Testing Concept of Operations (CONOPS) in DoD’s Net-Centric Environment

Mr. Steve Reeder
SCRA
5300 International Boulevard, N. Charleston, SC 29418
steve.reeder@isg-scra.org
(P) 757-203-4421, (F) 843 760-3250

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We get lost in diagrams like this... don't we?

GCCS-J 4.x External Interface Architecture

External Interface – A system which provides data to, or receives data from, the GCCS.
Basic Doctrinal Requirements

DoD’s responsibility is the management of violence.

Principles of War

- **Objective**
  Clearly defined, decisive and attainable objective. Each operation must contribute to the ultimate strategic aim...

- **Offensive**
  Seize, retain, & exploit the common objectives. Means to maintain freedom of action & achieve decisive results.

- **Mass**
  Synchronizing all the elements of combat power. Mass the effects not necessarily the forces.

- **Economy of Force**
  No part of the force should ever be left without a purpose.

- **Maneuver**
  Movement of forces in relation to the enemy to gain positional advantage. Continually pose new problems for the enemy by rendering his actions ineffective & eventually defeating him.

- **Unity of Command**
  For every objective, seek unity of command and unity of effort. Unity of command means that all the forces are under one responsible commander.

- **Security**
  Never permit the enemy to acquire unexpected advantage. Protecting the force increases friendly combat power.

- **Surprise**
  Strike the enemy at a time or place or in a manner for which he is unprepared.

- **Simplicity**
  Prepare clear, uncomplicated plans and concise orders to ensure thorough understanding effectiveness.

Regardless the of Technology
First and foremost, USJFCOM is the Joint Warfighter Advocate.
Program Decision Memorandum (PDM) III, December 20, 2005, Tasked the Assistant SecDef for Networks & Information Integration / DoD Chief Information Officer (ASD(NII) / DoD CIO….

“To accelerate the provisioning & adoption of Core Enterprise Services (CES) across DoD.

In commercial industry speak, that means to start developing a System Oriented Architecture (SOA) approach for C2.
Perspective

The DoD must continue to evaluate/assess technology’s impact on the current war. And quickly adopt approaches that increase our combat capabilities

- Emerging technologies, like SOA and innovative CONOPS must accelerate, **together**
- Viable technologies must be rapidly integrated into current C2 practices, allied operations, training, and doctrine for **maximum** effectiveness
- Warfighter needs are dynamic, our coalition arrangements are unique, and the “funding-requirement-acquisition” process is unacceptable in the ‘immediate’ for the soldier on the patrol

We believe that Net-Centric Environment “e.g. SOA approach” is the next principal mechanism for enhanced Command Capability of Joint C2.
Changing the Business Model Requires:

1. Willingness to work together to leverage each other's core competencies
2. Focus on Joint Warfighter as central driver – solution need originator and evaluator
3. Commitment to providing meaningful services rather than inflexible "products"

<table>
<thead>
<tr>
<th>Where we are</th>
<th>Where we need to be</th>
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<tbody>
<tr>
<td>Familiar</td>
<td>Less familiar</td>
</tr>
<tr>
<td>What we use</td>
<td>What we use and how we use it</td>
</tr>
<tr>
<td>Technology affects on system capability</td>
<td>Technology + method + people affect on operational capability</td>
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<tr>
<td>Developers' perspective</td>
<td>Warfighter perspective</td>
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<tr>
<td>Hardware and software must be developed together</td>
<td>Materiel and non-materiel must be developed together</td>
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<td>SoS assessment</td>
<td>MCP assessment - Holistic focus on all components</td>
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<tr>
<td>- OT&amp;E focus on the system</td>
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<tr>
<td>System centric</td>
<td>Capability centric (Warrior)</td>
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Focus on Joint Warfighter's urgent operational need -- solution providers must forge a single ‘integrated’ enterprise to reduce risk in satisfaction of that need.
TRANSFORMATION EFFORTS:
- Moving away from a Soviet based system
- Moving to a professional as apposed to a conscript based force
- Moving to a capitalistic based economic model
- Moving to asymmetric warfare
- Moving to a net-centric combat capable force

At the request of Poland’s Chief of Defense (CHOD), a combined NATO and USJFCOM, Poland’s Military staff, plus Industry and Academia constructed a near term Common Operating Picture (COP).
- Constructed a near term SOA environment to integrate Poland’s Air, Land and Sea into a combined Common Operational Picture.
- Supported Poland’s role as a NATO member & US strategic partner
Poland’s Case Study

Human Processes

DUNAJ
Polish Air C2 services

LEBA
Polish Maritime C2 Services

SZAFRAN
Polish Land C2 Services

KOLORADO
Polish Land C2 Services

BRITE Web Info Services

BRITE Web Portal

Information Sphere/Information Busses

BRITE interface incorporated in every system

Automatic discovery add-ons

BRITE = Baseline for Rapid Iterative Transformational Experimentation

CHOD & Operational Command’s Critical Information Requirements
These web systems and services will have a unique combination of characteristics that differentiate them from more conventional legacy client server applications. In particular, they tend to include:

- Architecture places data at the center of its design: Enterprise Resource Pattern (ERP) & Enterprise Service Bus (ESB)
- ERP standardizes access to any C2 domain object (APIs)
- ESB publishes messages based on an event/trigger
- Rapidly changing technologies, e.g. more actors, platforms, networks, and services not applications
With the net centric approach, user engagement occurs in the “sandbox” during the combined evaluation referred to as the “piloting” events.
Integrated Enterprise Process

Requirements

- Capability Articulation
  - NECC Requirement Generation Process
  - Capability Development Plan

- Joint Program Office Systems & Requirements Engineering

Operations

- NECC Evolving Baseline
  - Mature Capabilities

- Capability Maturing Process
  - Operational Testing
  - Operational Piloting
  - Development Piloting
  - Development

Acquisitions

- System Engineering

Persistant T&E Environment

Operations

- Capability Validation and Deployment

Testing & Evaluation

Operational Testing
Operational Piloting
Development Piloting
Development
Challenge/Approach

Industries Mixed Results

Mixed Results
How has your company’s SOA/Web services adoption performed?

- 32% Fallen short of expectations
- 10% Exceeded expectations
- 58% Met expectations

Data: InformationWeek Research SOA/Web services survey of 278 business technology professionals; 229 companies using SOA/Web services
David Linthicum

Top 5 Mistakes w/ SOA,

1. Not enough trained IT/SOA architects to put on the problem.
2. “Manage by Magazine” approach to SOA.
3. Don’t understand the unique nature of their problem domains.
4. Treat SOA as a project, not a journey.
5. Unable to define the value.

Jim Green,
Designing Reusable Software,

- Types of services:
  (1) put data in, (2) get data out
- SOA & error handling => careful planning

Oh, by the way: David said, “I actively tracks 120 different SOA standards 20% to 30% are duplicative At any one point in time.”
Hub Vandervoort, CTO, Progress/Sonic

- *His Key concept was Enterprise Service Bus (ESB)*

Service Requires alignment across 4 dimensions
- Functional
- Structural
- Behavioral
- Performance

Interaction Model (-Request Reply, -Store & Forward, -Pub/Sub, -Bulk transfers)

Steve Kahn, Bearing Point
- Discussed two SOA projects (Insurance Company & Commercial packaging firm)
- Focus on the business..., technology is never enough.

Some Final Thoughts
- SOA Maturity
  - Incremental approaches work best
  - Expect to get smarter along the way
- Business Process Management and SOA
  - BPM is the ultimate enabler of return on SOA Investment
  - BPM is to SOA what a conductor is to an orchestra
  - Business processes are built from high-level composite services
  - Invoke business processes as services
- Knock down remaining impediments
- Maintain Leadership Support
Melissa Soley, BAH, Trans-National COP

- BAH Mission Engineering (ME) method is a bottom-up IER data capture approach
- Very intensive data capture approach
- Point of interest: 80% of an Intel Analyst’s time is spent simply retrieving data not analyzing.

Sean Fitts, Amber Point

- **Keys to SOA Runtime Gov’n**
  - Visibility => what is going on & who is using it?
  - Control => Actions to prevent or correct issues
  - Integrity => Ensuring changes don’t impact the whole infrastructure

**The SOA Validation Problem**

- **Business System Integrity Always at Risk**

- Service reuse creates dependencies
- Impact of any changes ripple throughout the system
  - Real impact of planned changes is hard to predict
  - Impact of unannounced or unannounced changes can be devastating
- Yet, it quickly becomes impossible to setup and replicate all dependent systems for testing elsewhere

Need way to continuously check for integrity – both in staging and in production
What is our Testing Approach?

Operational Requirements
- Subject Matter Experts (SME)
  - Operational Node
  - Activity / Tasks
  - Work Pkg
  - Info

Materiel Developer
- Subject Matter Experts (SME)
  - Performance Rqmts
  - Nodes
  - Data
  - Modules

Integrating Architectures

C2 Services Capabilities

Test Threads
- Operational Community
- System Community

Other Authoritative Sources
- Universal Joint Task Lists (UJTLs)
- Master Training Guide (MTG)

Mediation
- Governance
- Management
- Security
- Service Discovery
- Mediation
- Messaging

Reporting Requirements

Mission/Test Threads
So what did he say?

- DoD’s C2 environment has @ 7 million customers
- Our business is the management of violence
- JFCOM is the Joint Warfighter Advocate
- DoD is moving to Net Centric C2
- DoD will continue to adapt to change

- Poland’s military transformation & movement toward Net Centricity
- NECC programmatic processes
- Industries views
- NECC testing concept
- DoD is in the early stages of SOA adoption
BACKUP SLIDES
What is our Approach?

Use an Operational Mission Thread Concept

Operational Event Trace Description (OV-6c)