10th Annual NDIA Science & Engineering / DoD Tech Expo
"Reducing Technology Risk in Acquisition Programs"

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

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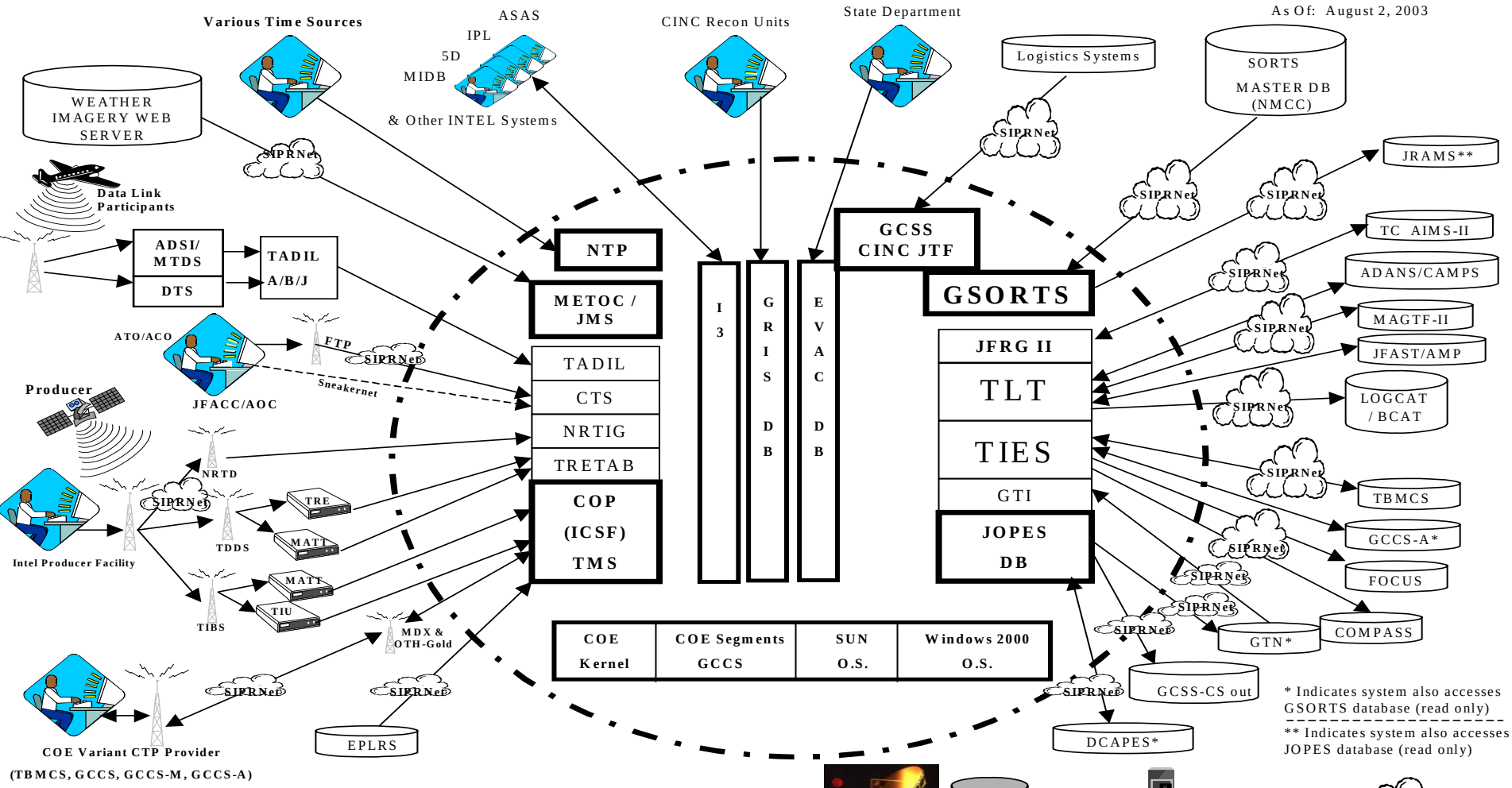
SCRA
Collaborating To Advance Technology

October 22-26, 2007

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.

Producers/Track Originators are Service/National assets

Infrastructure and Equipment is managed by Site

Comm Equipment is managed by Executive Agencies (varies)

SIPRNet is managed by DISA/ITESO

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Basic Doctrinal Requirements

DoD's responsibility is the management of violence. → **Regardless the of Technology**

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

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What USJFCOM Does to Support the Joint War

First and foremost USJFCOM is the Joint Warfighter Advocate

Concept Development & Experimentation

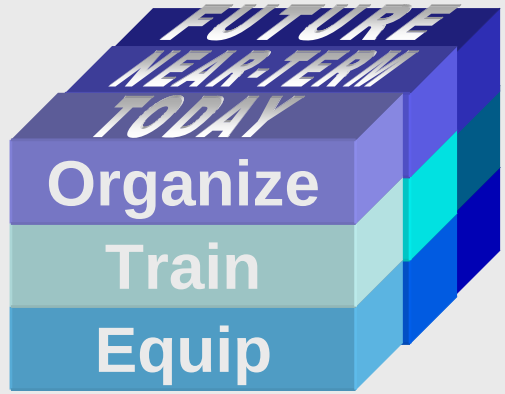
Integration & Interoperability

Training

Joint Enabling Capabilities

Joint Force Provider

Operational Analysis And Lessons Learned



JOINT CAPABLE FORCES

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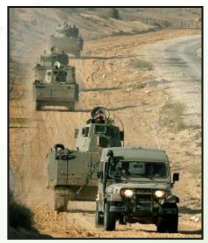
Major Mission Command & Control (C2) Capabilities Areas

FORCE PROJECTION

Joint Operation Planning
& Execution System (JOPES)



FORCE EMPLOYMENT

Air, Land, and Sea Operations
CAS Planning and Execution

SITUATIONAL AWARENESS

Common Operational
Picture (COP)

SITUATIONAL AWARENESS

ADAPTIVE PLANNING

EXECUTION

FORCE READINESS

Readiness Assessment System (RAS)

Global Status of Resources and
Training System (GSORTS)

FORCE PROTECTION

Early Warning and Integrated Air
and Missile Defense

INTELLIGENCE

Integrated Imagery Intel (I3)

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DoD's Approach to Developing Net Centricity

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.

