational Awareness

C2 System

Simulation System

Robotic System
Service Orientation

Potential Services
- Initialization, Runtime, Post-Ex
- missions, orders, & reports
- planning & decision support

Questions?

Contact Info:
OneSAF Architect & MSDL Vice Chair
Rob Wittman – rwittman@mitre.org