Joint Battle Management Language (JBML) Project (Phase 1)

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Outline

• Purpose
  • JBML Phase 1 Description/Status
  • Demonstration Results
  • JBML Future Plans/Summary/Conclusions
Purpose

The purpose of this briefing is to present the results of **Phase 1** of the Joint Battle Management Language Program (**JBML**)

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- Purpose
  
  - JBML Phase 1 Description/Status

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- JBML Future Plans/Summary/Conclusions
Phase 1 Project Definition

- Lead a collaborative effort to continue core BML capability development
  - Synchronize Service, Joint and Coalition BML activities to produce a Joint BML Specification
  - Establish Joint Services and Coalition consensus on C2-Sim interoperability based on a standard C2 interchange Data Model (JC3IEDM)

- JFCOM JNTC: technical, funding, and transition partner

Phase 1 Goal

Build and demonstrate an initial Joint BML capability to transmit digital orders:
  - to Joint and Combined Forces
  - using a Battle Management Language specification
  - for Proof of Principle
JBML Phase 1 Products

- Proof of Principle for Joint Capability
  - Representative Land, Sea, Air
- Draft SISO standard
  - Including Web Service infrastructure
- Integrated into NATO MSG-048 planning

JBML Phase 1 Team Leads

- Mr. Michael Powers, TEC, Program Manager
- Dr. Mark Pullen, GMU, Project Lead
- Dr. Michael Hieb, GMU, Technical Lead
- Dr. Stan Levine, GMU, Project Manager
- Dr. Andreas Tolk, ODU, Standards Lead
- Dr. Harry Keeling, HU, Testbed Lead
- Mr. John Roberts, ACS, Ground Lead
- Mr. Curtis Blais, NPS, Maritime Lead
- Mr. David Perme, Gestalt, Air Lead
- Ms. Shea Smith, JATTL, JFCOM Coordinator
- Mr. John Kearley, DRC, Scenario Lead
JBML Service Architecture

1. WSDL
   Web Service Exchange Interface

2. XML/WSDL

3. XSD FILES

Domain Knowledge

4. API

BML Domain-Configured Service

fully defines domain language

BML Base Service

Who, What, Where, When, Why

Slide 9
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Slide 10
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JBML Service Architecture

1. WSDL
   Web Service Exchange Interface

2. XSD/WSDL
   BML Domain-Configured Service

3. XSD
   BML Base Service
   Who, What, Where, When, Why

4. API
   BML Common Data Access Software

5. SQL
   JC3IEDM Database

6. XML/WSDL
   JC3IEDM Domain Specific Extensions

7. XML/WSDL
   Defined Interfaces
   all layers include validation

8. XML/WSDL
   Reference implementation middleware common to all BML domains

NOTE: Interface 5 (push) and Interface 8 (push & pull) are provided for future use (they are not used in JBML Phase 1)

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XSD Joint CommandType

```
<xsd:complexType name="CommandType">
  <xsd:choice>
    <xsd:element name="GroundCommand" type="GroundCommandType" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="AirCommand" type="AirCommandType" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="MaritimeCommand" type="MaritimeCommandType" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:choice>
</xsd:complexType>
```

XSD GroundCommandType

```
<xsd:complexType name="GroundCommandType">
  <xsd:sequence>
    <xsd:element name="TaskeeWho" type="WhoType"/>
    <xsd:element name="What" type="GroundBMLWhatType"/>
    <xsd:element name="Where" type="WhereType"/>
    <xsd:element name="StartWhen" type="WhenType"/>
    <xsd:element name="EndWhen" type="WhenType" minOccurs="0"/>
    <xsd:element name="AffectedWho" type="WhoType" minOccurs="0"/>
    <xsd:element name="Why" type="GroundWhyType" minOccurs="0"/>
    <xsd:element name="Label" type="LabelType"/>
  </xsd:sequence>
</xsd:complexType>
```
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JBML Demo Environment
Demo Concept of the Operation

- **Army** units proceed through **Urban Areas**, seizing designated objectives and destroying enemy forces, in order to reestablish an international border.

- They are preceded by:
  - **Navy** and **Air Force** strikes on key C2 and communication nodes
  - Close Air Support strikes
  - Pre-planned Navy Tomahawk strikes
CJTF-CS Joint orders to component commanders

- JFLCC as supported commander directs:
  - 2nd ID to conduct major ground operations:
    - 1-66 CAB to re-take strategic towns, airfields, railheads, and restore border
  - JFACC will conduct offensive operations:
    - Deep strike
    - Close air support
  - JFMCC will conduct offensive operations:
    - Provide forces (air and cruise missile) to JFACC for deep strike, close air support
Gulf of Caspia Joint Operations

Joint Urban Operations Target Area

Ground Forces

Tannykular Airfield
Baku-Bina Airfield

Reagan CVSG

Lincoln CVSG

Tomahawk
Russell
Hamilton
Antietam
Santa Fe

Mobile Bay
Shoup
Momsen
Chicago

Ground Forces
Summary

- Phase 1 has been successful in developing a basic Joint integrated capability:
  - ATO, Ground OPORD, TLAM INDIGO
  - TBMCS, JTC, C2PC, multiple JSAF
- Risks/Issues have been addressed and resolved
- Basis for Coalition BML Standard

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JBML Web Service Architecture

Available at http://netlab.gmu.edu/JBML (under password control)

- Descriptive documents
  - Architecture overview
    - Domain Configured Service (DCS); BML Base Service (BBS); Common Data Access Service (CDAS)
  - Code documentation (narrative & Javadoc)
  - XSD Web service schema
  - SQL database schema

- Open source code
  - Latest version of all Web services
    - Ground, Air, and Maritime domains for DCS
    - CDAS and BBS made possible by open source bootstrap of VMASC Atomic and Composite services
  - GUI to inspect JC3IEDM database using CDAS

JBML Follow-on Phase 2

- Phase 2
  - Basic Capability for Joint Operations
    - Adequate Land/Littoral/Sea/Air for exercises
    - Initial PMESII support
    - Two-way flow between C2 and Simulation
  - Evolving standards process
    - First balloted C-BML standard
    - Proof of Principle for NATO
JBML Follow-on Phase 3

- Phase 3
  - Joint capability usable as infrastructure in systems
  - Full support for significant exercise and experimentation events
    - Both US and NATO
  - Formal SISO standards effort for family of interoperating BMLs

Conclusions

- BML is a viable technology
- BML needs more development
- Analysis of ROI is a critical next step
- Identifying “target” systems and simulations is critical to success
- Resourcing needs to be stabilized
Questions?