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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, <u>together</u>
- 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.

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Changing Business Model

Where we are		Where we need to be
Familiar		Less familiar
What we use	*FOCUS*	What we use and how we use it
Technology affects on system capability	*SOLUTION*	Technology + method + people affect on operational capability
Developers' perspective	*PERSPECTIVES*	Warfighter perspective
Hardware and software must be developed together	*CENTRAL RULE or CONCEPT*	Materiel and non-materiel must be developed together
SoS assessment - OT&E focus on the system	*APPROACH*	MCP assessment - Holistic focus on all components
System centric	*CENTRICITY*	Capability centric (Warrior)

Focus on Joint Warfighter's urgent operational need -- solution providers must forge a single 'integrated' enterprise to reduce risk in satisfaction of that need.

Changing the Business Model Requires:

(1) Willingness to work together to leverage each others 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"

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Poland's Case Study

- **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**

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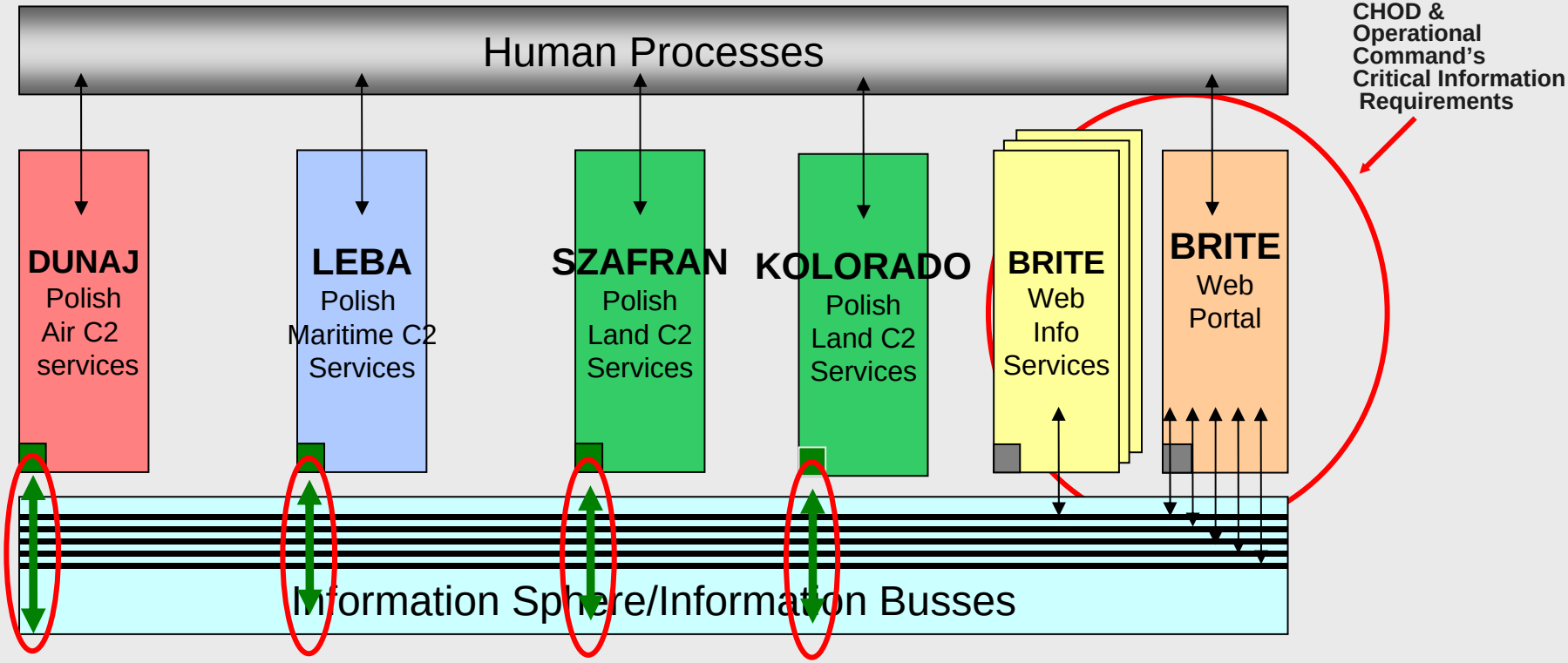
Poland's Case Study



