Joint Test and Evaluation Methodology (JTEM)

Managing Distributed Data Sets for Testing in a Joint Environment

October 17th, 2008
Purpose

Compare and contrast the data management aspects of two Live, Virtual, & Constructive (LVC) and Distributed Test Events in a Joint Mission Environment (JME):

1. AFICE (conducted in 2007)
2. JBD2 (conducted in 2008)
Processes and methods for designing and executing tests of system of systems in the joint mission environment are not well defined or understood. Nor is there a clear understanding of how to assess system performance as it pertains to capabilities supporting joint missions.

**Overall Goal:** Recommended Best Practices for a consistent approach to describing, building, and using an appropriate representation of a particular Joint Mission Environment across the acquisition lifecycle.
Evolution of Testing in a Joint Environment

2005 – MSDE
- Immature, ad hoc environment
- Little reuse; lack of DODAF artifacts
- Separate and parallel events with joint context but no complete joint mission thread
- No correlated data set

2007 – AFICE 07
- Small number of distributed sites
- Intent to reuse; some DODAF artifacts
- Separate events
- 1 joint mission thread
- Correlated data available within months

2008 – JBD2
- Many distributed sites
- IF 07 reuse; robust DODAF artifacts
- Single, integrated event
- 6 simultaneous joint mission threads; multiple customers and Service initiatives
- Correlated data available within 36 hours

Leave behinds: Capability Test Methodology (CTM) v3.0; test report; reusable environment components, measures, and DODAF artifacts; identified testing in a joint environment gaps and seams and recommended solutions
Evolution of Testing in a Joint Environment

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CTM v1.0 (Jan 07)
CTM v1.1 (Dec 07)
CTM v2.0 (Feb 08)

So what?!
“This is a hard problem!”

Max Lorenzo, JTEM Test Director

- The future of testing requires solving issues such as:
  - Implementing Live, Virtual and Constructive – Distributed Environment (LVC-DE) for a Joint Mission Environment (JME)
  - Evaluating System of Systems (SoS) performance
  - Addressing cultural differences / lexicon
Lessons Learned (1/4)

• Data Management Plan (DMP) → [LVC-DE, JME, SoS, CD]
  – Organizations have competing priorities.
  – DMP needs to be the roadmap of the test.
  – Data managers at each test site need to be dedicated to the DMP.
  – Instrumentation needs to yield automated data collection.
Lessons Learned (2/4)

• Integrated Data Reqs. List (IDRL) → [LVC-DE, SoS, Lexicon]
  – The IDRL was developed off the physical design (PD); the PD was not entirely implemented for the test execution.
  – JME needs upfront design and implementation.
  – Lack of data standardization results in analysis discrepancies.
Lessons Learned (3/4)

• Data Traceability (DT) → [LVC-DE, SoS, Lexicon]
  – Metadata needs to be clearly defined.
  – Need to verify and validate (V&V) data structures.
  – There needs to be a timely data verification process.

• Test Execution (TE) → [LVC-DE, JME, CD]
  – Data collection tools need to be robust.
  – Need to conduct thorough dry-runs.
  – Data collectors need to monitor all aspects of the test execution (visual and/or audio).
  – Need to execute authoritative JTTPs.
Lessons Learned (4/4)

• Time, Space, Position Information (TSPI) standardization → [LVC-DE, SoS]
  – World Geodetic System (WGS) vs. Global Positioning System (GPS)
  – Zulu vs. local times
  – Units

• Different Technologies → [LVC-DE, SoS]
  – Different data bases were not fused:
    • High Level Architecture (HLA)
    • Test and Training Enabling Architecture (TENA)
    • Message Handling System (MHS)
    • Distributed Interactive Simulation (DIS)
Recommendations

• Measures Framework and JME should be developed up-front [DMP]
• The instrumentation of the DMP should tie in with the JME [DMP]
• The physical design must be true to the Integrated Data Requirements List [IDRL]
• The IDRL must include joint standards [IDRL]
• Metadata must be clearly defined [DT]
• Enhance data collection and aggregation methods via V&V of Service procedures [DT]
• Thorough dry runs must be conducted early enough to allow for resolution of issues prior to STARTEX [TE]
• Data collectors must have access to all data sources impacting the IDRL [TE]
JTEM Success Stories

- Level of test complexity
- Increasing Level of effort and use of the CTM
- Reusability of test products and processes
- Data collection and reduction – speed, accuracy and fidelity
- Demonstration of mission, task, and system attribute evaluations
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