BRITE interface incorporated in every system

Automatic discovery add-ons

BRITE = Baseline for Rapid Iterative Transformational Experimentation

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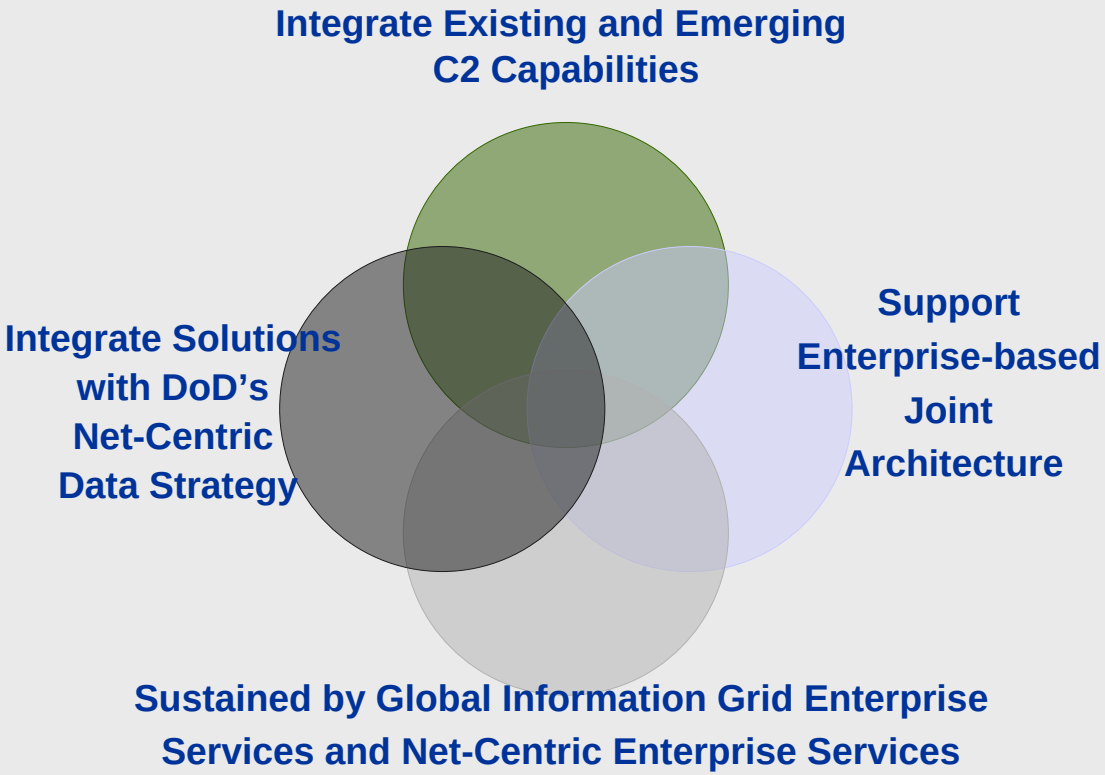
DoD's Web Services Characteristic



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

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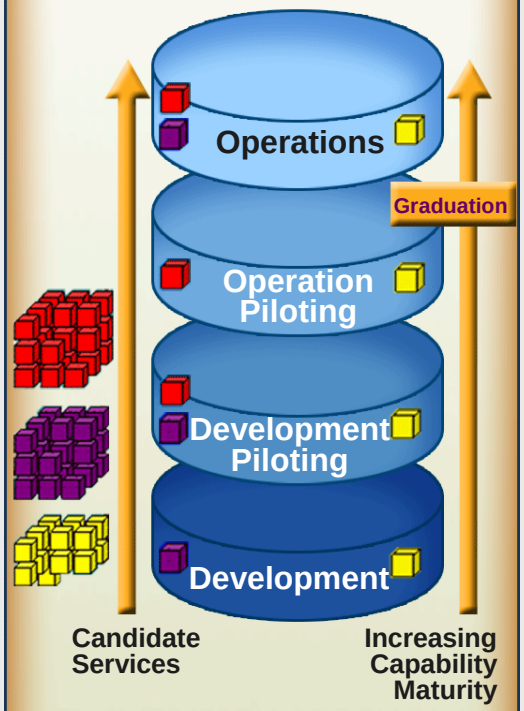
Joint Capability of Net-Enabled Command Capability (NECC)

Current C2 Systems

OTHER C2 SYSTEMS

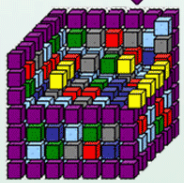
Systems Focus
Stove-piped systems
Information push



"The Sandbox"

Net-Enabled Command Capability

Systems transformed into discreet service capabilities



C2 Capabilities

Services used to support Joint 'business' processes

Operations Focus
Net & Data Centric
Information Pull

Joint Warfighters Command and Control Need Driven

With the net centric approach, user engagement occurs in the "sandbox" during the combined evaluation referred to as the "piloting" events.

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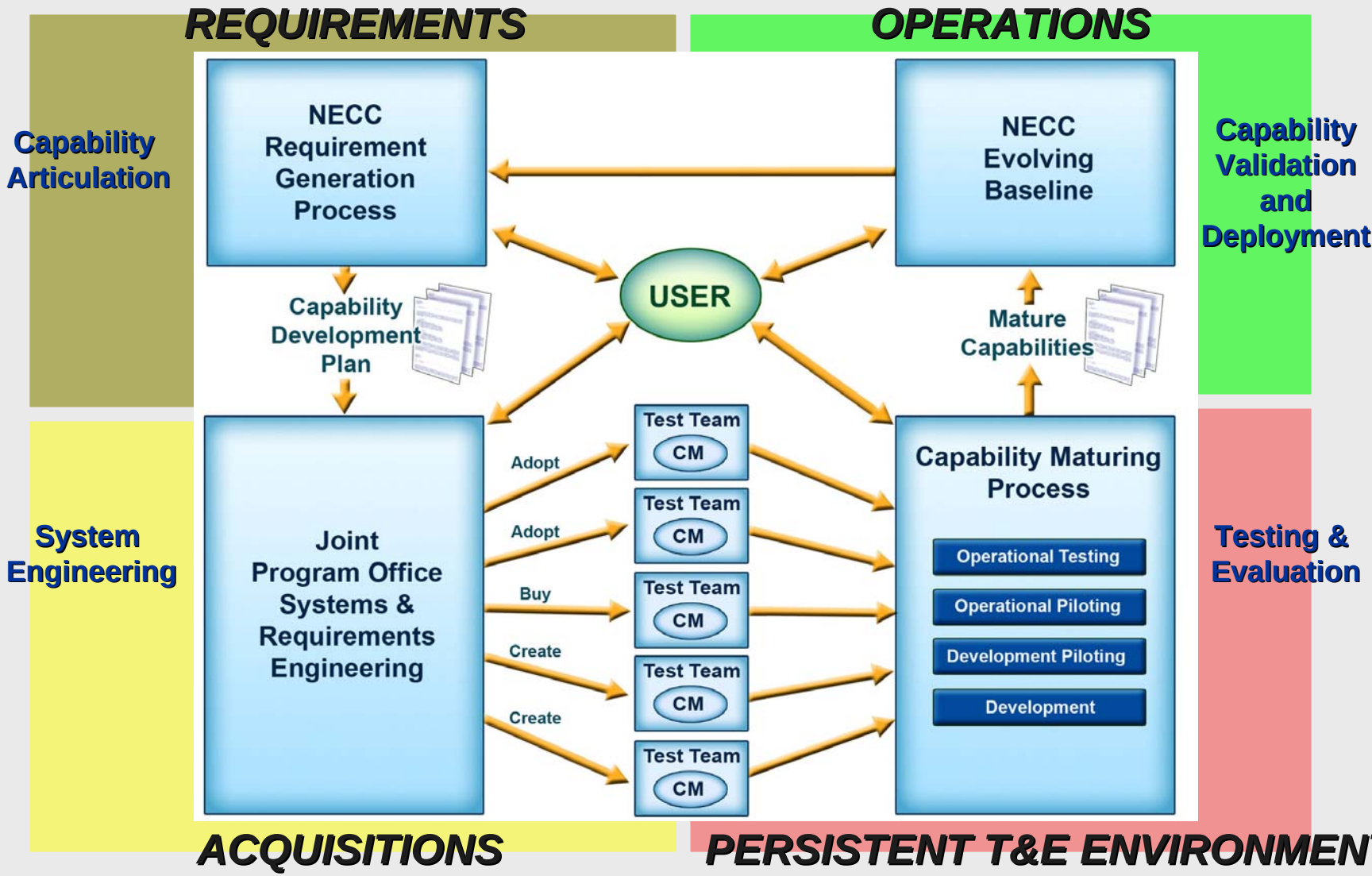
Integrated Enterprise Process



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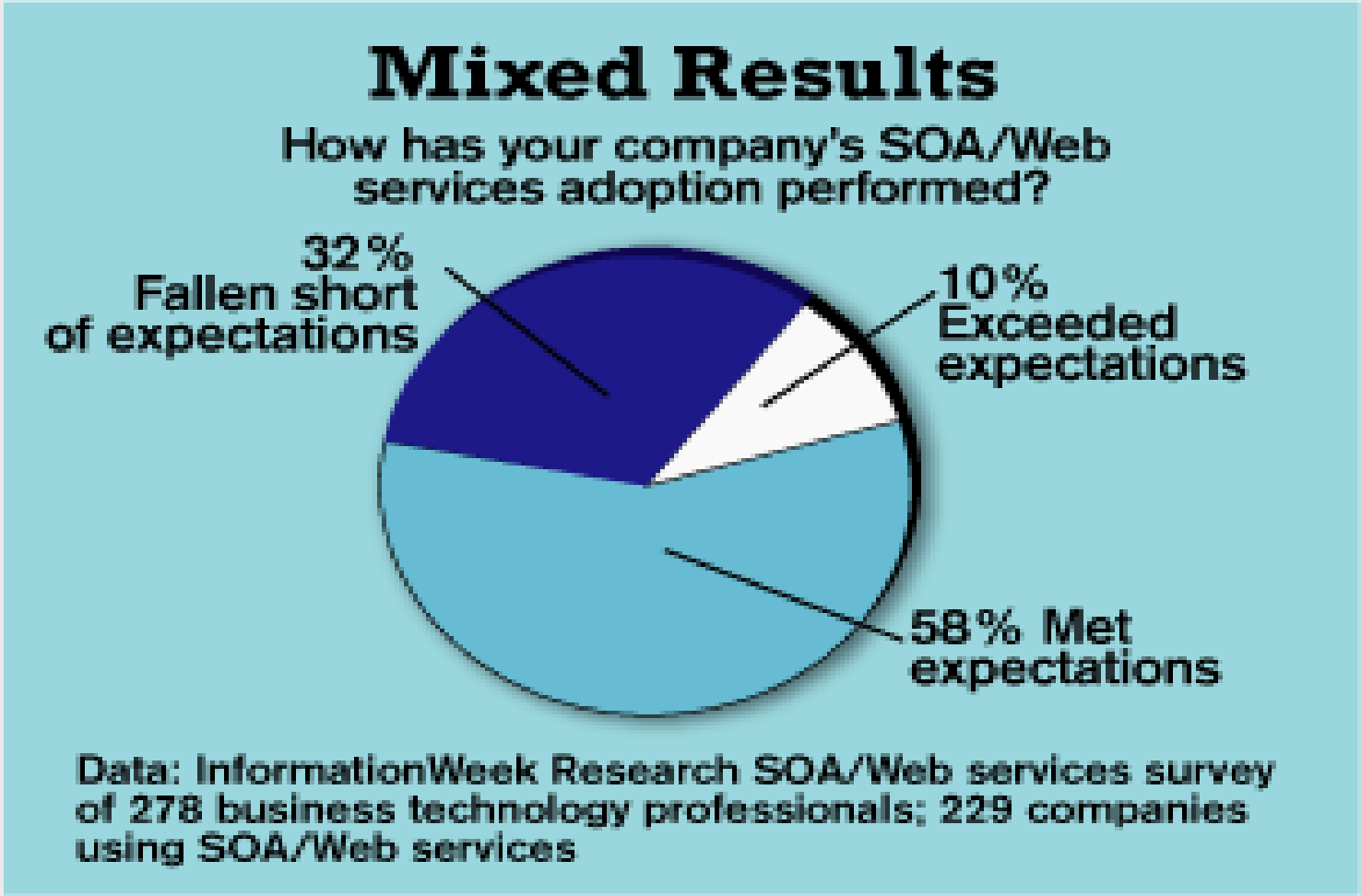
Challenge/Approach

Industries Mixed Results



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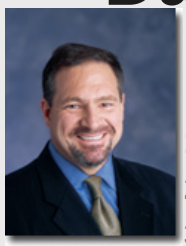
Challenge/Approach

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.

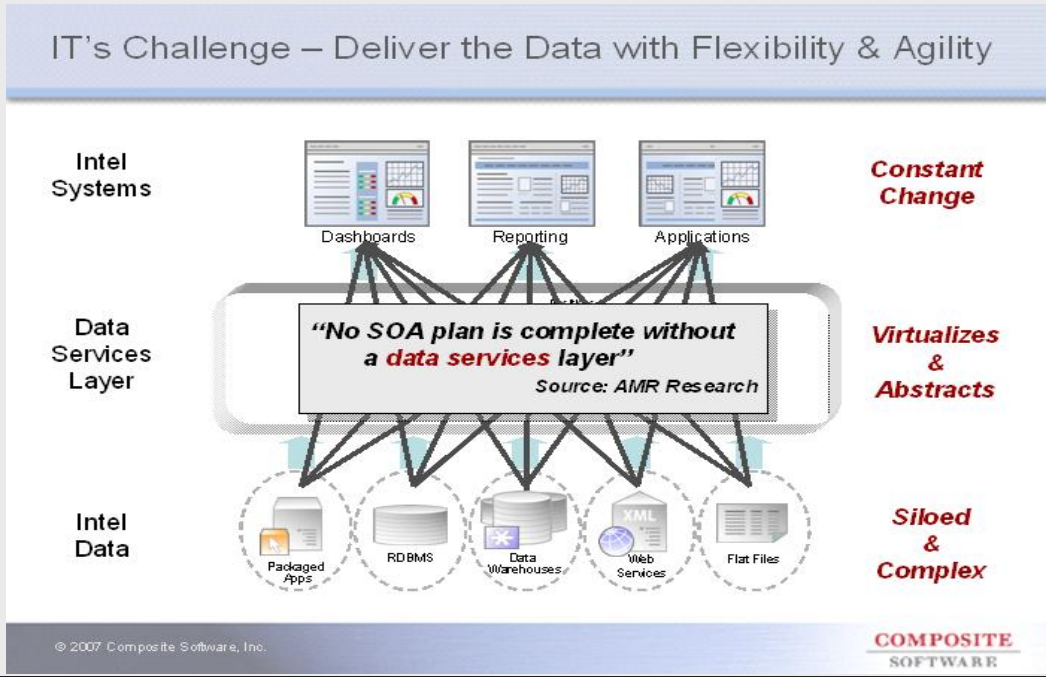
Linthicum Group

Oh, by the way: David said,
"I Actively tracks 120 different SOA standards
20% to 30% are duplicative
At any one point in time."

Jim Green,

Designing Reusable Software,

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



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Challenge/Approach

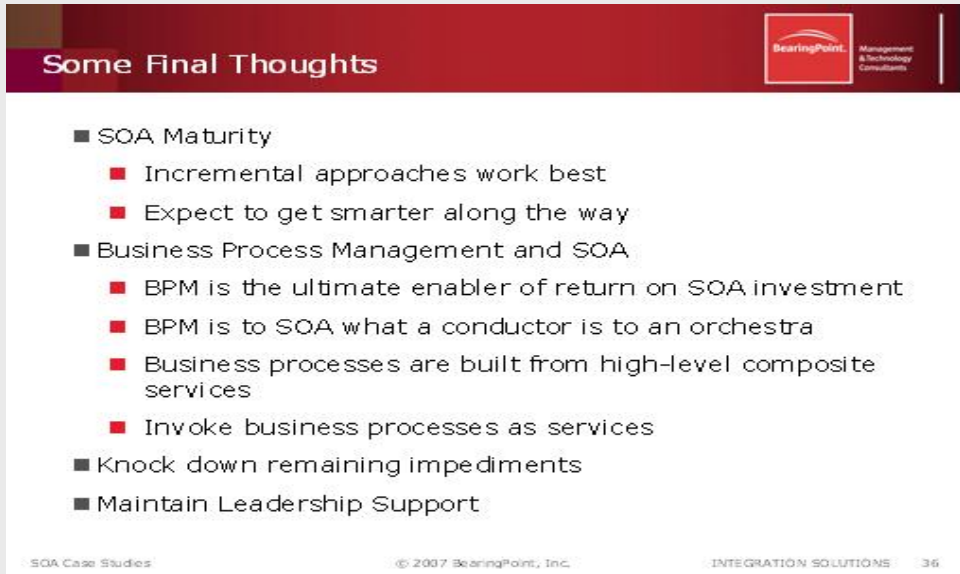
Hub Vandervoort, CTO, Progress/Sonic

- ***His Key concept was Enterprise Service Bus (ESB)***
  - **Service Requires alignment across 4 dimensions**
  - **Functional, (2) Structural (3) Behavioral (4) Performance**
  - **Interaction Model (-Request Reply, -Store & Forward, -Pub/Sub, –Bulk transfers)**

BearingPoint. Management & Technology Consultants

Steve Kahn, **Bearing Point**

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



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Challenge/Approach

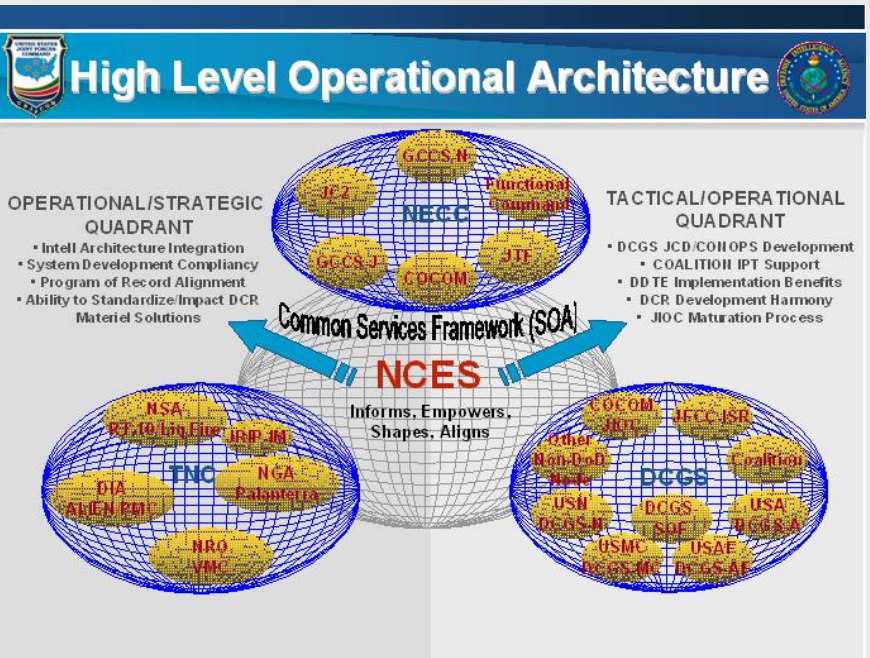
Booz | Allen | Hamilton
90 years delivering results that endure

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.**



AMBERPOINT

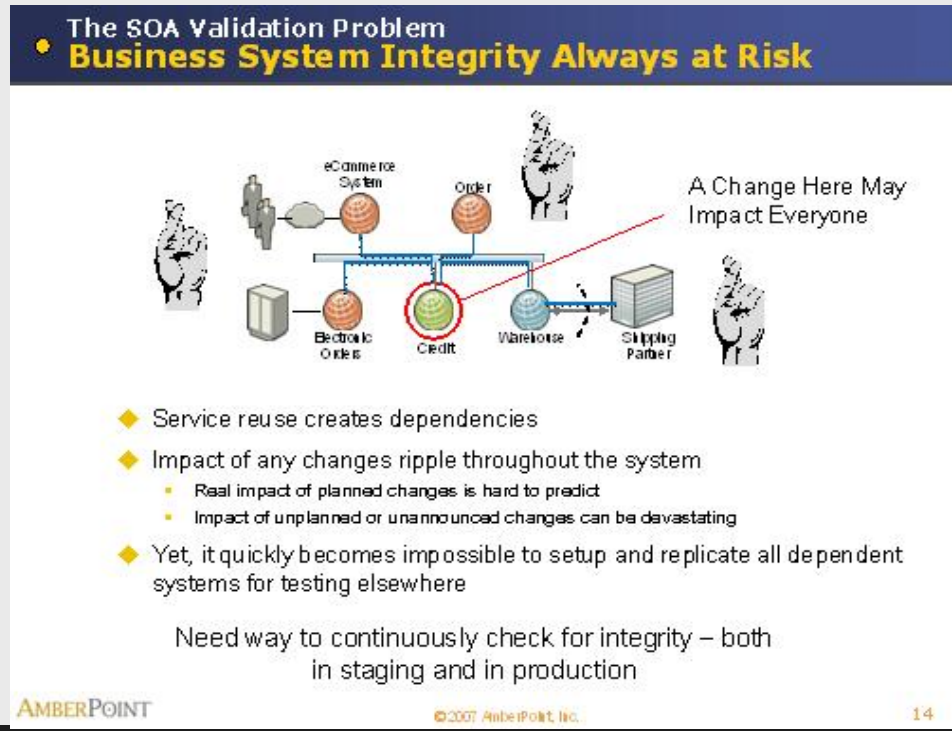
Sean Fitts, Amber Point

- ***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



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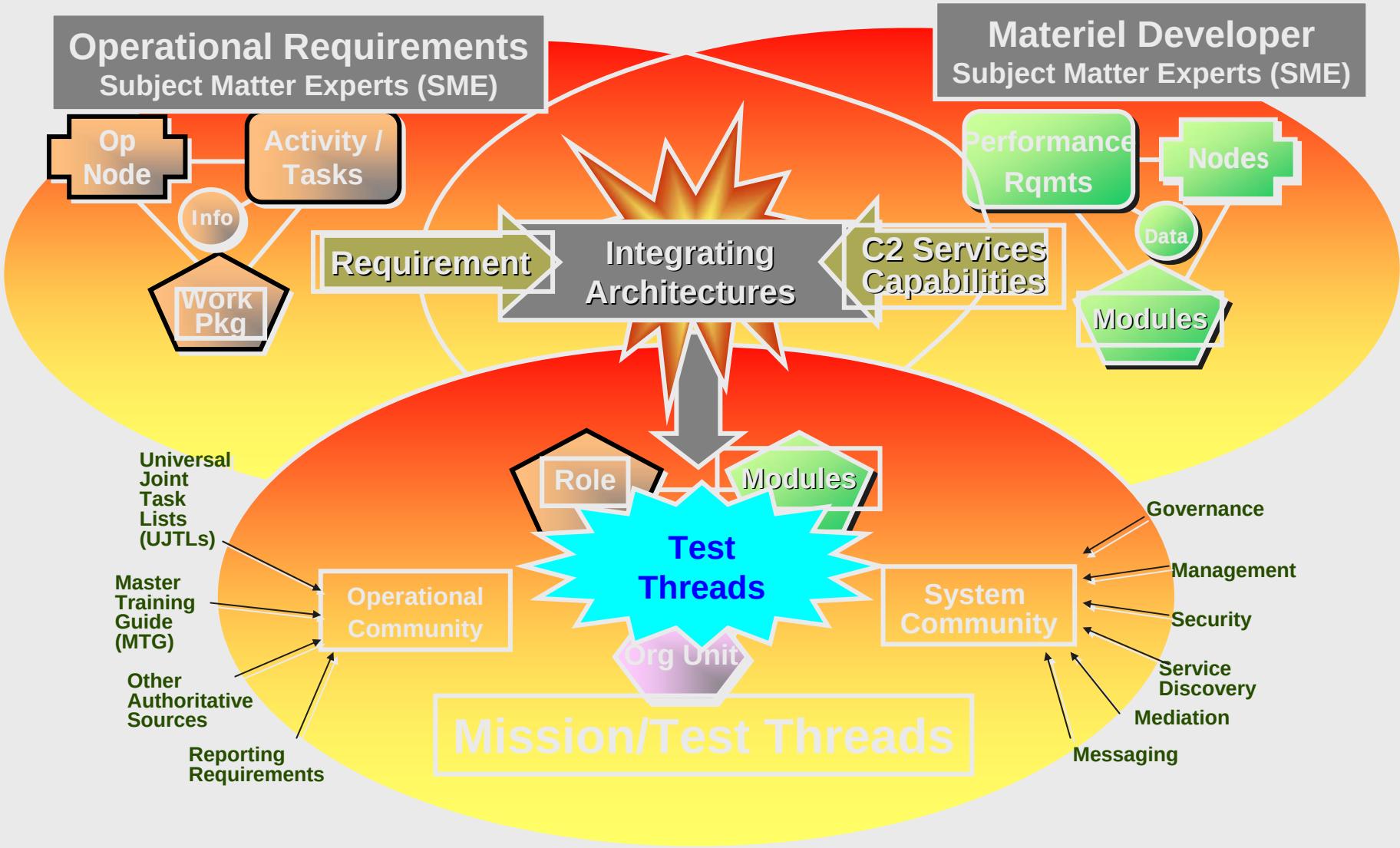
What is our Testing Approach?



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

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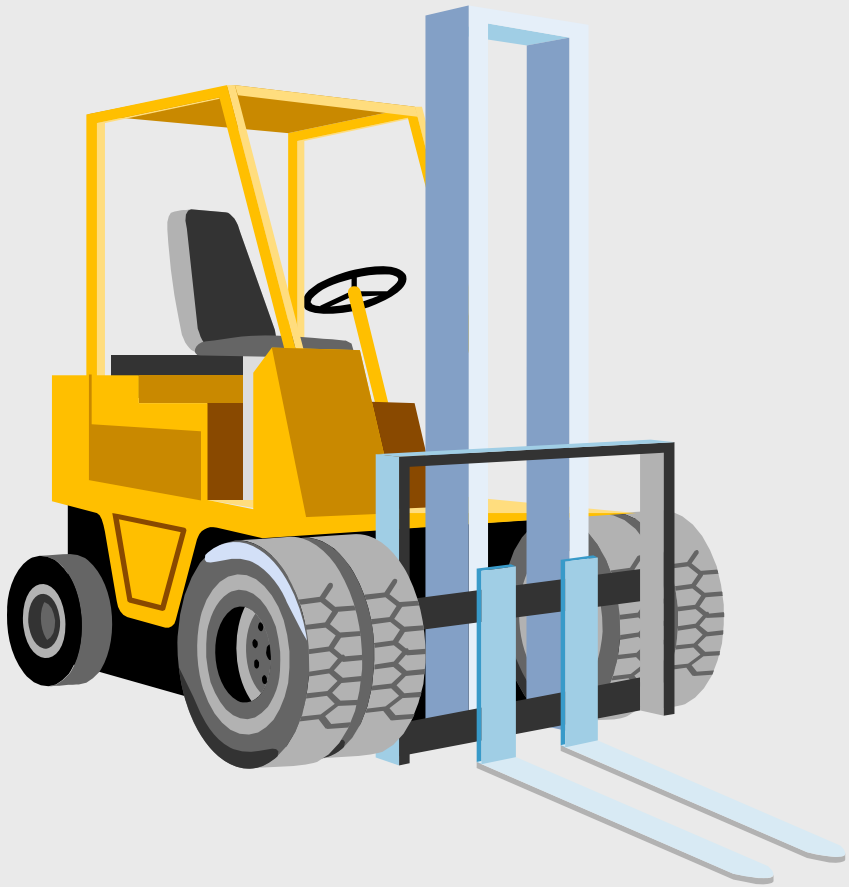
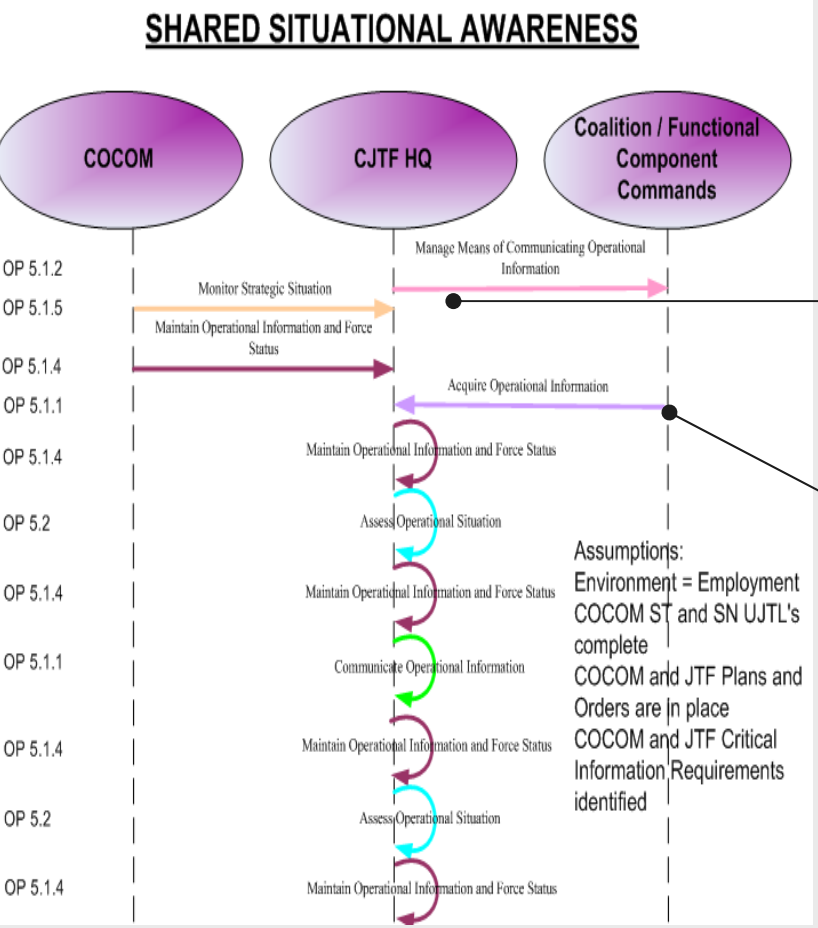
BACKUP SLIDES



What is our Approach?

Use an Operational Mission Thread Concept



Operational Event Trace Description (OV-6c)

	D	E	F	G	H	I	J	K	L	M	N	O
9	Need Line Identifier	Event / Action	Information Content	UJTL	Trigger Event	Producer		Consumer		Comm Path	Media	Control	Format
10						Sending Node	Producer System	Receiving Node	Consumer System				
15	C/CSM 5588.84D CH 1 C/CSM 5588.85A,	Task 4BHE-82 b A1.2 Administer Communications Channels	Manage means of communicating operational information	OP 5.1.2		JTF JE	DMS [Defense Messaging System]	JFHCC	DMS [Defense Messaging System]	SIPR		OPTASK COP	USMTF
17	C/CSM 5588.84D CH 1 C/CSM [illegible]	Task 4BHE-82 b A1.2 Administer Communications Channels	Manage means of communicating operational information	OP 5.1.2		JTF JE	DMS [Defense Messaging System]	JFLCC	DMS [Defense Messaging System]	SIPR		OPTASK COP	USMTF
18	C/CSM 5588.84D CH 1 C/CSM [illegible]	Task 4BHE-82 b A1.2 Administer Communications Channels	Manage means of communicating operational information	OP 5.1.2		JTF JE	DMS [Defense Messaging System]	JFMCC	DMS [Defense Messaging System]	SIPR		OPTASK COP	USMTF
19	C/CSM 5588.84D CH 1 C/CSM	Task 4BHE-82 b A1.2 Administer Communications Channels	Manage means of communicating operational information	OP 5.1.2		JTF JE	DMS [Defense Messaging System]	JSOTF	DMS [Defense Messaging System]	SIPR		OPTASK COP	USMTF
28	C/CSM 5588.84D CH 1 CDP 1-0V-2	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Blue Tracks	OP 5.1.5 OP 5.1.11		COCOM	GCCS-J	JTF	GCCS-J	SIPR		COP-S	CST
27	C/CSM 5588.84D CH 1 CDP 1-0V-2	A2 Select and Display Views	Geospatial, Objects and Tracks	OP 5.1.4		JTF	GCCS-J	JTF	GCCS-J	SIPR		COP-S	
28	C/CSM 5588.84D CH 1 CDP 1-0V-2	A3 Post / Modify Tracks	Objects and Tracks	OP 5.1.4		JTF	GCCS-J	JTF	GCCS-J	SIPR		COP-S	
57	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Blue Tracks	OP 5.1.1 OP 5.1.11		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
58	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Red Tracks	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
69	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture GroupTracks	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
70	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture UnknownTracks	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
71	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Assumptn Tracks	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
72	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture ELINT	OP 5.1.1		JFLCC	GCCS-M	JTF	GCCS-J	SIPR		CTP-18	CST
73	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Hstile Target	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	CST
74	C/CSM 5588.84D CH 1 CDP 1-0V-2	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture METOC	OP 5.1.1		JFLCC		JTF		SIPR		CTP-18	
75	C/CSM 5588.84D CH 1 CDP 1-0V-2	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture Map[s]	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	
76	C/CSM 5588.84D CH 1 CDP 1-0V-2 COP-18	Task 4B1 A B1 Collect Information from all sources	Common Operational Picture [unclear]	OP 5.1.1		JFLCC	GCCS-A	JTF	GCCS-J	SIPR		CTP-18	

Event Table

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